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CONFERENCE OBJECTIVES AND THEMES

Ecological economics has always aspired to have systemic impacts on human behaviour and institutional structures. Since its foundation in 1996, the European Society for Ecological Economics (ESEE) has combined diverse knowledge systems and disciplinary concepts and tools to foster sustainability. After two decades of scholarly work and community-building, it is timely to now reflect on our achievements and impacts.

Today’s challenges require true engagement and novel solutions from ecological economics. Academic and practitioner communities must enact meaningful participative and mutually empowering activities across disciplines and different knowledge systems. Ecological economics can contribute to generating inclusive and reflective research in a number of ways: as transformative science; as advocacy for non-human beings and future generations; as advocacy for environmental and social justice; as policy science; through understanding and promotion of broadly defined well-being; and through empirical insights and real-life impacts. Scientific and governance practices should be closely linked to the explicit spatial context of ecosystems and the biosphere, taking into account the needs of the non-human world. The 12th International Conference of ESEE aims to support this reflective and responsible turn in sustainability science in general and ecological economics in particular.

The conference will bring together diverse sets of actors who are engaged in co-producing ecological economics insights and advice for responsible and creative pathways towards sustainability. We seek to open up disciplinary boundaries through collaboration and discussion with conservation biology, environmental psychology and sociology, political ecology, social anthropology (amongst others), as well as through critical engagement and mutual learning with practitioners and local community efforts that aim to realise transformation towards sustainability. Novel socio-ecological insights and dialogues aim to encourage pathways to individual, collective and institutional change by virtue of collaboration, connection and meaningful knowledge-sharing through diverse expressions of human thought.
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LOCAL ORGANISING COMMITTEE

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The Organisers of ESEE 2017 would like to acknowledge and thank the following Reviewers for their service. Their efforts and willingness to support the Conference is highly appreciated.

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www.euroecolecon.org

www.uni-corvinus.hu

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www.routledge.com

www.nature.com
SCIENTIFIC PROGRAMME
20TH JUNE, TUESDAY

Opening Ceremony and Opening Keynote
17.00 – 19.30 Plenary room E IV.
Moderator: Eszter Krasznai Kovács – University of Cambridge, Environmental Social Science Research Group (ESSRG)

Welcome by professor Zita Zoltay Paprika, dean of Corvinus Business School
Welcome by Irene Ring, president of the ESEE
Welcome by György Pataki, chair of the Local Organizing Committee of the ESEE 2017 Conference

Collaborative practices at the science-society interface
Sara Jo Breslow
Center for Creative Conservation, University of Washington, Seattle, USA

(Sponsored by Hungarian Academy of Sciences, Centre for Ecological Research)

21ST JUNE, WEDNESDAY

Keynote Presentations – Experiments at the Science-Policy Interface
09.00 – 10.00 Plenary room E IV.
Moderator: Györgyi Bela – Environmental Social Science Research Group (ESSRG)

Globalizing biodiversity: representation, order, and the politics of knowledge
Esther Turnhout
Forest and Nature Conservation Policy Group, Wageningen University, The Netherlands

Handling the complexities of the Science-Policy Interface on different levels
Carsten Neßhöver
Helmholtz Centre for Environmental Research, UFZ, Leipzig, Germany

Parallel Session 1: 10.30 - 12.00

Ecological economics in sustainability and degrowth transformations - Room 236
Chair: Mladen Domazet

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<tr>
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<tr>
<td>Christina Plank</td>
<td>Degrowth and food sovereignty in CEE</td>
<td>Christina Plank</td>
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<td>Birte Strunk</td>
<td>Nature and Care from a Degrowth Perspective</td>
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<td>Erika Ohlund</td>
<td>Scenarios for sustainable agriculture in a degrowth Sweden 2050</td>
<td>Erika Ohlund</td>
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<td>Gergely Tóth</td>
<td>The first natural limit to GDP</td>
<td>Gergely Tóth, Cecilia Szigeti, Zoltán Pogátsa</td>
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### Studying social-ecological systems: bringing together diverse disciplines, knowledges and instruments - Room 238

**Chair: Eszter Krasznai Kovács**

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<td>Eszter K Kovacs</td>
<td>Divergent theories of change between farmers and conservationists: lessons from a year without green subsidies in Hungary</td>
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<td>Niklas Möhring</td>
<td>Pesticide use: application behavior, patterns and their determinants</td>
<td>Niklas Möhring, Robert Finger</td>
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<tr>
<td>Finn Müller-Hansen</td>
<td>Socio-ecological feedbacks in tropical deforestation and land-use intensification - an agent-based modeling approach</td>
<td>Finn Müller-Hansen</td>
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### Health and well-being: whose health, whose well-being, whose rights and whose capabilities? - Room 322

**Chair: György Pataki**

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<tbody>
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<td>Andrea Höltl</td>
<td>Energy Poverty, Health and Sustainable Housing: A Case Study in Austria</td>
<td>Andrea Höltl</td>
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<td>Géraldine Thiry</td>
<td>Incorporating Environmental and Natural Resources within Analyses of Multidimensional Poverty</td>
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<td>On urban trends, health and mosquitoes; The evaluation of welfare levels for the control of the Asian tiger mosquito in the city of Athens.</td>
<td>Antonios Kolimenakis, Kostas Bithas, Dionysis Latinopoulos</td>
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### (SpS) Positive uncertainties in megaproject evaluation - Room 326

**Chair: Markku Lehtonen**

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<tr>
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<tbody>
<tr>
<td>Markku Lehtonen</td>
<td>Contribution of institutionally-oriented ecological economics to the ‘opening up’ of megaproject evaluation</td>
<td>Markku Lehtonen</td>
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<td>Anne Bergmans</td>
<td>How stakeholder and citizen participation influences evaluation criteria for megaprojects: The case of the Belgian LILW repository</td>
<td>Anne Bergmans</td>
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<td>Ed Atkins</td>
<td>Mega-project assessments as a counter-hegemonic tool: Evidence from the Belo Monte and Tapajós hydroelectric complexes</td>
<td>Ed Atkins</td>
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### (SpS) Putting sustainable nutrition in the catering sector forward – Insights from the project NAHGAST - Room 328

**Chair: Nina Langen**

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<td>Displaying sustainability related information on meals – The role of design and information depth from a consumer’s perspective</td>
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</tr>
<tr>
<td>Nina Langen</td>
<td>Interventions to guide consumers towards sustainable nutrition out of home – the perspective of caterer vs. guests</td>
<td>Nina Langen, Emily Bauske, Ricarda Dubral, Christine Goebel, Melanie Speck, Tobias Engelmann, Petra Teitscheid, Holger Rohn</td>
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<td>Katrin Bienge</td>
<td>Usefulness of two indicator sets for sustainable out-of-home meals</td>
<td>Katrin Bienge, Melanie Speck, Holger Rohn, Christa Liedtke, Michael Lettenmeier, Tobias Engelmann</td>
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### (SpS) Developing consistent theory for social ecological economics – where do we stand? - Room 330

**Chairs: Elke Pirgmaier, Tone Smith**

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<td>Arild Vatn</td>
<td>Institutional economics – the economics of ecological economics</td>
<td>Arild Vatn</td>
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<td>Elke Pirgmaier</td>
<td>Explaining social ecological crises and dynamics. The contribution of Marx and eco-Marxists to theory development in ecological economics</td>
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### Social metabolism and systems approaches (ecological macroeconomics, consumption-production and social-ecological systems) - Room 334

**Chair: Nuno Videira**

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<td>João A. A. Santos</td>
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</tr>
<tr>
<td>Tiina Häyhä</td>
<td>Operationalising the concept of planetary boundaries</td>
<td>Tiina Häyhä</td>
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### Strategies for transformation to a low carbon economy - Room 336

**Chair:** Mária Csutora

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<tr>
<td>Ganna Gladkykh</td>
<td>Conceptualizing a Steady-State Energy System: Identifying Feedbacks, Causalities and Controversies</td>
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<td>Emilia Melville</td>
<td>Design principles for democratic, commons-based polycentric governance of energy systems in the UK</td>
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<tr>
<td>Philip A Lawn</td>
<td>How climate change mitigation and damage costs have been incorrectly calculated and grossly underestimated</td>
<td>Philip A. Lawn</td>
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<tr>
<td>Paul E Brockway</td>
<td>Measuring EROI (energy return on investment) on a national level using an Input-Output framework</td>
<td>Paul E. Brockway, Lina Brand Correa, Anne Owen</td>
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### (SpS) Ecological economics modelling and degrowth - modelling degrowth theory and proposals for prosperity and social equity - Room 340

**Chair:** Claudio Cattaneo

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<tr>
<td>Simone D’Alessandro</td>
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<td>Steffen Lange</td>
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**Poster Session 1**

13.00 – 14.00 Aula
## Parallel Session 2: 14.00 - 15.30

### Ecological economics in sustainability and degrowth transformations - Room 236

**Chair: Alexandra Köves**

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<tr>
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<td>Josef Baum</td>
<td>Current multiple challenges in Europe - Refugee question, the rise of the far right, globalisation and the socio-ecological transformation</td>
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<td>Alexandra Köves</td>
<td>Participatory methods, agency and the question of human development</td>
<td>Gábor Király, Alexandra Köves</td>
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<td>Sigrid Stagl</td>
<td>Sustainable work: Does work increase your wellbeing?</td>
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### Studying social-ecological systems: bringing together diverse disciplines, knowledges and instruments - Room 238

**Chair: Barbara Mihók**

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<td>Thomas W. Smith</td>
<td>Beyond shareholder value: using social learning and stakeholder theory to explain corporate involvement in biodiversity conservation</td>
<td>Thomas W. Smith</td>
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<tr>
<td>Nina Hagemann</td>
<td>From pledge to practical implementation: How to organise stakeholder integration in scenario development</td>
<td>Nina Hagemann, Martin Volk, Bárbara Willaarts, Annelie Holzkämper, Cordula Rutz, Martin Schönhart</td>
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<tr>
<td>Mihai Tivadar</td>
<td>Measuring environmental inequality: insights from the segregation literature</td>
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</tr>
<tr>
<td>Raphael M. Ferrer</td>
<td>What makes a community?: Resettlement and sense of community</td>
<td>Raphael M. Ferrer, Devralin T. Lagos</td>
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### Philosophical and methodological reflections: epistemology, theory and praxis - Room 322

**Chair: Judit Gébert**

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**Chair:** Gábor Harangozó

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### (SpS) Degrowth and Technology – Technological-social-ecological systems in co-evolution - Room 326

**Chair:** Petra Wächter

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### (SpS) Open and citizen science in sustainability research. Reflections on the responsible research and innovation (RRI) discourse - Room 328

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**Chairs:** Elke Pirgmaier, Tone Smith

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### Social metabolism and systems approaches (ecological macroeconomics, consumption-production and social-ecological systems) - Room 334

**Chair:** Tim Foxon

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### Strategies for transformation to a low carbon economy - Room 336

**Chair:** Mária Csutora

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**Chairs: Arnaud Buchs, Iratxe Calvo-Mendieta, Olivier Petit**

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### (SpS) Ecological economics modelling and degrowth - modelling degrowth theory and proposals for prosperity and social equity - Room 340

**Chair: Claudio Cattaneo**

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### Keynote Presentation – Ecosystem services on the ground

16.00 – 17.00 Plenary room E IV.

**Moderator: András Báldi – Director, Centre for Ecological Research, Hungarian Academy of Sciences**

**Eszter Kelemen**

*Corvinus University of Budapest, Environmental Social Science Research Group (ESSRG)*

*(Sponsored by Hungarian Academy of Sciences, Centre for Ecological Research)*

**Tibor Hartel**

*Sapientia Hungarian University of Transylvania, Romania*

*(Sponsored by Hungarian Academy of Sciences, Centre for Ecological Research)*
### Parallel Session 3: 17.30 - 19.00

**Science-society contributions to sustainability transformation: citizens science, CBR, PAR, RRI - Room 236**

*Chair: Györgyi Bela*

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### (Sp5) Linking energy and macroeconomics: which ‘energy’ and which ‘macroeconomics’? (panel discussion) - Room 238

*Chair: Lukas Hardt*

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### Philosophical and methodological reflections: epistemology, theory and praxis - Room 322

*Chair: Alexandra Köves*

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**Chair: Barbara Mihók**

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### (SpS) Governing Insurance Value of Ecosystems - Room 326

**Chairs: Eeva Primmer, Jouni Paavola**

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### (SpS) Human development and linkages to energy services - Room 328

**Chair: Paul Brockway**

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### Strategies for transformation to a low carbon economy - Room 336

**Chair: Tom Bauler**

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### Community economy, solidarity economy, social entrepreneurship - Room 338

**Chair: György Málovics**

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### (Sp5) Towards an Ecological Economics of Water - Room 340

**Chairs: Arnaud Buchs, Iratxe Calvo-Mendieta, Olivier Petit**

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22ND JUNE, THURSDAY

Keynote presentation – Values and valuation in ecological economics
09.00 -10.00 Plenary room E IV.

_Moderator: György Pataki – Corvinus Business School, Corvinus University of Budapest, Environmental Social Science Research Group (ESSRG)_

Ecological economics and nature valuation – The false promise of pragmatism, the limits of criticism and the search of a way forward
_Erik Gomez-Baggethun_
Norwegian University of Life Sciences, Norway

The IPBES view on valuing nature’s contributions to people: A step towards a pluralistic ecosystem services framing
_Unai Pascual_
BC3 Basque Centre for Climate Change, Bilbao, Spain

Semi-Plenary on Environmental Justice – Environmental Justice: Research, Movement, Metanarrative
10.30 – 12.00 Impact Hub

_Chair: György Málovics – Faculty of Economics and Business Administration Research Centre, University of Szeged_

_Environmental Justice in the U.S.: Origins, Trends, Research, Social Movement_
_Andrew Szasz_
University of California, Santa Cruz, USA

_The Construction of Environmental Justice in Latin America: Communities, cosmologies, and collaboration_
_David Barkin_
Universidad Autonoma Metropolitana-Xochimilco, Mexico

Parallel Session 4: 10.30 - 12.00

_Bringing power back in: power of science on knowledge production and use - Room 236_
_Chair: Eszter Krasznai Kovács_

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### Ethics of transformative research - Room 322

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### Natural resource management - Room 324

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### Facilitating social change and sustainability transformation - Room 326

**Chair:** Stephan Bartke

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### Biodiversity and ecosystem services in the policy arena - Room 328

**Chair:** Barbara Mihók

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### Ecosystem services: complexity, financialisation, trade-offs, valuation - Room 330

**Chair:** Erik Gomez-Baggethun

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**Chair:** Carsten Neßhöver

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### (SpS) How to define and assess needs and well-being in a degrowth perspective: debating concepts, tools and methods - Room 340

**Chairs:** Jerome Pelenc, Filka Sekulova, Ines Omann

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### Poster Session 2

13.00 – 14.00 Aula

### Parallel Session 5: 14.00 - 15.30

**(SpS) The energy trap of the green revolution - Room 236**

**Chairs:** Enric Tello, Claudio Cattaneo

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### Studying social-ecological systems: bringing together diverse disciplines, knowledges and instruments - Room 238

**Chair:** Mladen Domazet

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### (SpS) Debating work and growth. Inseparable twins? - Room 322

**Chair:** Stefanie Gerold

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### Natural resource management - Room 324

**Chair:** Eszter Krasznai Kovács

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Chair: Juha Hiedanpää

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### Biodiversity and ecosystem services in the policy arena - Room 328
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Chair: Györgyi Bela

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### Ecosystem services: complexity, financialisation, trade-offs, valuation - Room 330
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Chair: Erik Gomez-Baggethun

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### Strategies towards degrowth: increasing human well-being in a bounded economy - Room 332

**Chair:** Vincent Liegey

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### Social metabolism and systems approaches (ecological macroeconomics, consumption-production and social-ecological systems) - Room 334

**Chair:** Vera Kiss

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### (SpS) Vulnerability and conflict: implications for human wellbeing in a society embarking on degrowth - Room 340

**Chairs:** Filka Sekulova, Ines Omann, Jérôme Pelenc

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## Parallel Session 6: 16.00 - 18.00

**Ecological economics in sustainability and degrowth transformations: bioeconomy - Room 236**

*Chair: Mária Csutora*

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## (SpS) Negotiating diverging values, interests and institutions in the spatial governance of commons - Room 238

*Chair: Piotr Matczak*

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**Chairs: Leah Temper, Daniela del Bene**

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### Natural resource management - Room 324

**Chair: Barbara Mihók**

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### Facilitating social change and sustainability transformation - Room 326

**Chair: Ellen Stenslie**

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**Chair:** Györgyi Bela

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### Strategies towards degrowth: increasing human well-being in a bounded economy - Room 332

**Chair:** Judit Gébert

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**Chair:** Tommaso Luzzati

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# Strategies for transformation to a low carbon economy - Room 336

**Chair:** Gergely Tóth

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**Chair: Bálint Balázs**

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# (SpS) The role of trade in resource use across levels of scale: Conceptual and methodological advances - Room 340

**Chair: Nina Eisenmenger**

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Keynote presentation – Transformative social innovation and advocacy
09.00 – 10.00 Plenary room E IV.
Moderator: Bálint Balázs – Environmental Social Science Research Group (ESSRG)

Commons, Sustainability and Democratization – Understanding sociopolitical change and sustainability in the perspective of global political populism and ecological crises
Hans Peter Hansen
Aarhus University, Department of Bioscience, Section of Wildlife Ecology, Denmark

Transformative Social Innovation and New Economies
Flor Avelino
DRIFT, Erasmus University Rotterdam, The Netherlands

Parallel Session 7: 10.30 - 12.00

Studying meaning-making: attitudes, behaviour, cognition, emotion, norms, values - Room 236
Chair: Ines Omann

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(SpS) Theoretical and political journeys between environmental justice and degrowth - Room 238
Chairs: Federico Demaria, Bengi Akbulut, Joan Martinez Alier, Julien Francois Gerber

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*Chair: Veronika Gezik*

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### Technological-social-ecological systems in co-evolution - Room 324

*Chair: Zoltán Bajmóczy*

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### Facilitating social change and sustainability transformation - Room 326

*Chair: György Málovics*

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### (SpS) Complementing monetary evaluations by means of comprehensive environmental assessment of resources and services. The Emergy Accounting method - Room 338

Chair: Francesco Gonella

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### Parallel Session 8: 13.00 - 14.30

#### Studying meaning-making: attitudes, behaviour, cognition, emotion, norms, values - Room 236

Chair: Alexandra Köves

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### (SpS) Theoretical and political journeys between environmental justice and degrowth - Room 238

Chairs: Federico Demaria, Bengi Akbulut, Joan Martinez Alier, Julien Francois Gerber

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### (SpS) Sustaining urban ecosystem services: The multiple benefits of green and blue infrastructure - Room 322

**Chair:** Veronika Gezik

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### Reflections on justice: role of Indigenous and Local Knowledge (ILK) and Traditional Ecological Knowledge (TEK) - Room 324

**Chair:** Zoltán Bajmóczy

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### Facilitating social change and sustainability transformation - Room 326

**Chair:** Bálint Balázs

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Developing consistent theory for social ecological economics – where do we stand? - Room 328

Chairs: Elke Pirgmaier, Tone Smith

This workshop offers a platform to collectively discuss sound theoretical foundations of our community. We will discuss in a participatory way:

1) How can we build more bridges between heterodox traditions and progressive ecological economics? - i.e. What are elements of a research agenda moving forward?

2) How can we better organize this type of research in practical terms (capacity building, collaborations, funding, outreach etc.)

Ecosystem services: complexity, financialisation, trade-offs, valuation - Room 330

Chair: Gábor Harangozó

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Social metabolism and systems approaches (ecological macroeconomics, consumption-production and social-ecological systems) - Room 334

Chair: Christian Schleyer

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### Strategies for transformation to a low carbon economy - Room 336

**Chair: Mária Csutora**

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### (SpS) Complementing monetary evaluations by means of comprehensive environmental assessment of resources and services. The Emergy Accounting method - Room 338

**Chair: Francesco Gonella**

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### Conference closing
Transformative Social Innovation and New Economies
Flor Avellino¹
¹DRIFT, Erasmus University Rotterdam, Rotterdam, NETHERLANDS

Worldwide we see critiques of current economic and institutional arrangements emerging. These critiques are translated into action by initiatives promoting new ways of doing, thinking and organizing. In TRANSIT, an ongoing research project on transformative social innovation, we study 20 translocal social innovation networks in both Europe and Latin America. We conceptualise social innovation as changes in social relations, involving new ways of doing, organizing, knowing and framing. This also involves new approaches to the economy. All sorts of new economy concepts arise; green, communal, collaborative, sharing, inclusive, solidarity, social, circular and several others. Based on a comparison of social innovation networks and initiatives – such as ecovillages, Transition Towns, Impact Hub, Ashoka, RIPESS and several others – we identified four strands of alternative economy narratives: 1) degrowth and localization, 2) collaborative economy, 3) solidarity economy and 4) social entrepreneurship. In this lecture, dr. Flor Avellino shares insights on how different translocal initiatives across Europe question mainstream economy, and existing institutional constellations by creating narratives of change and shaping new social relations. We discuss the transformative ambitions and potential of these initiatives and explore their role in enabling transformative change towards a sustainable future.

To see more click here

The Construction of Environmental Justice in Latin America: Communities, cosmologies, and collaboration
David Barkin¹
¹Universidad Autonoma Metropolitana-Xochimilco, MEXICO

EJ is a relatively new concept that has become an important part of the self-identification of many communities around the world seeking to reaffirm their right to a decent quality of life while caring for their ecosystems. Although many nations assumed the responsibility to implement programs of “environmental governance” to assure these conditions for their peoples in international fora, the experience of recent decades is that both the quality of life and the environment have deteriorated with global integration and the imposition of neoliberal economic policies. As a result, numerous social and environmental movements sprung up, spearheaded by affected communities concerned about the impact of the rapid advance of international capital, attempting to control their resources, their territories and their very means of livelihood. A vivid depiction of the global scope of these actions can be readily accessed in the international online Atlas of Environmental Justice Organisations, Liabilities and Trade that a group of academics prepared in collaboration with the communities
These social movements have been particularly evident in Latin America, where there is a long-standing tradition of community activism in response to the inability or unwillingness of national governments to fulfill their commitments ratified in international treaties and conventions. This lack of responsiveness is not only for lack of money or expertise, but also rather because of a profound clash of cosmologies, of socio-political projects, and visions of how society should advance and the actors responsible for this process. The presentation builds upon this background, examining this clash of ideologies and the principles of the environment justice movement in Latin America. It emphasizes the demonstrated capacities of the communities to implement their own programs, achieving significant improvements in social welfare and environmental conservation while strengthening their ability to forge alliances among themselves and to negotiate with their governments.

Collaborative practices at the science-society interface
Sara Jo Breslow¹

¹Center for Creative Conservation, University of Washington, Seattle, UNITED STATES

We know that a sustainable future will require our collective wisdom. We know it is more important now than ever to communicate and collaborate across difference. We know that we must somehow integrate our knowledge and ideas, while navigating the incongruities in our values and institutions. But what does this truly mean for how we conceptualize and practice sustainability research? Drawing from a suite of eclectic experiments in cross-disciplinary, community-based, and arts-based collaborations, I reflect on this question by repurposing the familiar framework of the scientific paper. “Introductions,” I argue, are the place for re-conceptualizing what the problem is, how the world works, and basic assumptions about knowledge and reality. “Methods” are where we experiment with new relationships among data, theories, and people; and strive for trust and reciprocity by exposing and overcoming our biases, hierarchies, and mutual incomprehension. “Results” may be unexpected: “failures” may prove to be avenues for deeper understanding, and the relationships built through collaboration may prove more valuable than solving the problem at hand. “Discussions” are where we analyze, package, and report on the significance of our work – but for who, and why? Why restrict ourselves to the scientific paper at all? Why not break away into theatre, games, or dance, where we can engage, and inspire, so many more? In “Conclusion,” transdisciplinary collaboration is like foreign travel: it is helpful to learn a bit of the language, be respectful, and come with gifts. It is an open-ended journey that will provoke acute questions about oneself and one’s work, and how both are implicated in the metamorphoses our world needs to achieve sustainability.

Ecological economics and nature valuation - The false promise of pragmatism, the limits of criticism and the search of a way forward
Erik Gomez-Baggethun¹

¹Norwegian University of Life Sciences (NMBU), Department of International Environment and Development / Noragric, Ås, NORWAY

Nature valuation remains one of the most heated debates in environmental science and policy and it has gained renewed prominence through international initiatives like The economics of Ecosystems and Biodiversity (TEEB) and the Intergovernmental Panel on Biodiversity and ecosystem services (IPBES).

Contending views in the valuation controversy range from the endorsement of monetary valuation and market solutions as core strategies to solve environmental problems, to an outright rejection of utilitarian rationales for conservation. In between, many scientists have opted for a strategic endorsement of monetary valuation as a pragmatic short-term tool to communicate the value of
biodiversity using a language that reflects dominant political and economic views. The ‘pragmatic case’ for monetization has created a rift in the sustainability sciences, dividing ecological economists among those who accepted valuing nature in monetary terms as a pragmatic choice and those who rejected it on methodological, ethical and political grounds (Gómez-Baggethun and Ruiz-Pérez 2011; Kallis et al. 2013). While ecological economists agree to the idea that the costs from environmental degradation needs more visibility in governance, the way in which these costs should be valued and articulated in policy remains a major source of controversy (Gómez-Baggethun and Martín-López 2015).

This presentation discusses two major developments in the debate on environmental values and valuation. First, monetary valuation is losing hegemony in ecosystem service assessments, as growing attention shifts towards value pluralism, incommensurability and non-monetary valuation approaches (Martínez-Alier et al. 2002; Chan et al. 2016; Jacobs et al. 2017; Pascual et al. 2017). Second, this shift takes place within a broader ontological drift, where instrumental values of nature gain prominence over intrinsic ones as attention shifts from biodiversity to ecosystem services (Spash and Aslaksen 2015). We discuss the role of ecological economics in these developments and the key challenges ahead. It is noted that, while ecological economics has succeeded in promoting value pluralism as a foundation for global ecosystem assessments, it has fallen short at mainstreaming valuation frameworks that meaningfully incorporate i) notions of environmental justice (Phelps et al. 2015), and ii) links to ecological thresholds and planetary boundaries, ultimately failing to breakdown the case for an expansionary economy premised on the axiomatic necessity of growth (Gómez-Baggethun and Naredo 2015). We conclude by pointing to possible steps and alliances that ecological economics can make to promote valuation frameworks that encourage environmental justice within safe planetary boundaries.

Key words: Values, valuation, ecosystem services, biodiversity, commodification, growth

Commons, Sustainability and Democratization – Understanding sociopolitical change and sustainability in the perspective of global political populism and ecological crises

Hans Peter Hansen¹

¹Aarhus University, Department of Bioscience, Section of Wildlife Ecology, DENMARK

With the election of Donald Trump as president of the United States, what we refer to as Modernity has suffered yet another setback. Beliefs in and enlightened concepts of science, human rights and equality, progress, secularization and democracy have proven to be more fragile than we anticipated. We might ask ourselves if Modernity ends up to be just a short historical epoch? The “Donald Trump phenomenon” is the so far latest manifestation of an ‘anti-establishment’ and ‘anti-democratic’ global trend which also illuminates the internal contradictions and destructive forces of Modernity itself. The question faced by society is twofold: 1) How do we make sense of this new historical situation? and 2) How do we meet the societal threats from this new Trumpist era and renew our societies politically, economically and ecologically, without ‘throwing the baby out with the bath water’ with regard to the positive contributions from Modernity? Departing from my own theoretical inspiration from critical theory, I will share some possible answer to the first question. As an attempt to suggest some possible answers to the second question I will share some practical research experiences that create potential ‘openings’ for sociopolitical and ecological transformation – not ‘openings’ as final fixed solutions but as avenues for developing new sociopolitical cultural practices.

To see the case study click here
Ecosystem services on the ground - promises and pitfalls

Eszter Kelemen1, Tibor Hartel2
1Corvinus University of Budapest, Environmental Social Science Research Group (ESSRG), Budapest, HUNGARY; 2Sapientia Hungarian University of Transylvania, ROMANIA

The concept of ecosystem services (ESs) has risen to prominence in science and policy discourses. As ESs are being recognized, assessed and applied widely in sustainability approaches, the connotations and values associated and the applicability of the ESs framework are continuously being debated. How ESs are perceived in a real-life world by different actors? How society aspirations influence the perception and application of ESs concept? What can the specific CEE view provide to the Western European academia and practice? Can ES be our magic tool or should we rather start a search urgently for a new one?

Our keynote speakers represent conservation biology and ecological economics disciplines. As experienced trans- and interdisciplinary researchers, Tibor and Eszter will share their perspectives and on-the-ground experiences with the challenges of using the 'ES language' among local communities and regional policy makers. The plenary will cite case studies and include stories from the rapidly changing Central and Eastern European landscape, giving a strong CEE focus.

Handling the complexities of the Science-Policy Interface on different levels

Carsten Neßhöver1
1Helmholtz Centre for Environmental Research - UFZ, Dep. of Conservation Biology & Science-Policy Expert Group, Leipzig, GERMANY

Calls to increase the interactions between diverse knowledge holders to support evidence-informed policy-making have been growing over the last couple of decades. At the same time, decision-making and action on the environment, from local to global, seem not to hold pace with its growing problems. Most discussions about this revolve around the challenge of environmental policy implementation competing with other policy interests and how evidence may “compete” in this context. So, science-policy interface (SPI) activities have to take note of this new settings and need to take new forms in order to stay relevant.

In my talk, I will reflect from a practical perspective on these challenges, outlining which new elements are needed at the interface to help make a difference, including (a) inclusion of different forms of knowledge, (b) improving the transparency and role of interface processes, (c) the diversification of knowledge synthesis methods in this context and, finally (d) the role of networking and communication across different knowledge domains in science and beyond. These reflections will be based on insights gathered in recent research on SPIs in Europe in the SPIRAL project, insights from active engagement in the TEEB and IPBES processes and the implementation of a new SPI approach on the European level via the EKLIPSE mechanism, an “experimental” attempt to take these new elements serious.

The IPBES view on valuing nature’s contributions to people: A step towards a pluralistic ecosystem services framing

Unai Pascual1
1Basque Centre for Climate Change (BC3), Bilbao, SPAIN

Since the publication of the Millennium Ecosystem Assessment in 2003, the term ecosystem services (ES) has witnessed an enormous growth in the scientific literature, and in the application of conservation and development policy support tools, e.g., assessments, scenarios, and instruments, e.g., Payments for Ecosystem Services (Muradian et al., 2013). This is also reflected in the journal of the international society for ecological economics (ISEE). In fact, Ecological Economics has published
more than 500 papers (and cited more than 17,000 times) since 2003, with no year showing a decline in publication numbers. This is remarkable if we compare it with the times concepts such as ‘valuation’ or ‘sustainability’ appear in the title or abstract of papers published by the journal over the same period, ca. 700 and 800 times respectively (ca. 60-70%). In other words, the community is increasingly continuing to debate, refine and apply the concept of ES and it does not seem this trend will decline any time soon. This is also evidenced by the interest in valuation of ES as a precondition for designing policies for environmental sustainability (ca. 250 papers or about half of the papers on ecosystem services in Ecological Economics, 2003-17).

Perhaps, since the Costanza et al paper in Nature two decades ago, valuation continues to appear as one of the most contentious topics, also in ecological economics. Year after year the regional and international societies of ecological economists attest to this and the 12th ESEE meeting will likely be no exception. In order to enrich this debate, in this keynote talk I will introduce the vision of IPBES with regard to valuing so-called nature’s contributions to people (NCP), a more encompassing term than the one of ecosystem services, which can sometimes act as limiting metaphor for social transformation towards sustainability (Norgaard, 2010; Pascual et al., 2017a), and recently endorsed by the Fifth Plenary of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), in March 2017. IPBES, established in 2012, is an ambitious intergovernmental global science-policy effort to promote knowledge on the diversity of life on Earth, and its contributions to people. IPBES explicitly recognizes the centrality of institutions and governance systems for the evolution of social-ecological systems (Díaz et al 2015) as well as the need of scientific interdisciplinarity and giving voice to multiple other knowledge systems, including those based on traditional, local and indigenous practices. To date more than a thousand experts, including many ecological economists, have been involved in the work of IPBES on a voluntary basis.

The IPBES vision on values and valuation has been enriched by multiple disciplines and schools of thought, including those from ecological economics, philosophy, ecology, etc. as well as those working on indigenous local knowledge systems, conservation practitioners and many decision makers over the last few years (UNEP, 2015; Pascual et al., 2017b). What is most relevant about the approach IPBES has decided to take on valuing the diversity of so-called NCP? After highlighting a few features of the notion of NCP, I will mention just two main general principles explicitly recognized by IPBES: First, valuation requires the recognition of a broad range of worldviews and thus the need to express and respect the ways through which people ascribe meaning and importance to nature, NCP and different constituents of a good quality of life. This clearly calls for promoting social equity in valuation around three dimensions: recognition, participation and distribution of benefits and burdens from value articulation (Pascual et al 2014; Zafra-Calvo et al., 2017). This also means promoting the idea of the diversity of conceptualisation of values, often associated with instrumental, intrinsic and relational views on nature (Chan et al., 2015). In turn, this involves having the ability to overcome paralysis in the face of value pluralism. Second, valuation requires recognition that the incorporation of values and valuation methods into decision making processes are themselves value-laden. Thus, one must recognise that valuation is potentially subject to manipulation due to existing unequal power relations in society, which in turn implies that valuation cannot be abstracted from a politicization process. Together these two principles suggest the growing intellectual influence of ecological economics about value pluralism over the last decades. I think that this is a promising sign and one to continue nurturing.

References


Environmental Justice in the U.S.: Origins, Trends, Research, Social Movement

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In the United States, “environmental justice” is both a social movement and an increasingly sophisticated field of research for social scientists. A local protest by African Americans, opposing the proposed siting of a toxic waste landfill in their community, in Warren County, North Carolina, 1982, is widely considered the founding event. In one sense, that is correct. Warren County focused researchers’ attention on the environmental dimensions of class and race/ethnic inequalities. Warren County also triggered a wave of EJ protests throughout the nation. I review important trends in EJ research and I discuss the development of the EJ movement.

There is more, though. The origins of the modern world, the whole historical transition from feudalism to capitalism, can be re-narrated as an environmental justice story: the dispossession of the European peasantry; the creation of two new, intensely hazardous human environments, the factory and the industrial city; the social and environmental transformation of societies forcibly turned into colonies. And if one extend the definition of EJ in these ways, it is possible to see that the EJ movement predates Warren County by more than a century: Workers’ fighting for the shorter working day and for safer factory conditions; decades-long struggles to clean up the early industrial city. In this light, EJ is not just a movement and not just a field of research; it can be considered a new metanarrative about some of the deepest, most characteristic features of contemporary society.
Governance of ecosystems and responsibility for the provision of natural insurance

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Centralized states and science have something important in common: they both require order to function. This is one reason why, in spite of the many complaints about the supposed gap between science and policy, they actually get along very well in many areas. One of these areas is biodiversity conservation. Here, various elaborate classification systems function as technologies of order, making possible the political treatment of specific, scientifically sanctioned, conservation priorities and preferences. In this talk, I will draw on examples in Ecosystem Services literature and on the Global Assessment of biodiversity and ecosystem services, which is currently being developed under the auspices of IPBES (the Intergovernmental Panel on Biodiversity and Ecosystem services) to illustrate how biodiversity knowledge and global biodiversity governance are made to align in practice. Specifically, I will demonstrate what orderings are at work to enable the global representation of biodiversity and how, at the same time, these orderings are continuously tweaked and resisted. I will conclude by discussing these simultaneous practices of ordering, tweaking, and resisting as sites where the politics of biodiversity knowledge plays out and, consequently, also as the sites where the democratization of biodiversity knowledge may take shape.
Developing a Polanyian-Gramscian Framework in Explaining Environmental Movements (or Lack Thereof)
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We have been indeed witnessing increased environmental problems in the contemporary era of globalized capitalism and extension of markets to the environment. To such problems, numerous societal responses—local struggles, NGO’s, state-level or international initiatives—are being given; yet at the same time there exist an equally large amount of such problems where concerns are not pronounced (Ehrenberg 2011). Among the theoretical attempts in understanding societal responses (or lack thereof) to environmental issues, the Polanyian and Gramscian frameworks have been noteworthy—especially since the beginning of the 21st century (Adaman et al. 2003; special issue Geoforum on Gramscian Political Ecologies 2009; Ekers et al. 2013, Prudham 2013) Although a synthesis of these two names at a general level is available, thanks to the path-breaking work by Burawoy (2003), we do not have a well-worked theoretical synthesis of these two names as applied to environmental issues. It is the aim of this paper to provide a theoretical toolbox drawing upon both Polanyi and Gramsci in order to analyze society’s position vis-à-vis environmental issues.

The contemporary political-economy landscape is marked with growing importance gained by environmental issues—at local, national as well as global levels—that are manifested in three interrelated aspects in particular. The first one corresponds to processes of commodification and marketization that are extended to the domains of natural resources and environmental management (Arsel and Büscher 2012; Castree 2008). Secondly, this is coupled with the fact that the environment is being intimately enrolled in states’ political agendas, not only in terms of policy-making, but also in the more integral sense of state-making (Whitehead et al. 2007; Asher and Ojeda 2009; Bridge 2014). Finally, social struggles around a wide range of environmental issues, waged at multiple scales from the global to the local, and even the individual, gain increased visibility and become forces that push forward transformations towards sustainability (Tamiotti and Finger 2001; Doherty and Doyle 2006).

As the social struggles over the environment proliferate and diversify, it has become even more pertinent to develop theoretical and analytical perspectives that can help us better understand their multiplicity, multi-dimensionality and multiple trajectories, as well as their absences. Different disciplines and fields of study, including but not restricted political ecology, ecological economics, critical geography and environmental sociology, have offered important insights as to the economic, social, ecological and political processes that underlie specific struggles, and in which they are embedded, as well as to the discourses and strategies that diverse social actors (including institutions) deploy to advance their environmental claims.

Our aim in this paper is to contribute to these studies by offering a coherent analytical framework to analyze environmental struggles that brings together the approaches of Gramsci and Polanyi. More specifically, we propose that Polanyi’s perspective of a double movement between the expansion of the self-regulating market and the counter-movements to resist its depredations, and Gramsci’s conceptualization of the dialectics of capitalist hegemony and counter-hegemony can be fruitfully combined to locate environmental struggles within the broader historical process of capitalist development and the diverse social struggles against its excesses.

Building on Polanyi’s analysis of the market and the society (Polanyi 1944), environmental struggles can be understood as responses to the broader disembedding of the economy from the society and nature, and the institution of an economic logic in the governance of the environment through its commodification (Adaman et al. 2003). Polanyi was one of the first figures pinpointing the inherent
tendency for capitalist production to undermine the ecological conditions on which it depends for its continued existence. By drawing attention to the dislocations and tensions that the disembedding of the economy from society and nature cause, Polanyi pointed out the conditions for the emergence of environmental struggles. However, Polanyi’s approach falls short of accounting for the ways the capitalist exploitation and commodification of nature are sustained and sanctioned. Moreover, although for Polanyi the resistance to the commodification of nature would mainly come from the old landed interest, in today’s world, environmental social movements and especially local initiatives have indeed assumed that very role; and for that matter his insights seem to remain partial in explaining the multiplicity of social actors that mobilize around environmental concerns, the different directions these mobilizations take, and the strategies and discourses they deploy.

We argue that bringing Gramsci’s work on civil society, especially its dialectic relationship with the state, into a dialogue with the Polanyian framework promises to address these issues. Gramsci (1971) was mainly concerned with understanding how power relations are produced, maintained and challenged in capitalist societies. For him, civil society, understood not as separate from and opposed to the state, but organically connected to it, is not only the terrain on which hegemony is established, but also where it is contested (Buttigieg 2005), hence it contains both possibilities and constraints for social transformation. Gramsci conceptualizes social struggles in the sphere of civil society to challenge hegemony through the metaphor of “war of position”, which denotes the struggles aimed at “a disorganization of consent, a disruption of hegemonic discourses and practices” (Carroll and Ratner 1994: 6), as well as building of new conceptions of the world, and new social and economic relations. Although Gramsci’s own writings do not explicitly deal with the question of environment, building on his theoretical insights, it can be argued that environment is deeply implicated in the construction of hegemony, and environmental struggles are part of the “war of position” in civil society. Such a perspective will provide an elaborate framework that can shed light on the political dynamics at work in environmental struggles.

We posit that the integrated Polanyi-Gramsci framework can provide a useful theoretical lens to analyze environmental struggles, on the basis that the former perspective explains why societies would limit the scope of the homogenizing rationality of self-regulating market economies, and the latter offers an articulate treatment of the ways in which state and society interact to shape the specific contents, forms and trajectories of environmental struggles. More specifically, Polanyi provides an explanation as to why various segments of societies are growing increasingly more frustrated about the commodification of nature, while Gramsci offers a systematic understanding of the power struggles on the terrain of state and society relations through which commodification of nature is legitimized, imposed, accepted and resisted. We argue that by combining both, we can better explain the political dynamics in environmental struggles, and examine their role in changing the unequal power relations within which decisions regarding the environment are made.

While the main purpose of our paper is theoretical, we draw on selected examples of environmental struggles from around the world to demonstrate how the integrated Polanyi-Gramsci framework that we propose can shed light on their complex dynamics. Specifically, we discuss the struggle against a large-scale copper mine in the Intag valley of Ecuador, the conflicts triggered by the proliferation small-scale hydropower plants in Turkey, the struggle against privatization of water in Cochabamba, and the NO TAV movement against the building of a high-speed railway in the Susa Valley.

References
Conceptualizing Work for a Social Ecological Transformation

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With the world grappling with multiple crises, calls for a social ecological transformation gain momentum. Given the relevance of work in social systems, any transformation needs to address society’s understanding and organization of work. Work is at the core of considerations of social welfare, consumerism, and the provision and creation of the means to satisfy needs. Moreover, work, as one aspect of (re)productivity, affects all interactions among humans and between humans and their environment. Here we agree with Biesecker and Hofmeister (2010) when they point towards work as the root of the current multi-dimensional crises. Consequently, work practices need to change dramatically for a social ecological transformation to succeed (Räthzel and Uzzell 2011). Such a revaluation of work practices has to challenge the very notion of work used by scholars and policy-makers in meaning- and decision-making. The central question we therefore address in this contribution is: Which conceptualization of work can contribute to a social ecological transformation? In our contribution, we define work as a human (re)productive activity that satisfies needs through mediating between human, social and natural (re)productive processes. More precisely, we first define work as a mediator between economic productive and natural as well as human reproductive processes. Biesecker and Hofmeister (2010) present a framework that fits this purpose very well. Their framework, termed (Re)productivity, shows the limitations of separating economic processes into segmented stages such as production and consumption. Instead, (Re)productivity covers all economic processes at once and insists that each of them incorporates both the natural as well as the human sphere. Moreover, the authors show that sustaining (Re)productivity requires conceptualizing each economic activity to entail both natural and human (Re)productivities. However, Biesecker and Hofmeister are not explicitly concerned with work as an activity, but focus on (Re)production. One part of their concept, human (Re)productivity, refers to the (Re)production of value by humans; hence, the creation of value through humans. We propose to understand this as the
sphere where work takes place. Such processes happen in each economic stage, and hence work does so - e.g. in the case of mining raw materials, caring for children, manufacturing computers or composting food waste. This helps us to illustrate that there is no clear distinction between production and consumption, as both contain (Re)productivities, that is, processes of mediation between humans and nature.

Second, we define work as an activity, a ‘doing’, that satisfies human needs, based on the human scale to development approach (Max-Neef, Elizalde and Hopenhayn 1991). Herby, we built on others (e.g. Blustein et al. (2016) and Spencer (2014)) who propose “satisfaction of needs” to be the goal of any work, but without further specification. We therefore put forward that work is any kind of satisfier that in Max-Neef’s framework falls within the realm of ‘doing’. The focus on doing is crucial: having work can also be a satisfier, or being a worker. However, focusing on doing emphasizes the conduct and the operation itself, opening up the space for considerations of quality and quantity of work.

Third, a social ecological transformation is not only concerned with individuals, but prescribes considerations of society’s and nature’s (re)productivities. In order to address these in the context of work, we introduce the concepts of contributive justice (Sayer 2009) and planetary boundaries (Steffen et al. 2015). The former addresses interactions between individuals who work and the societies they are embedded in, while the latter concerns their interaction with global biophysical processes. Both concepts allow addressing social (re)productivities and natural (re)productivities in a comprehensive manner and hence are useful for our endeavor of conceptualizing work for a social ecological transformation.

Finally, we employ the concept of work specified above to discuss developments in climate and labor policies in Denmark and Sweden. Both countries are internationally recognized for their socially inclusive labor market policies as well as progressive environmental policies. In both countries we find a lack of concern for interactions between human productivity and reproductivity, as well as human and natural (re)productivities. Independently of human, social or environmental (re)productivity, both countries privilege monetized (re)productivities over non-monetized (re)productivities. One reason is that both countries target social cohesion, and thus inclusion of individuals in society through quantitatively equal contributions to (monetized) economic processes, without particular concerns of qualitative aspects. Moreover, in Sweden labor market participation is a primary means for social inclusion, sideling other means such as community work (Isenhour and Feng 2016). In the same vain, Denmark’s ‘flexicurity’ model shifts away from providing security and thus negatively effects the satisfaction of needs through non-monetized means. Subsequently, the provided insights suggest that work in both countries only satisfies parts of the nine needs outlined by Max-Neef (1992).

Further, despite their ambitious and partly successful climate change policies, neither of the countries integrates work with environmental policies and hence both countries sideline the interactions of human and natural (re)productivities in work policies. One example is the approach outlined above that addresses social cohesion through labor market policies. In Sweden these policies led to protests against mining operations in the name of creating employment, while little concern was given to means to satisfy needs other than wage-labor, and to creating social cohesion. Moreover, In both countries the downgrading of social rights legitimizied through conceptualizing work as having instead of doing fosters the countries’ dependence on economic growth, and neglects the latter correlation with embedded CO2-emissions.

Having in mind the goal of a social ecological transformation, the proposed concept of work reveals a need for additional steps towards integrating human, social and environmental concerns, despite the seemingly positive performance of both countries.

References:
Thinking Alternative Economic Models of Post-capitalist/Socialist Structures from the Viewpoint of Ecological Economics

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As a distinct paradigm comprised of the laws of thermodynamics, the co-evolutionary perspective, and the means of managing uncertainty and complexity within economics (via the concepts of “post-normal” science, “procedural rationality” and “deliberative institutions”), ecological economics has been operationalizing a number of models and techniques to observe the ecosystem’s stability and resilience, measure progress towards sustainability, and engage with decision making since its inception (see, e.g., Adaman et al., 2012). In that inquiry, it has successfully demonstrated the biophysical limits of economic activities and produced alternative indicators of depicting socio-economic processes.

In the more recent decades, the growing dialogue and alliance between ecological economics and political ecology (Martinez-Alier, 2003; Martinez-Alier and Muradian, 2015; Perreault et al., 2015) has been important in highlighting the role of broader political-economic settings in mediating the interaction between economic processes and environmental dynamics. Capital accumulation, commodification, neoliberalism, power relations, inequalities, state-society relationships, politics of knowledge are among the many issues that analyses informed by such a dialogue/alliance have focused on while dealing with economic/political/social aspects of ecological problems (see, e.g., Arsel and Buscher, 2012; Adaman and Madra, 2014; Gerber and Gerber, 2017f).

In a somewhat parallel way, a productive debate on alternatives to move towards socially just and sustainable futures emerged within the field. One particular proposal within this context that has received significant attention, both academically and politically, is degrowth (see, e.g. D’alisa et al., 2014), arguing that the environmental load of growth economies will inevitably bring about environmental devastation even if “green” approaches/technologies are applied, and hence, advocating a reduction in production and consumption activities through a radical reorganization of economic relations. The concrete proposals associated with degrowth include the use of alternative (biophysical) indicators to GDP to depict and assess socio-economic performance of countries, introduction of income ceilings and universal basic income, reforming the tax system to account for the use of energy and resources, and supporting alternative/solidarity economies.

Yet, ecological economics have by and large fallen short (with a few exceptions, see, e.g., Kallis, 2011; D’alisa et al., 2014) of discussing the political and socio-economic framework within which such proposed changes are materialized—i.e. global corporate capitalism under neoliberal governance structures. And ipso facto, the discipline has not so far put its full attention on discussing alternative
economic models either in a post-capitalist or a socialist society/community. Given that in different contexts alternative forms of organizing economic relations and activities as well as decision-making processes towards embedding the economy within the society and nature (in the parlance of Polanyi, 1944; see also Adaman et al., 2003) are being experimented with, the need for ecological economists to engage with the political economy of non/post-capitalist economies emerges as an important task (Adaman and Devine, 2017f).

The aim of this paper is to systematically evaluate emerging alternative economic models (be they formal or not) of post-capitalist and socialist structures from the viewpoint of ecological economics. More specifically, the paper will try to provide an exposition of available alternative approaches along the premises of ecological economics, i.e. whether they can be categorized as compatible with the basic premises of ecological economics—the laws of thermodynamics, the co-evolutionary perspective, and the means of managing uncertainty and complexity within economics. Within this context, the allocation mechanism (markets versus planning; monetary versus non-monetary) and the issue of governance (hierarchical versus centralized versus participatory structures) will be the keystones of the evaluation of post-capitalist applications (such as alternative/local currencies, barter and alternative exchange networks, cooperative production units) as well as various socialist models.

References

Sustainable urbanization? Urban structures and urban nature in promoting subjective well-being
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The factors of good life seem to be rather similar for everyone, and multiple studies report a relationship with health, family status, employment, income, and age (Kahneman, Diener, Schwarz 1999; Blanchflower 2009). However, there is no such a uniform understanding about the well-being effects of spatial factors. Literature on subjective well-being (SWB), for example, reports so called
rural-urban well-being gradient (e.g. Easterlin, Angelescu, & Zweig, 2011; Berry & Okulicz-Kozaryn, 2011), meaning that urban residents tend to self-report lower well-being scores than their rural counterparts. However, in some cases, the results are contradicting, especially when it comes to relationship between density and SWB (e.g. Dolan et al., 2008). Furthermore, it has been suggested that the link between subjective well-being and spatial variables depends on the context, and for example, Kyttä, Broberg, Haybatollahi, and Schmidt-Thomé (2015) and Leyden, Goldberg, and Michellbach (2011) suggest that e.g. the easiness of service access and availability of public transport can lead to varied well-being outcomes depending on the urbanity of the setting.

The on-going urbanization and discussions about the effects of sub-urban sprawl makes the comparisons of, and within, different types of urban structures highly relevant, and planning for better urbanization calls for using more sophisticated and detailed descriptions of the actual living environments. The public discussions tend to be vigorous especially when talking about the relationship between densification and preservation of urban green spaces, which have also been connected with well-being and urban sustainability promotion (Van den Berg et al., 2007). However, there seem to be mostly separate streams of literature devoted to well-being effects of density and those of green spaces.

We study the effect of residential location and its features on self-reported overall life satisfaction. Our data was collected using the softGIS methodology, a public participation GIS (PPGIS) method that combines online questionnaires with interactive maps (Brown and Kyttä, 2014). In softGIS, participants give their answers as geographic data or as answers to more traditional survey questions. The survey provides information on various background variables of the respondents, as well as on well-being and attitudes among information about the exact residential location. The sample size is 898 respondents living in Helsinki Metropolitan Area (HMA) in Finland, all from 25 to 40 years of age. The utilized method of analysis is ordered logistic regression. Life satisfaction is measured as answer to question “how satisfied are you with your life as a whole these days?” on a scale from zero to ten. In addition to information gathered by the PPGIS survey, we use external datasets, which allow for controlling for multiple neighbourhood characteristics that have been found to affect subjective well-being, such as density at different spatial scales and the share of the unemployed and share of people living in owner-occupied housing. The information is at very detailed scale, at either at level of 250 x 250 m grid of cells, or the level of neighbourhoods, which average area is 3.1 km2.

The main contribution is to shed light on the spatial nature of urban well-being, and provide information about the well-being effects of different urban zones, types of residential areas and structures, green spaces, as well as on the effect of socio-economic characteristics of the neighbourhood. The results imply that socio-economic structure of the neighbourhood as well the perceived safety of the area are more important for subjective well-being than the spatial characteristics per se. However, some interesting insights that support planning for well-being promoting urban environments are found, and they could be used to support decision making, and, for example, help in identifying the most “efficient”, in terms of well-being, locations for urban green spaces.

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How to sustainably manage commons that are mobile and spread over large areas? This question is crucial to solve water management problems. For example, in South Western France, numerous watersheds experience long-term water misbalance, but political incentives to collectively design management plans have failed in many parts to bring out solutions that were both socially-accepted and effective (Debril & Therond, 2012). This is the case in the downstream portion of the Aveyron watershed, an agricultural landscape in which irrigated productions (maize, fruit, seeds) dominate but also where water use restrictions occur each year because of insufficient water flows. To operate changes, it appears necessary to consider and assess various management alternatives, which may challenge social conventions and bring issues of acceptability into play, before their implementation. Hence, we decided to develop and implement a multi-actor multi-criteria assessment of quantitative water management alternatives in this study area.

The problem of water quantity management we tackle comprises challenging features, which are shared by other contemporary natural resources management problems:

(1) It is a complex problem. Social and ecological systems interact at various levels (the field, the farm, the collective irrigation unit, the little watershed, the broader watershed, etc.) and also various points of views and representations exists that are not always compatible.

(2) It is a problem about commons. Many different users (farmers, fishermen, inhabitants, non-humans etc.) use a common-pool resource (Ostrom et al., 1999). These uses do not only lead to changes in resource availability (subtractability), but also in water quality and allocation/availability across spatio-temporal scales.

(3) It is a problem about spatial commons, because the relationships between the resource and the resource-users entail a spatial dimension (Moss, 2014). The distribution of water in space is a structuring element for farming decisions and water regulations; conversely, the way cropping systems are distributed in space and regulation perimeters delineated strongly influences the water resource availability and dynamics. Furthermore, water is a “fugitive resource” (Giordano, 2003); consequently, benefits diminish while costs grow from upstream to downstream users.

We opted for a method based on collective deliberation to account for the complex and common nature of the problem (Vatn, 2009). We added a spatial aspect to account for the spatial dimension of the water management problem but also to foster exchanges and produce new knowledge. The method followed 5 steps: (1) Problem structuring that consists in defining the alternatives of water management (scenarios) to be compared, the criteria and indicators for evaluating the scenarios, and the relevant participants; (2) Evaluation of each scenario, i.e. attribution of values to indicators, primarily through model simulations; (3) Assessment of scenarios by participants; (4) Analysis of the results and (5) collective discussion.

This presentation will focus on step (1), and more specifically on the spatial dimension of the chosen indicators. In deliberative multi-criteria assessments, indicators have two roles: describing the criteria and the alternatives, and facilitating the expression of normative judgments (Frame & O’Connor,
While the criteria of assessment were identified by means of interviews with diverse stakeholders, indicators describing the selected criteria were defined by experts in workshops. We explicitly requested experts to specify the spatial and temporal extent and resolution of indicators, the way to estimate their value and to present them.

As the expert workshops are still in process, we observe two tendencies in the indicator set (more definitive results will be available for the conference):

(1) It seems that a minority of indicators are spatially-explicit.

(2) Spatially-explicit indicators seem to be linked to specific sets of criteria.

Those two preliminary observations are then followed by a question: under which conditions can indicators be spatially-explicit, both in terms of feasibility (possibility to map out values), and relevance (does it make sense to map them out)?

First, we can distinguish different cases of indicators that are not spatially-explicit: non-spatial indicators (e.g. the percentage of the total water management cost assumed by each water use); spatially-implicit indicators, which are expressed and only meaningful at the landscape level but whose calculation require spatially-explicit variables (e.g. metrics of landscape heterogeneity); and aggregated indicators, which are evaluated at fine resolution and then aggregated to be expressed at the landscape level (e.g. the average treatment frequency index for the landscape).

Following the analysis of our indicator set, we will discuss the reasons explaining the predominance of non-spatially-explicit indicators and their distribution in our criteria grid. Four main reasons are offered:

(1) Aggregation processes, which are of special relevance for “fugitive commons” (Giordano, 2003) such as water. For instance, the water flow at the main river outlet is an indicator that aggregates information for the whole watershed. Such aggregative indicators constitute useful and used references to help to compare management alternatives.

(2) Complex processes, resulting from numerous and cross-level interactions. Changes in one part of the system can lead to non-linear effects that are difficult to apprehend, e.g. on water quality, on biodiversity or on employment. As a result, experts often resort to indicators loosely coupled to the criteria expressed by stakeholders, such as “pressure” indicators. This weak significance of indicators makes them then more relevant at an aggregated level than at fine resolutions.

(3) Not “mappable” relations of humans to space. As a map displays a standardized from-the-top view of space, it does not necessarily account for social, esthetic or symbolic relationships people create with places or spaces. For example, some experts judged that “horizontal representations” of the landscape would better capture features of landscape identity than a map.

(4) Inferring social rationality. Experts qualified indicators that would match the commons and landscape-level nature of the problem. It possibly led them to avoiding representations reflecting individual interests, such as farm-resolution representations that would have been easier to map. They rather favored “overall” representations or differentiations (e.g. according to farm archetypes) that do not necessarily require a spatial zoning.

Reasons (1) and (2) relate to the question of how to describe the system at stake in the most informative way, while reasons (3) and (4) rather relate to the question of producing an information that is in line with the needs of the participants to express a judgment (c.f. Frame & O’Connor, 2011). To conclude, we expect that this analysis will help to provide new insights on the extent and conditions at which spatialized multicriteria assessments fit management problems regarding spatial commons.

References:

Energy transition on the periphery: the case of solar, wind and nuclear electricity in Hungary
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The Energy Roadmap of the European Union lays out an ambitious plan to achieve 80-95% reduction of greenhouse gas emissions by 2050 compared to the 1990 level. This is unimaginable without a fundamental transition of energy systems. Until now, the fastest change in several European countries has been observed in the electricity sector. The most widely discussed example is Germany where renewable sources provided almost 33% of the electricity in 2015, up from less than 7% in 2000. The speed of change has also been impressive in Denmark, Sweden, Spain and Portugal. Other member states, however, are moving much slower. For instance, several countries in Central and Eastern Europe have added very little renewable capacity so far, especially neglecting intermittent renewables which have the largest growth potential.

Hungary is an excellent example: its combined per capita electricity generation from wind and solar sources was the lowest in the EU in 2014. Exploring the causes of this and the possible ways forward can help to understand whether and how electricity transitions could be accelerated. Such exploration can provide interesting insights because – seen from a distance – Hungary does not look like the most inhospitable place for wind and solar energy within the EU. There are many more sunny hours than in Germany where solar is booming, the per capita technical potential of onshore wind energy is not substantially below the EU average, and the load factor of existing wind turbines are similar to those in other European countries. Likewise, the low level of investment cannot be easily explained by economic factors because Hungary is not the poorest country in the EU. Romania and Bulgaria, where the average income is much lower, had more than five times higher per capita production from wind and solar in 2014. Furthermore, Hungary imports approximately 30% of its electricity (third highest share in the EU after Luxembourg and Lithuania) which could be a good reason to develop renewables. In official communications, the government seems committed to reduce energy dependence. So what explains the low penetration of wind and solar energy in Hungary? A particularly fierce competition with nuclear energy, especially since the 2014 decision to build two new nuclear reactors before 2030? Or high investment risks due to possible sudden or retroactive policy changes? Or governmental aversion against intermittent renewables? Or a combination of these? Perhaps something else? A further interesting question is how low production from intermittent renewables would affect national and European energy policy goals if there were large investments in nuclear energy. Which goals would be served and which goals would be jeopardized by such pathways? A systematic analysis of these questions can be informative for at least three reasons. First, a deeper understanding of Hungarian energy policy can be important to assess the opportunities and constraints of different low-carbon scenarios at the national level. Second, identifying country characteristics or mechanisms that slow down the adoption of wind and solar can be relevant in other countries. For instance, other peripheral member states of the EU may face similar challenges due to historical, technological, economic and political similarities. Third, better understanding interactions between the national and the European level of energy policy making in a country that often goes against the mainstream European opinion can be interesting as such vocal disagreements increase in Europe. This article combines three approaches to explore the political economy of solar, wind and nuclear
electricity in Hungary. First, it collects relevant information on the electricity system, the history of its development, governmental strategies and public attitudes. The focus is on the period 2000-2015 because solar and wind electricity generation were negligible earlier. Similar studies of other countries (e.g. Germany) proved that the combined analysis of technological, economic and political developments can deliver useful insights. Since available information and literature on Hungary is more limited than that on core countries, two other methods are used to complement the analysis. As a second approach, the coverage of solar, wind and nuclear energy is reviewed in the archives of origo.hu, one of the most popular Hungarian online news portal from 2000 to 2015. On the basis of more than 1600 articles it is possible to reveal the level of media interest in different areas, how it changed, and whether public attention and discussions preceded or followed policy decisions. Third, the paper builds on 21 interviews conducted with key stakeholders and experts in 2016. This part helps the interpretation of past developments and the description of pros and cons in various future scenarios. Agreements and disagreements between experts reveal the strengths and weaknesses of different narratives. The article concludes by integrating insights from the three approaches.

Is time a more pluralistic measure for valuing 'nature' than money?

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Contingent valuations have been widely applied to measure willingness to pay (WTP) for ecosystems and biodiversity conservation. However, WTP measures may misrepresent or obscure values that results from non-instrumental relations with ‘nature’ (e.g. emotional, ethical, spiritual or aesthetic values). Indeed, in WTP studies some people reject expressing the importance of ‘nature’ through a monetary measure, grounded on ethical or justice concerns. Because these kind of answers do not represent the homo economicus rationality, they are considered as ‘protest answers’ and are usually excluded from WTP analysis. Recently, willingness to give up time (WTT) in activities for ecosystems and biodiversity conservation has been developed as a non-monetary valuation approach. Scholars have shown that WTT studies can result in less protest answers and that respondents tend to prefer WTT than WTP donations. In this research, we will compare the extent in which WTP and WTT measures allow the articulation of plural values of ‘nature’. Specifically, we will analyze and compare i) the plurality of values expressed in people motivations for donating money or/and time for ecosystems conservation and ii) the ethical positions and socio-economic conditions embedded in both WTP and WTT protest answers. We applied 589 surveys in Otún Watershed in the Colombian Andes, covering both rural and urban population. A content analysis will be applied to classify the plural values expressed in the stated motivations of WTP and WTT for Otún ecosystems’ conservation. Then, we will apply descriptive statistics to compare the plurality of values across WTP and WTT motivations. Finally, we will apply a multivariate analysis (e.g. logit models) to analyze the factors that influence protest answers of WTP and WTT. We hope our results and discussion contribute to the development of valuation methods that are ontologically and epistemologically suitable to express the multiple- and also non-western- ways in which people relates and care about ‘nature’.
The 21st century has witnessed a boom of hydropower project construction across the globe. Similar to other megaprojects, the construction of a hydroelectric complex often takes the form of a long-term interaction between coalitions of public-private interests, which place large-scale energy projects on the government agenda, and multi-stakeholder opposition networks. The result of this competition is that such projects become representative of wider debates of economy and ecology, with individual licensing decisions becoming “crucibles for the airing of giant social conflicts that really should be settled in other ways” (Hochstetler & Keck, 2007: 45-46).

The Belo Monte and São Luiz do Tapajós hydroelectric projects represent two of the most contentious mega-projects in modern Brazil. The debates surrounding these projects exist at the apex of a number of the tensions that dominate modern Brazilian politics, including: energy security, environmental sustainability, economic growth, and the rights of non-traditional communities. Power asymmetry within these contests often results in the limitation of the resources available to movements against such projects. However, within the cases of the Belo Monte and São Luiz do Tapajós complexes, opposition groupings have sought a new method of criticism - the provision of alternative project evaluations – as a tool against the projects.

The completion of an Environmental Impact Assessment (EIA) - designed to profile the environmental and social impacts of megaproject construction and provide an evaluation of both the costs and the benefits of project completion - is a central part of the process of megaproject construction in contemporary Brazil. However, opposition movements have focused criticism of such schemes on these processes of project evaluation. Methods are questioned, motivations condemned, and the accuracy of EIAs has provided an opposition tool to illustrate the problematic nature of the scheme in question.

This paper will – via the analysis of field-interviews and documents – explore how the opposition movements to these projects have sought to both criticise the adequacy and rigour of official evaluations and to present alternative understandings of the projects’ nature, benefits and repercussions. In exploring this process, this analysis will seek to understand how opposition against these projects have sought to discredit the rationalities underpinning these official assessments whilst asserting the continued problematic nature of the uncertainties surrounding these schemes.

By presenting alternative rationalities and additional analyses, the opposition movement- cast as a multi-scalar, multi-stakeholder grouping - has sought to transform the flaws of these documents into a successful campaigning tool. Dominant rationalities for the projects were questioned – such as the necessity of energy supply and the environmental sustainability of the projects. Furthermore, the context of the megaprojects (such as the public-private nature of the scheme) has been utilised as a means to create linkages between the projects and dominant political problems in Brazil, such as systemic corruption, dismissal of indigenous rights, and the denial of rights to legal redress. In adopting these methods, opposition movements have sought to harness the complexity and uncertainty of these megaprojects as a tool to question, criticise and discredit the official project evaluations.

Such alternative evaluations move beyond the mere weighing of costs against the expected benefits of the scheme and seek to paint a more holistic picture of the megaprojects in question. This criticism implicitly follows conditions present in ecological economics – such as the appropriateness of scale, the allocation of risk and the just distribution of benefits (Daly, 1992; Martinez-Alier & O’Connor, 1996). The neo-classical economic paradigm – cast as symbolised within the Belo Monte and São Luiz do Tapajós projects – is questioned and elements of social sustainability, the irreversibility of the environmental change caused by the projects, and issues of equity and human rights all asserted within the sources examined.
In doing so, this research finds that opposition movements have harnessed the policy concepts, indicators and instruments of project evaluation and transformed them into a counter-hegemonic tool designed to not only criticise government intentions but also to provide alternative framings of the projects in question. In doing so, this mobilisation of opposition criticism has been able to recast ‘megaproject pathologies’ (Primus, 2010; Lehtonen, 2014) – such as cost overruns, failure to meet social benefits, environmental externalities - as reasons for project suspension. As a result, this paper finds that opposition groups have moved beyond previous tactics of “trying to shoot down the project through adverse actions inside or outside parliament” (Bruzelius et al, 2002: 47) and towards the use and production of information and evaluative methods as a means of public criticism of megaprojects. Furthermore, although, at the time of writing, the Belo Monte project is nearing completion, the assertion of these alternative rationalities has secured the suspension of the São Luiz do Tapajós project. As a result, this paper will present an important case study of how citizen participation can extend beyond mere consultation, participation and deliberation that brings more sense to a scheme and towards a successful resistance against megaproject construction.

TATA-BOX: “Territorial Agroecological Transition in Action”: a tool-Box for designing and implementing a transition to a territorial agroecological system in agriculture

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Agroecological transition can be considered as an innovation process toward sustainable agriculture. It involves technological, social, economic and institutional coevolution. It depends on interactions between stakeholders of farming system, supply chain and natural resources management at local level (Duru et al., 2015).

An increasing societal demand emerges toward science and policy. On the one hand, civil society claims for more involvement in local policy making for a democratic ideal. On the other hand, public incentives promote development of action-research or transformative post-normal science with a call for more social consideration. According to Cash (2003), the effectiveness of scientific inputs can be evaluated according to 3 criteria: i) impact of science on how issues are defined; ii) production of useful information for society i.e. credible, salient and legitimate; iii) strong interface between scientists and stakeholders by means of effective communication.

More and more recent research projects or studies integrate participatory approaches. They generally share common concepts such as systems thinking, interdisciplinarity and multi-stakeholder representation in order to design more adapted and accepted innovations. Nevertheless, this is not sufficient to guarantee meaningful knowledge-sharing for innovation. Collaboration between stakeholders can be encouraged through facilitation technics that have to be designed in order: i) to foster creative pathways towards sustainability, ii) to reach agreements and dynamics for transition, and iii) to generate an engagement of stakeholders for changes (Checkland and Poulter, 2006). Considering these goals, it is therefore important to question the ways in which sustainability transitions can switch from theory to practices. Which frameworks are designed and which tools are operationally implemented? Finally, how do we evaluate the efficiency of the scientific framework?

In this communication, we will present a reflexive analysis on how we conceived and leaded a participatory research project – the TATA-BOX project. The purpose of this project was to develop an operational tool-box for participatory design at local level of a transition toward a territorial agroecological system. The methodology is based on the framework of Duru, Therond and Fares (2015) structured into 5 phases: i) analysis of the current situation; ii) scenarios of major exogenous forces (forecasting); and design of iii) a wished Territorial AgroEcological System (TAES, normative vision); iv) the transition pathway between the TAES and the current situation (backcasting), and v) governance and management of the transition. The TATA-BOX project aims at operationalization of this methodological framework by developing methods adapted to lead these different phases.
Importantly, applying this methodology leads to consider the local agriculture through a multi-domain management perspective for each one of these phases: farming systems, agro-food chains and natural resources. This allows considering the different domain and action scales of agricultural actors and revealing their complementarity for action plans in agricultural projects. The method was implemented during a set of workshops in two studied territories in the South West of France. Empirical knowledge and results obtained during a phase were used to adapt methods applied to the next one. Scientists with ergonomic background evaluated efficiency of the methodology.

The methodological framework was implemented through 3 participatory workshops in both territories. The first was a co-construction of the representation of the current situation and issues of local agriculture. The second was a co-conception of a wished Territorial AgroEcological System resilient to the future exogenous changes. The third was a co-conception of transition pathways to reach the future vision with a special attention paid to governance. Each step followed a process of free expression, confrontation and selection of ideas, and stabilization and specification of them.

Methodology dealt with three key issues:

i) selection of diversified participants: since all the local stakeholders were too numerous to be involved, choices had to be made as regards to representativeness, willingness to participate, and legitimacy. TATA-BOX project relied on a classical stakeholder analysis (Grimble, and Wellard 1997): after primary selection in cooperation with local partners, an interest/impact diagram was used to identify concerned stakeholders in the different field specializations, levels of action and values.

ii) fostering multi domain and multi-level approach: articulation between plenary sessions and working groups, and more specifically between mono-domain to trans-domain working groups, brought participants to broaden the conception of “transition”. The articulation between these working group layouts allowed stakeholders to go back and forth in scale and detail levels progressively along each workshop. In terms of operational results, this method support identification of original transversal objectives, actions and associated polycentric governance.

iii) intermediary/boundary objects have the triple purpose of i) developing creativity; ii) facilitating participation of the various stakeholders; and iii) providing a detailed description of their proposals. Different kinds of expression modes were used, oral, written, schematic representation, to insure that each stakeholder would find a way to express his/her ideas. We generated unusual communication tools that helped open representation frames and boost creativity (ie drawing, maps and card games)(Vinck, 2009). Moreover, mediation tools materialized the allocation of speaking time what balances co-construction.

Such an approach leads to numerous and various outputs that have to be adequately integrated and formalized to be used from one step to the next. The TATA-BOX project tested various analysis and representation methods. A multidimensional text analysis (via R with IRAMUTEQ interface) of audio-recording transcription was used to analyze and compare both territories reflexing modes. Proposals were transcribed through the “Five Ws one H” analysis method (What, Who, Where, When, Why and How) adapted to a territorial project by adding “How much”, “Risk”, “(In)compatibility”. This analysis was translated to artefacts at 3 scales using special iconic representation: individual ideas, cluster of ideas, overview of the shared vision through rich picturing (Berg and Pooley, 2013). Finally, ideas interdependency was analyzed and represented through a mind-map including an actors-resources-dynamics-interactions representation.

TATA-BOX includes a reflexive group that focusses on evaluating the gap between theory and practice. This target requires an important data collection system during the workshops. In each working group an observer annotated non-verbal communication. The evaluation was completed by participants’ surveys and interviews at the start and end of each workshop. These feedbacks were helpful to identify efficiency and limits of the different methods and tools used.

References:
Identity in political/economic-ecological theory: An examination of the science/policy nexus in Germany's move to renewable energy and what we can learn from it in Canada and elsewhere

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In examining the formation of regulatory frameworks guiding markets for renewable energy in Germany, this paper addresses the assumptions made about human agency, the role of markets, and the role of governments in political-economic theories. Germany’s move to and relative success with developing markets for renewable energy relied, in part, on breaking with the traditional economic wisdom that views free markets as sacrosanct and individuals as self-interested maximizers. Instead, an Institutionalist understanding is evident from an analysis of the political discourse in Germany. By using the example offered by Germany, this paper critically reflects upon the above mentioned assumptions in political/economic-ecological theory and their policy implications. It will be argued that the more robust assumptions underpinning institutionalist economic theory provide a better guide for institutional arrangements and policy formation. It will further be argued that both federal and provincial governments in Canada can learn from the German experience not simply by copying and implementing specific policies (as has been done so far), but rather by using the lenses offered by alternatives to traditional political-economic theories in the form of institutionalist political-economic frameworks.

Rethinking political/economic-ecological theory is important for making it relevant for the application of effective policies. This study comes on the heels of Clive Spash’s 2012 critique of pluralism in ecological economics. Part of Spash’s critique is a call for the assessment of various approaches to ecological economics, based on existing institutional arrangements and policy practices, as well as critical interrogation of those same institutional arrangements and policy practices. Germany provides an excellent backdrop for such a study because Germany has been relatively successful at transitioning to and establishing markets for renewables (through the Energiewende). Canada provides a good foil for Germany because, while Canada has great potential for renewables (and some provincial success), Canada has not fared as well. In addition, Canada’s resource mix is interesting because most of Canada’s domestic electricity is provided by hydroelectricity but Canada also has an abundance of non-renewables it extracts and exports. This study examines the institutional and policy contexts of both countries through the conceptual lenses afforded by neoclassical-ecological economics and institutional-environmental economics (as developed by Peter Söderbaum). The conceptual components of both approaches to ecological economics are used to examine institutions and policy in both countries from roughly 2000-2015.

This study employs case study methodology. Case study methodology is ideal for examining economic frameworks in their socio-historical, political, cultural, and economic contexts. Case studies are designed to help guide empirical inquiry of contemporary, complex phenomena in real world contexts as they involve the case or cases. Since case studies examine contexts in which there may be more
variables of interest than data points, case studies rely on multiple sources of evidence utilizing triangulation. Because the phenomena under investigation occur within complex, real world contexts, case studies are ideal for studies that are interdisciplinary in nature. Case studies are also well suited for investigating real world cases that are too complex for single, standard methods. The case study that I propose to use is a holistic, comparative, and explanatory employing two cases (Germany and Canada), two economic frameworks (neoclassical and institutional economics), and, due to the complexity of the contexts involved, interdisciplinary in nature. As such case study methodology is capable of incorporating the economic frameworks needed to conduct the empirically based, institutional and policy analysis for this comparison of Germany and Canada.

Floodplain ecosystem insurance values: Connecting visions to values
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Responding to likely increased flood risk from climate change the UK government has recognised a need for greater investment in flood defences (CCC, 2016; HM Government, 2016) both from building infrastructure and by restoring the nation’s natural capital (NC, DEFRA 2015; NCC 2015). In floodplains this has raised the profile of nature-based solutions, such as reconnecting rivers to floodplains and wetland creation and restoration, to deliver flood regulation and other ecosystem services (ES) (Acreman et al., 2011). To meet urgent sustainability challenges the ES approach needs to deliver solutions (Daily et al., 2009). The insurance value of ecosystems provides potential to articulate and connect private land management with policy initiatives to protect and restore natural capital at the landscape-scale.

The concept of insurance value is the ability of an ecosystem to withstand risk and uncertainty (Baumgärtner, 2007; Quaas and Baumgärtner, 2008; Baumgärtner and Strunz, 2014; Pascual et al., 2015). Quaas and Baumgärtner (2008) investigated the interplay between financial and natural insurance using biodiversity as an example. In their model biodiversity: is influenced by ecosystem processes at different scales, from farm management at the farm-scale to aggregate action at the landscape-scale; and reduces the variance of other ES flows. This latter is conceptualised as the natural insurance function of biodiversity. Pascual et al., (2015) focus on soil biodiversity and the private vs public sources of value, again using a model. Responding to a call from Quaas and Baumgärtner (2008) for the need for empirical studies on natural insurance, the objective in this paper is to investigate the insurance value of floodplain ecosystems using case study analysis of the Somerset Levels and Moors (SLM) in Somerset, southwest England.

Method
Working with a stakeholder partnership we co-produced two water and land management options for the SLM and a full description of the base case. The two options were informed by a series of “vision” documents for the region (e.g. see Biodiversity Vision, 2011, Appendix 1; Reimagining the Levels, Making Connections, 2016). The management options were translated into land uses and using benefit transfer the ES flows were monetarily valued. A gap analysis indicated missing values related to how the floodplain ecosystem was managed. We identified features or characteristics of the floodplain as well as features of the human system interacting with it in the social-ecological system (SES, Ostrom, 2009). Results were presented to the stakeholder partnership and the concept of insurance value was discussed.

Discussion
An initial goal of the stakeholder partnership was to develop estimates of the monetary value of different options. The results prompted discussion not around improving the results, e.g. with original valuation studies as compared to benefit transfer, but rather around the unaccounted-for ES, such as the more intangible cultural ES and the insurance value of the floodplain ecosystem under different
options.

Our focus was to elaborate the features of the floodplain that provide insurance value analogous to biodiversity providing the insurance function in soil (Pascual et al., 2015). The visioning documents and the co-construction of land and management options proved useful in identifying features of the floodplain ecosystem that are components of natural insurance, including diversity, species richness, lateral connectivity and upstream connectivity (Bark et al., 2009). We note that farm-scale and landscape-scale best practice management can influence all these components. Next we looked to the vision documents and our knowledge of the SLM for features of the socio-ecological and institutional system operating with the floodplain ecosystem that support natural insurance, such as: initiatives to join-up the management of the catchment (upstream connectivity), e.g. Hills to Levels; efforts to join-up farm holdings to create economies of scale, security of tenure and management flexibility (lateral connectivity, diversity), e.g. the Pawlett Hams; funding mechanisms for flood risk management at the whole county-scale; and the long-termism, per se of the visions.

Tests or metrics for the natural insurance value under each option could be how the floodplain copes with hazards, such as floods and droughts, including sequences of hazards as well as with changes in preferences and abrupt or gradual climate change. The challenge remains how to measure and value insurance value to underpin mechanisms to support it. This is particularly urgent as there are substitutes for natural insurance, for instance built flood defence infrastructure in the SLM. Whilst built infrastructure provides a good short-term hedge, or insurance value, it may over time result in stranded assets or make the SES more susceptible to shocks. Greater understanding of the components of natural insurance could assist in designing hybrid solutions that combine investments in built infrastructure that support the natural insurance value of ecosystems.

References
Urban community gardens can be considered as commons-based institutions where people decide to grow food jointly. It is well emphasized in the international literature of community gardening that the gardens have much diverse impacts on local communities’ and societies lives than just providing them with locally produced fresh food. Community gardens are sites for leisure activities, social interactions and various sustainable every-day practices. Gardens can help people reconnecting to food, nature and communities. Applying the framework of the economic concept of the commons, and relying on the recent literature of the “new commons” and “urban commons” I am trying to find evidences to what extent the latest findings related to these concepts are applicable to the community garden cases in Hungary. I am curious what types of collective actions take place in the gardens, and what tangible and intangible outcomes these activities can have. Social and economic development must rely on functioning ecosystems, and based on qualitative data I would argue that community gardens are such sites where there is a very visible interplay between the ecological and social impacts of collective action, and community gardens can promote sustainable ways of living in different ways.

Community gardens are often described as grassroots type or community-based voluntary organisations. One alternative way of defining community gardens is to apply the “commons” approach to them. Commons is key a concept in Elinor Ostrom’s scientific contribution and her main argument is that under certain conditions specific groups of people are capable of managing their own common resources (commons). She defined eight design principles that should be met so that groups solve the problem of coordinating their activities. By showing several empirical evidences Ostrom proved that the community-based management of the commons is possible and this can be a good alternative form to avoid the privatisation of the resources as well as of the direct intervention by governments (Ostrom, 1990; 2000). Though Ostrom’s focus was on the management of the natural resources such as fisheries and forests, others tried to apply her principles to different kind of resources and groups. Charlotte Hess introduced the concept of the “new commons” and argued that there are “various types of shared resources that have recently evolved or have been recognised as commons” without any pre-existing rules or clear institutional arrangements (Hess, 2008: p1). She was mapping those resources and distinguished seven different types of them. One of these categories are the “neighbourhood” commons, where there is a local resource which is managed by a group of people who live in close proximity. Community gardens are typical cases of the neighbourhood commons. According to Hess the new commons are new in the sense that they call for new or renewed processes of participatory self-governance by local communities. Collaboration and cooperation are key characteristics of these new organisational forms, and contributors often have long-term goals in which sustainability, equity, social justice appear as guiding values. (Hess, 2008)

In community gardens people grow their own food, and through this they provide the cities with green areas and ecosystem services. The gardens are recreational sites which help the gardeners to have a physically and mentally healthier life. Apart from the green spaces, recreational opportunities, and biological diversity provided by the gardens there are less tangible outcomes related to the community gardening activities. Knowledge creation is one of these outcomes. Through the daily interactions people pool knowledge not just about the technical aspects of gardening (composting, seeds, fertilisers etc.), but also about how to run a commonly owned and managed asset. I would argue that since gardeners have a shared interest which is related to different sustainability questions such as local
food production, healthy nutrition, ecological footprint reduction etc. they pool and disseminate practical knowledge on these questions. Sheila Foster argued that in community gardens the actions of the group members do not only transform the physical space but also the norms and the behaviours that govern that place. (Foster, 2012) With Iaione they emphasize that the most important aspect of the new commons is that they are socially produced, and they foster relationships and networks in which the activities are situated. (Foster and Iaione, 2016). These thoughts are in line with Newton and Sullivan who argued that when people want to relate to nature, by doing this they create social arrangements (Newton and Sullivan, 2005). Community gardens can create communities that play a role in influencing the social order. Though they are created with the purpose of growing food and building community, based on the empirical evidences we can have no doubts that by providing infrastructure for social interactions, the gardens are sites where social capital is being created.

Managing the common resources of the garden requires the actors to cooperate with each other, to set rules, to choose leaders, to practice decision-making. I am interested in how these processes are developed by the gardeners and under what conditions the group efficacy is realised. Wilson et al argue that if a relatively small group of people live in a close proximity they can develop structures to manage their commons, and once they start working effectively in a certain context they may address other common needs (Wilson et al., 2013). Based on my previous empirical investigations it seems that the community gardens from Hungary are spaces that are well suited for collective action. I am curious how and in what forms of collective action is the common resource management taking place in the gardens and if and how these activities can scale up to addressing other neighbourhood or city level needs and problems. Asking why and under which conditions do people cooperate, I am also interested in the relationship between groups’ identities, values and norms to their self-governance practices. I am particularly curious about how their values and identities related to sustainability issues and the green agenda are influencing the gardeners’ solutions to collective action problems. Today it is widely acknowledged that to reach sustainable developmental goals, actions at the local level are crucial, and sustainable development can only be realised through sustainable communities. Increasing biological diversity, producing more urban green space are just a few obvious contributions of community gardens to the sustainability goals. In my paper I would like to prove by empirical ethnographic data that the gardens can promote sustainable every-day practices, help communities to increase their self-reliance and provide communities with infrastructures where the management of the common resources may happen in an innovative and democratic way. I intend to explore what are the circumstances and conditions which enable communities to address their collective action problems and sustainability issues at the same time.

References
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With this contribution, we want to outline a new modelling approach that merges insights from post-Keynesian economics and ecological economics, by introducing ecological variables and energy in post-Keynesian stock flow consistent models. In doing so, we want to contribute to a better understanding of the conditions under which a sustainable economy is possible.

A sustainable economy in the strong sense of sustainably must ensure that what is taken from the environment by humans as "free gift from nature", is recovering in the long run (Ott and Döring, 2008). The structure of such an economy is part of an ongoing discussion around "green growth" on the one hand (OECD, 2011) and "steady state" or "degrowth" on the other (Jackson, 2009; Daly, 1991). However, the contribution of non-mainstream macroeconomic models dealing with this question is rare. Even if these are capable of modeling phenomena such as money (Godley and Lavoie, 2012), bounded rationality (Teschfsoon and Judd, 2006) or income distribution (Hein, 2014), these models are especially weak in regard to ecological variables. This is a major disadvantage especially in contrast to widespread and far developed neoclassical environmental and resource economic models, which aim to combine ecological and economic dimensions (Perman, 2011).

By developing a comprehensive flow-fund model, we want to address this issue and contribute to the further development of stock-flow consistent models. Thereby, the paper is located in the emerging field of ecological macroeconomics (Rezai and Stagl, 2016; Berg et al., 2015; Rezai et al., 2013). It builds on the insight, that post-Keynesian and ecological economics share substantial common ground, and are ripe for a synthesis (Kronenberg, 2010; Gowdy, 1991).

According to Dobusch and Kapeller (2012) synthesis of different economic paradigms seems possible, if these share similar ontological and methodological approaches. This is true for the concept of stocks and flows, which lends itself for economic modelling and is therefore suitable for bridging the gap between ecological and post-Keynesian models. The need to study stocks/funds and flows and their relation explicitly has been emphasized by Georgescu-Roegen (1971) in the tradition of ecological
economics regarding the physical economy. Apart from that, Post-Keynesians such as Godley and Lavoie (2012) used the stock-flow concept for modeling the monetary economy. Combining both approaches and integrating monetary and ecological issues may be helpful to study pressing problems of sustainable development, which are neither purely economic, nor purely environmental, nor purely physical, but rather are all of the above.

However, the only study that aims at combining the two paradigms, at least to our knowledge, is Dafermos et al. (2017). Different to their very complex and interdependent model, we offer a simple toy model that may help to understand and combine the two paradigms.

The model is composed of two interacting parts: The economy is modeled as a demand driven monetary economy based on the approach of Godley and Lavoie (2012):

The model economy consists of a government sector, collecting taxes, paying interest on government bills and spending money. The second sector are consumers, specified by a behavioral consumption function, which consume out of income and out of wealth. The third sector is the production sector, producing goods using labor and natural resources.

The production sector interacts with a simple ecological system describing the stock of biomass. It is modeled as a discrete logistic growth process including ‘harvest’ from the production sector. As the possible harvest may limit production, an attenuation function is integrated to allow for a smooth transition from a demand driven economy to a state where supply is ecologically constrained. Natural resources are tracked consistently within the economic and ecological processes. The complexity reduction compared to Dafermos et al. (2017) or other ecological macroeconomic models allows to study the essential features of the model with stability analysis. This method from dynamical system theory can been applied to discrete time economic models as shown by Richters and Siemoneit (2016). It is especially suitable for understanding the behavior of the system depending on parameterization.

The model produces three interesting results:

a) Similar to Richters and Siemoneit (2016), we find that if interest rates are high compared to consumption out of wealth, the monetary economy of the model first grows unboundedly, but later results in an ecological and economic collapse due to depletion of natural resources.

b) Even if the parameters are such that a monetary stable non-growing economy can be realized, ecological degradation continues and collapse can be seen without continued economic growth.

c) For a certain range of parameters, a stationary state/steady state can be obtained, that is compatible with ecological and economic stability.

The stability analysis allows to identify the relevant parameters and the transition points (bifurcations) from stable to unstable states and compares them with raw estimates of empirical values.

Our results emphasize the need to include ecological systems into model analysis, because these extensions make it possible to study whether a monetary stationary state corresponds to an ecologically viable scale as outlined in the beginning of this abstract. Most models neglect these interdependencies (Richters and Siemoneit, 2016). Furthermore, the model approach provides a fruitful basis for further development and might help to further understand the limits of growth and reflect the claims and policy recommendations for degrowth (Kallis et al., 2012).

References


Bioeconomy is the new sexy in the political debate on sustainability. In particular, a modern agriculture, able to utilize the soils as a sustainable resource for the provision of biomass, is envisioned as basis for a new economic system meant to replace the fossil-based economy. This vision of a bio-based economy, which is to be achieved by a step-by-step substitution of renewable for non-renewable resources, is quite in line with old ideas of the critics of economic growth (Daly, 1996). However, an important characteristic of current perspectives on the bioeconomy is that they are heavily engineering-focused; as a result, they tend to lack a holistic perspective that (i) takes into
account the interconnections between different social and ecological systems, (ii) goes beyond technological solutions by incorporating a study of people’s behaviour and (iii) considers the critical role of institutions in enabling or hindering sustainability. This paper analyses the needs to broaden the bioeconomy focus to incorporate such a holistic perspective as they arise in the context of sustainable soils governance.

The link between soils and bioeconomy is quite obvious—soils are the very basis of all terrestrial vegetation, and thus the foundation of bio-based production processes. The relationship between bioeconomy and soils is bidirectional: on the one hand, degraded soils endanger the supply of biomass for production processes fundamental to a bioeconomy; on the other hand, a large-scale substitution of bio-based for non-renewable resources may put large pressures upon soils. While the approaches of a bioeconomy are highly relevant for the sustainability transition, sustainable soil governance necessitates a broader view beyond bio-based production processes and technologies, and needs to include the behaviour of all relevant actors at different governance levels as well as interactions between different dimensions of the relevant eco- and human systems.

A bioeconomic approach to soil governance thus focuses on output maximization with limited inputs through fostering technological solutions in soil management, or, in other words, on efficiency. Approaches such as precision farming or more efficient use of pesticides and mineral fertilisers are paramount; stakeholders are viewed mainly through the lens of acceptance issues. Whether such approaches alone can secure sustainability in the use of soils is questionable. This is so for at least three reasons.

First, as partly addressed in acceptance studies, a mere technological possibility of ‘doing better’ does not necessarily mean that a given practice will be adopted. Possible obstacles include path dependencies, cognitive biases, transaction costs, unsuitability of proposed solutions to local contexts etc. They all underscore the importance of taking into account institutions.

Second, soil management does not happen in a vacuum—it has manifold repercussions on and exhibits multiple dependencies from other systems. For instance, soil use for agriculture, which is the basic precondition for the bioeconomy perspective, can be in conflict with other uses of soils, including as source of non-agricultural raw materials, as carbon sink or for nature protection (given the huge biodiversity of soils). Assessing whether soils are used sustainably cannot only be determined on the basis of the availability and acceptance of technological solutions, but also by institutional and legal frameworks. Furthermore, what is an efficient use of soils need not automatically fulfil other sustainability criteria, such as equity. For example, the adoption of high-tech solutions requires high up-front costs, which might foster consolidation of the agricultural sector even beyond the already heavily consolidated status quo. More generally speaking, aligning the bioeconomic perspective with the goals of sustainability requires the identification of indicators suitable to inform actual soil governance and needed to navigate between conflicting goals of soil use. This challenge is made even more daunting by another aspect: soil governance faces issues of inherent uncertainty and different degrees of reversibility of different use options, which again underscores the need for a holistic and adaptive approach, going well beyond purely technological solutions.

Third, bioeconomy may itself endanger the resource it is so heavily dependent upon. By focusing on bio-based production, it creates new conflicts and trade-offs in terms of the use of scarce land and soil resources. Bioenergy, biomaterials, biofuels and other essential elements of a bioeconomy need the soils currently used to produce food or to conserve biodiversity/to store carbon. Sustainable soil governance within a bioeconomy—and even more, a bioeconomy within a sustainability-oriented soil governance—need to take into account such pressures and help resolving trade-offs that arise because of them.

Thus, sustainable soil governance within a bioeconomy offers a welcome opportunity to broaden the bioeconomy perspective and align it with a more holistic approach to sustainability.

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Existence value, biodiversity, and the utilitarian dilemma
Bartosz Bartkowski

Partly in response to the critique that economic valuation is too narrow, economists often emphasise that the total economic value (TEV) framework includes non-use values, which capture preferences going beyond narrow self-interest. In fact, they are supposed to include intra- and intergenerational equity concerns (altruistic and bequest value, respectively) as well as non-instrumental concerns (existence value). Whether the latter is, as often claimed by economists, equivalent to the concept of intrinsic value from environmental ethics, is debatable (McShane, forthcoming). However, even if existence value is not understood as a proxy for intrinsic value, but simply as the result of preferences for the existence/preservation of something (Aldred, 1994), this concept is problematic for at least two reasons. First, it is in conflict with the foundation economic valuation has in the marginalist theory of value. This problem can be resolved, but at the cost of a rather bold reinterpretation of existence value. Second, existence value of biodiversity is an example of a deeper problem pertaining economic valuation in general—namely the conflict between its inherently liberal, preference utilitarian foundation and the fact that some preferences are clearly mistaken. It can be shown that biodiversity, properly understood, logically cannot have existence value—and yet there is evidence that stakeholders assign existence value to it. From this insight arises the utilitarian dilemma—should the utilitarian economist accept the preferences despite knowing that they are wrong? Or should she manipulate them in some way?

The trouble with the marginalist interpretation of existence value is the following: If something has existence value—allegedly an economic category—it provides utility because it exists, independent of any use. But existence is a binary category: either something exists or it does not. There cannot be more or less existence of a thing. Therefore, existence cannot experience a (marginal) change—yet this is what constitutes economic value. There is, however, a way to ‘save’ existence value without dropping the marginalist interpretation of economic value: To do this, one needs to think of existence in probabilistic terms. For instance, if respondents in a stated preference survey are asked to evaluate a change in an ecosystem, if it can be linked to a change in the probability of collapse of this ecosystem (i.e., the end of its existence), then the WTP for this could be interpreted as an expression of existence value. Other than this probabilistic interpretation, existence value does not work well within a welfare economic framework, where value can be captured only as a result of change.

To highlight the utilitarian dilemma, it is necessary to define biodiversity first. It is a multidimensional characteristic of ecosystems, and can be defined as the variety, balance and disparity of kinds in biotic and biota-encompassing categories (Lyashevska and Farnsworth, 2012; Maier, 2012, pp. 76–7; Stirling, 2007). Thus, contrary to the term’s common usage, it is not equivalent to ‘life on Earth’ or ‘nature’, nor is the identity of the kinds a relevant aspect of diversity (Faith, 2017).

Given this, it is easy to show that biodiversity cannot have existence value. Most basically, existence implies non-existence—but every ecosystem always has some level of biodiversity; it can be driven to drastically low levels, but it cannot be ‘eradicated’ without the ecosystem being wiped out before. Without an ecosystem, however, there is no sense in talking about biodiversity. Moreover, the existence value category is only sensibly applicable to things or categories: species can be valued because of their existence; populations and individuals most certainly can, too. The necessary condition is that these ‘things’ are in some sense unique. But biodiversity is not. It is simply a dynamic property of ecosystems. Biodiversity levels change constantly, so it is not clear what it would imply if one would claim that it has existence value: does it mean that some particular level of biodiversity should be preserved? Which level? Unless these questions can be satisfactorily answered, biodiversity cannot have existence value (see also McShane, 2017).

Given all this, the utilitarian dilemma arises as follows: if biodiversity cannot have existence value, how is the economist to deal with people in stated preference surveys who do express such value? A focus group study conducted by the author in a German Biosphere Reserve indicated that local stakeholders
consider biodiversity valuable independently of any usefulness for anybody, now and in the future, which implies existence or intrinsic value. This violates the logic-based arguments above; but it is at the same time an expression of the preferences of sovereign consumers. Thus, the economist faces a dilemma.

This utilitarian dilemma faced by practitioners of economic valuation exhibits resemblance to the older problem of ‘ideal preferences’ (e.g., Harsanyi, 1977; Mirrlees, 1982). As argued by Hahn (1982), analysis based on ideal, not actual preferences opens a ‘Pandora’s box’ of deciding what the ‘right’ preferences are. The utilitarian dilemma is problematic in a similar way. On the one hand, it seems even more profound because it is based on considerations of logic, not of an ideal of perfectly informed and rational preferences. On the other hand, it leads to a similar conundrum: should the economist accept the preferences she knows to be wrong? Or should she ‘correct’ or otherwise manipulate them? There seems to be no right answer to this question.

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Current multiple challenges in Europe - Refugee question, the rise of the far right, globalisation and the socio-ecological transformation
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In Europe we face a multiple crisis, but still on a high level. The general background is the economic and financial crisis and the follow-up specifically in the field of employment. The fast increasing number of refugees coming to Europe confronted European people harshly with long existing realities of huge global disparities in a globalizing world.

There is a big discussion and there are a lot of studies on the economic effects of the increasing numbers of refugees in Europe. Some position stress the costs and other negative effects; yet some outline economic gains by preventing aging and negative demographic trends. Much depend on
temporal term and on a comprehensive view. But primarily not the economic considerations are decisive but political. From an existential view climate issues clearly should have priority in policy - and so indeed in Europe there were some rudimentary positive approaches at least until the outbreak of the crisis 2008 and still around the (failed) Copenhagen climate conference in 2009. At that time climate policy actually was still more important than today. A grave but little-noticed aspect of the rise of the far right in Europe is that a lot of most valuable time will pass unfruitfully in terms of climate policy measures; either indirectly because political energy and necessary efforts are directed to a prevention of a far-right governance, or when this does not succeed, worse directly by years of relapses, because the far right usually denies climate change. And the denial and non-acting would still be exceeded by provoking additional complications and destroying constellations for implementations of national and global climate policy.

The right turn in Europe also puts the question for foundations for global solidarity drastically: The dramatic development to the far right in many European countries raises many issues, regardless of the actual future of the EU. Probably the most fundamental is the question for the material political and ethical foundations for global solidarity. More precisely the safeguarding of the "welfare state" (already reduced by neoliberal policies) is contentious under the conditions of globalization; the refugee issue is a trigger for destruction of the welfare state using divisions between poorer people and migrants; but the more basic aspect is globalization. European countries as a whole has been winners of globalization, but who exactly? The yields obviously are distributed asymmetrically. The very fundamental question is: Can a process of convergence and solidarity be defined, implemented and secured under 1. the well-known conditions of enormous differences especially on a global scale (prosperity, wealth, income, environmental conditions, quality of life) and 2. the increasing of "globalization" or the increasing of the (global) societal character of production and reproduction, as well as the deepening of informatization and communication-, and how? In fact the stark disparities at the global level, and also at continental and national (and regionally and socially along classes and layers) are not new; there is a complex picture (Milanovic): With regard to the distance between countries, international differences have become even smaller, mainly due to the development in emerging economies especially in China, ie for the last few decades there are global convergence processes at the comparative level between countries (Maddison) and also within European countries until 2008. However, the differences remain on a high level, and the intra-national distributions have become also more unequal almost everywhere. For the global (personal) distribution we see a complex convergence tendency, with contrary developments on the upper and lower edges (ISW 2015).

We are experiencing a special stage of "post-colonial" development (as Angela Davis stated): by "globalization" and background technical development now long-term retained and cumulated global distribution questions has come massively to the surface and are on the agenda although usually seen under other frames (e. g. xenophobia). And these issues are further strengthened by the accumulated global environmental problems which finally are also matters of distribution.

From the point of view of capital, stabilization basically would not be difficult because its simple regulation mechanism is the (regional) balancing of the profit rates. Because of capital flows to higher profit regions in the international arena profit rates always balance themselves out, more or less – this is a discussion among economists. Thus for the capital side some equality may exist. But it has always been different for the non-capital side. Now the world has grown together, the huge disparities have become more tangible, and the urgent big question is whether there can be win-win solutions for the non-capital side in a balance, convergence and equalization process, and how this process can be implemented deliberately. More specifically: can the income and wealth level of the wage-earners in the industrialized countries be increased at all together with a global catch-up of the less well-off on the non-capital side in the (former) developing countries? And if yes, under which conditions? Or even more roughly: are parts of the "wage-dependents" in Europe in a global perspective a "workers' aristocracy" without a clear perspective for securing the current status?
The current paradigm of the stagnation of average wages for many years in many “industrialized countries” combined with high fluctuations and therefore with high proportions of persons with real income losses, has apparently accumulated wealth on the other side, on the (financial) capital level; and may have generated some global convergence on the whole - statistically by mass effects; but on the other side it undermined prerequisites for realizing global solidarity, because it distorted the consciousness of broad strata feeling only that they are underdogs and losers. Compared to foreseeable later phases which are likely to be without sweeping measures, climate change just now reveals only relatively minor impacts -. But climate change already is likely to have been a factor also for the Syrian conflict--. In this case, first uprisings after droughts occurred and migration to cities happened increasing urban poverty. So interconnections between the refugee issue and the environmental question have already emerged, and they are likely to become much more important.

Productive forces are pushing for new solution: The development of the "productive forces" is pushing for new societal solutions in an almost classical way. This is a result of the further deepening of the division of labor and of the social character of production and reproduction: the globalization wave from the late 1970s onwards was still less drastic because many regulatory systems were still intact. The intensification of the wave of globalization since the 1990s under the conditions of the offensive of neoliberalism led to new realities. New international value chains have strengthened the connections and dependencies. Technical progress has clearly revolutionized communication, especially via mobile phones and the internet. Increasingly we have a (common) global production, and increasingly we have a (common) global working class. But are working people the masters of production or the captains on the value chains? Do prices and profit integrate and reflect caused emissions and damages?

Anyway by the new (online) technologies disparities have become more aware; and by much more available information (mobiles and internet) migratory activities are supported. No less than the realization of "homeland earth" (Edgar Morin) is on the agenda.

Paper can be downloaded here:
Current multiple challenges in Europe - Refugee question, the rise of the far right, globalisation and the socio-ecological transformation

A decision criterion for ecosystem services management under Knightian uncertainty – with an application to coastal regions under climate change
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Decision-making about ecological-economic systems is often characterized by deep uncertainties. Knightian uncertainty denotes income lotteries with known payoffs over known states of nature, but unknown probabilities of these outcomes (Keynes 1921, Knight 1921). It is a deeper form of not-knowing-the-future than risk (where probabilities of outcomes are known) or ambiguity (where people have some, possibly differing, beliefs about the likelihood of outcomes), but less deep than unawareness of payoffs (in some or all states) or unawareness of potential states of nature (“unknown unknowns”) (Faber et al. 1992).

There are compelling reasons to care about Knightian uncertainty. For, it may be clear what are the potential outcomes of an action, but it may be outright impossible to assign probabilities to these outcomes. For example, the system generating the outcomes may be too complex and the time horizon too long to warrant any reasonable probabilistic assessment. A relevant example is our planet's
climate where we do not even fully understand every single part of the system yet, let alone all feedback loops contained. Moreover, the fundamental disagreement of expert groups on a certain issue alone, for whatever reason, might invoke situations of Knightian uncertainty. A number of decision criteria have been suggested for situations of uncertainty, non-probabilistic as well as probabilistic, and there are apparent problems with both. In this paper, we employ the fundamental idea that Knightian uncertainty can be measured by an entropy: the more homogeneous the distribution of payoffs over states of nature, the less “uncertain” is the payoff. In the spirit of Knight (1921), we do not refer to any concept of probability. Instead, we base our argument on Knightian income lotteries – or, equivalently, Knightian acts – which are distributions of monetary payoff over different possible outcomes with completely unknown probabilities.

In previous work (Baumgärtner and Engler 2016), we have shown – employing an axiomatization from physics (Lieb and Yngvason 1999) – that there exists a function from the set of Knightian lotteries to the real numbers that constitutes an entropic measure of uncertainty on the set of Knightian lotteries. This function is unique (up to linear-affine transformations), additive and extensive. A particular example of such a function is Rényi’s (1961) generalized entropy. It is a one-parameter function that can serve to measure Knightian uncertainty.

Here, we employ this concept to study land management for ecosystem services in coastal regions that are affected by climate change.

Empirical data comes from several project sites along the North Sea and Baltic Sea coasts of Germany, which have been studied in the project COMTESS (“Sustainable coastal land management: Trade-offs in ecosystem services”). Data was obtained through field experiments, model simulations and stakeholder interviews, including data on socio-economic characteristics of stakeholders, hydrological variables, coastal vegetation, and plant and bird diversity. Nine ecosystem services are considered in this application – crop production, forage production, drinking water for livestock, energy generation, climate regulation, risk of flooding, amenity values, feeling of safety and species conservation.

We consider four land management options (“LMO”): (i) trend or business as usual, (ii) water management, (iii) carbon sequestration, and (iv) stakeholder based. Under the trend option, dairy farming is continued in low elevation areas behind the primary dike line while agriculture is continued in the higher elevation areas. For the next two LMOs, a secondary dike line is built to enclose polders where there will be natural reed growth inside the polders. Subsequently, one alternative is water management – harvest reeds for bioenergy production and focus on water retention; the other alternative is to maintain reed stands for carbon sequestration. The last LMO is developed based on feedback from relevant stakeholders who want smaller polders and wider drainage ditches (compared to the water management/carbon sequestration option).

For each LMO, two cases of sea level rise (0.25m and 0.80m) are considered with three temperature change scenarios (temperature increases of 1.8ºC, 2.8ºC and 3.6ºC over the next 100 years) within each. This makes for six climate change scenarios. While we know the outcome in terms of ecosystem service provision in each of these scenarios, we do not know which scenario will be realized as a consequence of climate change, not even as a matter of probability. That is, there is Knightian uncertainty about the consequences of different land management options under climate change.

We then study trade-offs between different ecosystem services among the different land management options under Knightian uncertainty.

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Citizen science and DIY science in sustainability research. Reflections on the responsible research and innovation (RRI) discourse

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It is widely accepted among ecological economic researchers that natural resource issues occur within complex socio-ecological systems (SES). Safeguarding biodiversity and sustaining natural resources require a paradigm shift in conceptualization, thinking and research. The features of the new science should be responsive to social and environmental problems, transformational and transdisciplinary and provide meaningful engagement.

According to resilience thinking and adaptive governance concept learning is an important organizing principle. It can help citizens to understand complex socio-ecological problems and it improves capacities of citizens to develop new solutions and new competence of dealing with complexity and uncertainty (Boyd, E. and C. Folke 2012)

The number of collaborative initiatives between science, scientists, and volunteers (i.e., citizen science and do-it-yourself science) is increasing across many research fields. Garcia (Garcia 2015) reported about some innovative projects that bring together TEK (traditional ecological knowledge) and citizen science.

There are many classifications, but generally, we can differentiate between four major types of citizens’ involvement in science (Haklay 2013):

● Crowdsourcing, where citizens act as sensors, and their cognitive engagement is minimal (e.g. carrying around GPS sensors),
● Distributed intelligence, where citizens act as basic interpreters, their cognitive ability is the resource used (e.g. after some basic training, collecting data or carrying out a simple interpretation activity),
● Participatory science, where citizens engage in problem definition and data collection, but are not involved, or do require the help of professionals, in analysis and interpretation, and
● Extreme citizen science, where citizens fully collaborate in all the steps of research with professional scientists, and scientists are required to act as facilitators as well.

The promise of societal transformation together with scientific breakthroughs contributes to the current popularity of citizen science (CS) in the policy domain, as making room for CS in conservation programs may improve the visibility and acceptability of conservation science’s research findings in that field and may contribute to the transformation of conservation science into a more transparent, open, democratic, and socially relevant endeavor (Conrad & Hilchey 2011; Cosquer et al. 2012).

Despite this emphasis on the social effects of CS, there is little systematic evidence on the transformative capacity of CS. CS projects are, in fact, frequently described as merely a source of scientific data. Focus on acquiring data and information may, however, neglect the broader transformative potential as explicitly emphasized in research on resilience (Berkes et al. 2003), risk perception (Wynne 1992), and adaptive and co-adaptive management (Pahl-Wostl et al. 2007; Armitage et al. 2008; Cowling et al. 2008).

Do-it-yourself science (DIY-science) on the other hand is usually out of the reach of policy thinking due to its elusive, often individualistic and radical, but also entrepreneurial nature that intends to
deconstruct institutions and approaches, and the perceived exclusive control those represent, that are considered given today.

Usually fueled by either curiosity or personal frustration, and often informed by hacker ethics, DIY-science aims to democratize science, and this democratization is based upon material processes: it strives “to increase the affordability, accessibility and mutability of scientific equipment” and processes. It “relies on ‘creative work arounds’ around objects (to transform and combine them in novel ways) and institutions (to circumvent established university–industry business linkages)” (Meyer 2013). Taken as a whole, it “indicates a way of engaging with science and technology that is praxis-oriented and builds on sharing, participation, and creativity.” By definition, it is political, its objective being “the empowerment of individuals to actively build their own future” (Golinelli and Ruivenkamp 2016).

However, recent studies aiming to define CS and DIY-science for analytical purposes often fail to improve the conceptual clarity of CS and DIY-science by, among other things, neglecting the investigation of these from a learning perspective. It is unanimous that learning in CS and DIY-science is considered important, but in practice, it often goes unreported or unevaluated. However, reflecting on the learning outcomes can benefit both citizens and scientists, whether these were intended or defined as goals of the CS or the DIY-science initiative.

CS and DIY-science programs and projects may have transformative learning potential, but such transformation does not always occur. This type of learning may contribute to the development of individual-level skills, resulting in radical changes in awareness and behavior related to environmental issues. However, transformative-learning outcomes should not be associated with only the individual level. Learning outcomes at organizational and institutional levels may contribute to a more effective and efficient practice of scientific research as well as science–society–policy interactions. There is evidence that both citizens and scientists learn and that learning outcomes and processes should be a focus of assessments of CS and DIY-science programs and projects. Scientists generally acquire and improve their skills for collaboration and participation and they may, overtime, change their awareness and expectations with regard to the institutionalized ways of conducting research. A community of practice around CS and DIY-science may gradually build up and have a transformative potential at higher levels, including both individual research organizations and science as an institutional field in modern societies. (Bela et. al., 2016).

Nevertheless, the assertion of transformative effects of CS learning is often based on assumptions rather than empirical observation, therefore there is a vital need for reliable and transparent measurement of transformative effects for the democratization of knowledge production. (Bela et. al., 2016)

References:
How does virtual water flow in Palestine? A political ecology analysis

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A core contribution of ecological economics is the identification and assessment of the hidden resource and energy flows that sustain final consumption. Ever since Howard Odum’s (1973) conceptualization of ‘Emergy’, that is the energy embedded in final goods and services, ecological economists have been on the forefront of developing new indicators and quantifying the ‘rucksacks’ and the indirect material flows that sustain an economy. Concepts such as the ‘ecological footprint’ (Rees, 1992), the water footprint (Hoekstra & Hung, 2002), or the material footprint of nations (Weidmann et al., 2015) have their origins in the conceptual innovation of ecological economics in seeing the economy not as the aggregation of monetized goods and services within the borders of a single country, but as the totality of energy and materials that support the production and consumption of a social system. Virtual water refers to the “hidden or embodied (actually not embodied, but evaporated) in a particular product, defined as the volume of water used in the production process of that product” (Martinez-Alier, 2010, 68). Whereas ecological economists have contributed to the quantification of the virtual water moved through trade and the water footprint of nations or regions (Aldaya et al., 2010, Ercin et al., 2011), they have paid less attention in elucidating the political and economic dynamics that govern these hidden flows of water.

The study of power relations and the way they affect access to and use of resources, and the distribution of environmental goods and bads, is the domain of political ecology. Political ecology and ecological economics are ‘sister’ communities that have evolved together (Martinez-Alier, 2010). In the spirit of integrating further political ecology with ecological economics (see Martinez-Alier et al., 2010, Kallis et al., 2014), this article advances a political-ecological economic approach to the study of virtual water, quantifying hidden flows, while contextualizing them and explaining them by understanding political and power dynamics (Beltran and Velazquez, 2015).

Palestine is an emblematic place for studying power and water. The role of water in the Palestinian-Israeli conflict has been analysed by Kally and Fishelson (1993), Lonergan and Brooks (1994), Elmusa (1997), Selby (2003a, 2003b, 2011, 2013), Trottier (1999, 2007), Zeitoun (2008) and Glover and Hunter (2010), to name a few, who argue that the asymmetric power of Palestine in the Oslo negotiations has ensured Israel’s domination over water allocation in Palestine. Studies have also shown how Israel-
Palestine trade relations have influenced the deterioration of Palestine’s agricultural productive capacities, resulting in the decline of the agricultural sector’s contribution to the economy (de Pascale, 1996; Cottier and Paunatier, 2000; Haj Khalil 2009; Taghdisi-Rad 2011). Despite this exhaustive literature on Israel, Palestine and water, less attention has been paid on the interface of water, trade and agriculture, and the ways in which controlling trade, Israel may have controlled the virtual flows of water too.

The concept of virtual water, developed by Allan (2001), is extremely useful to make this water-agriculture-trade relationship visible, as it sheds light on agricultural trade flows in terms of water. Virtual water (VW) refers to the amount of water required for the production of a good or service. Allan (ibid.) promoted this term to underline how Middle Eastern countries’ water requirements have exceeded available resources since 1970. In other words, water scarcity in these countries was being managed by importing VW in the form of agricultural products from the international market. While VW was defined as a theoretical indicator, the water footprint (WF) emerged from the methodological attempt by Hoekstra & Hung (2002) to estimate VW, defined as the “volume of water needed for the production of the goods and services consumed by the inhabitants of the country” (Chapagain & Hoekstra, 2004, 11). Amidst many other methodologies (see Velazquez et al. 2011 for an overview), WF remains the most widespread. Suffice to say that VW and WF have been popularised and numerous studies on virtual water flows of economies worldwide have shown the increase in virtual water trade around the world (Chapagain & Hoekstra, 2004, Chapagain et al., 2006, Hoekstra & Chapagain 2008).

In terms of the Palestine case, previous studies have implemented methodologies capable of estimating VW flows in the West Bank (Nazer et al., 2008) and quantifying the effects of VW trade on water management in Palestine (Nassar, 2007; Hamdi, 2014). However, there is an ongoing debate over the contradictions generated by the VW indicator when it comes to providing information for implementing water and trade policies (but see Wichelns 2010, 2011, 2015). And most analyses on VW flows are undertaken from a quantitative perspective while the wider socioeconomic and environmental context is absent (Chenoweth et al., 2014).

In light of these gaps, we propose that a political ecology approach to VW offers powerful theoretical bases to contextualise and politicise environmental knowledge (Forsyth, 2003). Political ecologists recognize the biophysical roots of environmental problems, but also focus on the link between ecological problems and their political dimension showing how socio-ecological conditions are sustained by and organised through both social and metabolic-ecological processes (Swyngedouw, 2006). In this vein, we argue that the estimation of VW flows should be explained considering the political, social and territorial implications of these flows – that is, who benefits and who suffers from VW flows, or non-flows. This approach means that VW flows are not just the flow of a resource, but the manifestation of the political and social relations that exist between water, agricultural production and trade in the Palestinian Territories.

The purpose of this paper is thus twofold. Firstly we examine the social and political mechanisms that affected the flow of agricultural VW in Palestine during the Post-Oslo period. Secondly, we quantify these VW flows and then relate them to their broader social and political context. The analysis reveals that VW flows evolve along with the political context in which they are embedded, bringing to light the power geometries that affect the flows of VW.

The findings suggest that Israel reduced the flow of Palestinian agricultural virtual water exports and diverted virtual water imports from Palestine to itself. This contextualised VW approach illuminates the link between the control of VW flows and the consolidation of Israeli political and economic power over Palestine through water.

This paper, in this light, explores the relevance of combining biophysical analyses with the examination of institutional and political relations that both coexist with and affect virtual water flows. Following this introduction, the second section describes key elements in the Oslo Protocol, the Peace agreement signed between Israel and Palestine in Oslo in 1993, and how this affects water, land governance and agricultural trade. The third section unpacks VW and the methodology we used to estimate it, explaining how VW can be approached from a political ecology perspective. The fourth section presents the quantitative analysis of Palestinian agricultural VW flows from 1997 to 2013 and examines
how the political and social context has conditioned these flows. The per capita agricultural virtual water imports and exports of the Palestinian Territories are compared to those of the adjacent countries (Israel, Jordan, and Egypt) in order to provide a regional perspective on the Palestinian case. Section 5 draws conclusions from this research and what it contributes to the study of virtual water and political ecology.

Does buying local help? Consequences of poorly-regulated short food supply chains: implications for environmental policy

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Short food supply chains (SFSCs) are often detailed in grey literature as opportunities for reducing carbon footprints via direct purchasing from farmer-vendors. However, there appears to be no consensus in academic literature about the benefits of these approaches, compared to conventional systems. For example, when the regional growing season is short, or when there is a need for long-term storage and cooling, delivery of the produce through conventional food supply and global trading chains might have less environmental impact than when food is locally produced. Although a growing body of literature exists that has sought to provide a comparative analysis of the environmental impacts of conventional and short food supply chains, much less attention has been paid to the differences between different SFSC marketing channels. This paper describes research into the distances farmers travel and their related carbon emissions for different direct marketing channels.

149 Hungarian farmers were surveyed in 2013 in three differently-regulated types of markets (conventional, farmers’ and organic markets) of Budapest (capital), Debrecen (second biggest city, county capital) and Tura (a small town in Pest county). In the paper, differences between these markets are explained in details. Farmers’ markets are specifically supported due to considerations of rural development, with attendant environmental benefits expected as a consequence of the increased emphasis on localism. Farmers may sell their own (personally-grown) produce so long as it is grown within a 40 km radius of the point of sale. All the produce that originates from within a single county may also be regarded as local, while any farmer is allowed to sell produce at a farmers’ market in Budapest.

To analyse the relationship between the distance from market and other explanatory variables that might play a role, linear mixed effects models (random intercept, random intercept and slope; and additionally, random slope only models) were used. Mixed models, compared to simple linear regression models, incorporate fixed and random effects and thereby permit the modelling of unbalanced or correlated data. By using LMEs it is possible to model the variability in data that stems from spatial, temporal, spatiotemporal or other sources of grouped structuring in data that lead to correlations in a sample. In the present case, the variation in distance caused by the hierarchical structure of the data (where several observations came from different regions and within regions from different types of market, thereby creating a complex structure of associations) was accounted for. The use of LMEs makes possible the partition of the overall variation of the dependent variable into components corresponding to different levels of data hierarchy.

Results show that respondents with bigger and more developed farms are willing to travel further and/or more often, a fact which may undermine the pro-environmental initiatives of decision-makers. In spite of strict geographical limitations which were introduced to promote local food, both food mileage and CO2 emissions appear to be significantly higher for farmers’ markets compared to conventional and organic markets. This pattern is strengthened by the fact that farmers’ markets in Budapest are exempted from complying with the maximum distance regulation that is in effect elsewhere in Hungary (which is designed to allow farmers an equal chance to sell their products on the market in a region with the greatest national purchasing power).
Two conflicting policy goals are thus in evidence; one is to reduce the environmental impact of food supply while the other is to support the socio-economic wellbeing of farmers. One potential solution for harmonizing these two distinct policy goals is the promotion of cooperative ventures such as joint marketing. However, due to the low level of cooperation among Hungarian farmers, clear political support and related motivational measures would be needed to ensure broader participation. Moreover, in order to verify the origin of a certain product in a local food system, more accurate guidance on increasing traceability is needed.

Consumers usually associate farmers’ markets and organic markets with better environmental performance. However, a lack of appropriate regulation may produce unintended impacts due to conflicting environmental and socio-economic tendencies. A lack of understanding about the environmental impacts of making purchases at different types of markets may reduce the efficiency of the environmental efforts of consumers and thereby also limit the efficiency of environmental policies.

How stakeholder and citizen participation influences evaluation criteria for megaprojects: The case of the Belgian LILW repository
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In this paper we elaborate on the siting process for short-lived, low- and intermediate-level radioactive waste (LILW) in Belgium as a case in which the criteria for an ex ante evaluation of the project have been – and continue to be – constructed throughout the assessment and decision-making process. We investigate whether indeed wider citizen participation improves the evaluation of the socioeconomic impacts and leads to a more sustainable conception of the project.

After a clear failure to site a LILW repository facility in a top-down manner with the idea to achieve the optimum scenario from a national and techno-economic perspective, the Belgium radioactive waste management agency, ONDRAF-NIRAS, resorted to a co-productionist and more bottom-up and voluntary approach. Participatory processes (Local Partnerships) were organised at the municipal level, involving local actors in designing the repository and in setting the conditions under which their community would be willing to host the repository facility as part of an integrated project, including socio-economic dimensions. After 5 years of study and debate the partnership programme culminated in two candidate sites with their respective project blueprints, one of which was chosen by Federal Government decision in 2006. However, siting did not prove to be the end of the process. Participation (i.e. the incorporation of local community representatives into the project management structure) continued during the more detailed elaboration of the various components of the proposed project, later baptised the cAt project.

In our analysis we have looked at what impact – if any – a widening of the notion of project management may have on project culture, on managing uncertainty and on assessing performance at different stages in the project’s development.

‘Iron triangle thinking’ with its crude criteria of ‘on time, on budget and within prescribed specifications’ does not seem to dominate the project culture in this particular case, nor did we see any evidence of outsider pressure in this regard, at least at the current stage in the project development. A strong focus on project content (a safe repository concept within a broader project answering to the conditions set by the host community) and a relatively relaxed attitude towards project timing by most partners, created space for reflection and negotiation.

Our case suggests a need to complement the notion of bounded rationality with that of multiple rationalities. Rather than depicting the latter as part of the former our case illustrates that they both play a role, but in different ways. The more complex the project and the more actors involved, the greater the tendency of these two types of rationality to reinforce each other. The implication of local representatives in the decision-making at the project level has allowed for the incorporation of emerging project goals along the way.
The more inclusive the structure of project management, the more ambiguous is the project culture—or the more diverse are the project cultures—shaping the project’s development. However, even the most inclusive project management will always be confronted with an outside reality, again with different rationalities, perceptions and interests. Flexibility to deal with that type of uncertainty and the ability to deal with changes in stakeholder ‘morphology’ over time are thus important. Indeed, throughout the various stages of the development of the cAt project, project management has taken different forms. Initially foreseen to last for about two years to conduct feasibility studies, the Partnerships have been in place for over 15 years. During this period, their role and relationship with the implementer has changed and was adapted according to the project management stage. This flexibility, learning and adaptation appear to be more present, though in a more incremental way, as the project develops and becomes more complex.

In spite of its relatively long history the cAt project is technically still in a planning phase, as no licence has yet been obtained for its central component. Some components are already being launched, while others remain relatively open. This makes the transition from plan to project more fluid and the project as a whole difficult to describe in tangible and measurable outcome criteria. Therefore, a continuous process of (re)assessment, particularly regarding the socioeconomic impacts of the project, appears to have unfolded, guided by mainly qualitative performance criteria. We could distinguish safety, local acceptability, a willingness to adapt and flexible financing mechanisms as important performance criteria. It was the Partnership’s merit to introduce them, to make space for them and to keep open—or to reopen—negotiations, if it felt that its criteria were not being met and the proposed alternative was not considered satisfactory.

Conclusion

Complexity should not necessarily be seen as a negative attribute. Projects of this magnitude are characterised by a variety of project cultures and understandings, both within and around its management structure. Acknowledging complexity creates room for negotiation and a more conscious way of approaching megaprojects as being continuously (re)constituted through the actions of all concerned parties, within a context of multiple bounded rationalities leading to socialised forms of often irreducible uncertainty.

The absence of a preconceived idea of what the project or its management structure should look like at the outset, contributed to the robustness of the project governance. It is hard to predict whether or not the project, when fully implemented, will effectively be judged as sustainable. However, it appears to us that a flexible and inclusive management culture and a certain vagueness resulting from the application of mainly qualitative performance criteria has been constructive in managing and handling uncertainty in this particular case.

Further research is obviously needed, but we would suggest that in megaproject assessment, the time is nigh for replacing the Iron Triangle considerations by a ‘Velvet Triangle’ thinking in terms of adopting an open and flexible project culture, fostering multiple rationalities through qualitative performance criteria, and managing uncertainty through tolerating vagueness and complexity.

A combined perspective of political economy and socio-ecology to study multidimensionality of rural landscapes: connecting scales and dynamics throughout selected case studies in Colombia

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1). SHORT ABSTRACT

This paper presents an analytical and methodological framework to analyse the interlinkages between rural landscapes and agricultural chains for domestic food consumption, and the challenges of ecological economics to study, advise and improve those agri-chains to achieve more egalitarian, inclusive and sustainable forms of development. We offer to combine concepts and methods from
political economy and socio-ecology to examine economic, social and environmental sustainability of such agricultural chains. More specifically, we propose to analyse the domestic agri-chains as being embedded in specific political-economic contexts and socio-ecological systems.

We apply our framework to analyse the agricultural chains and the associated ecosystem transformations in four selected regions in Colombia. We argue that the particular ways that agricultural chains are governed are markedly shaped by regional political-economic, as well as ecological dynamics. And in turn, they engender transformations in the socio-ecological systems within which they are situated. These transformations bear on the sustainability of the ecosystems, and the well-being of the populations that live in and from them.

2). THEORETICAL AND METHODOLOGICAL FRAMEWORK

The analysis of these multiple and complex linkages between agri-chains and rural landscapes requires going beyond the traditional focus of value-chain analysis that focuses on the creation and distribution of economic value added along them, and the governance mechanisms that shape these processes. In order to understand complex and multiple linkages between agri-chains and rural landscapes, we present a conceptual framework grounded on two theoretical bases: the perspective of political economy and the approach of socioecological systems.

Political economy approaches to value chains have focused mostly on understanding the power relations governing those chains at the global level, and how these in turn affect specific local communities with respect to income, marginalization, equity and other facets of uneven economic and political power relations between rural communities, private economic agents and social actors. Yet, agri-chains and agri-food systems are often embedded in regional ecological contexts, where different economic activities simultaneously shape landscape transformations. And within the framework of sustainable rural development, we need to better understand the ecological dynamics, for which political economy approaches fall short.

Hence we suggest complementing its perspective with that of the socio-ecological systems, which provides more conceptual and methodological tools to analyse the ecological transformations at the level of regional landscapes. For the study of the sustainability of these transformations, we find the concepts of vulnerability and resilience particularly useful (Folke, 2006). Through these concepts, socio-ecological systems approach integrates ecological dimensions, such as ecosystems, agri-systems and landscape diversities with social dimensions, including the management of common pool resources, maintenance of traditional knowledge, distribution of access to and rights over productive resources, in their assessments of sustainability and proposals for sustainable management (UNU-IAS et al., 2014).

The studies from socio-ecology of productive landscapes to understand and measure vulnerability and resilience are helpful, and are starting to integrate elements of inequality and well-being in their assessments. Yet, they underemphasize the power relations that influence the resilience, and the constraints to better socioeconomic change and governance, hence the needed political economy emphasis. The study of socio-environmental conflicts from this perspective places special attention to elicit competing social groups with different economic and political powers. For political economy of the environment (Boyce, 2007) is key to investigate the social, economic, political and environmental facets of distribution, allocation and dispute over environmental costs and benefits, as well as historic patterns of usage, access and enjoyment of natural resources. This multidimensional approach can shed some light in the discussion of environmental justice and governance (Martínez-Alier, 2002) in rural settings, allowing an overarching assessment of the contributions and challenges that agri-chains exhibit in relation to sustainable development of rural communities and territories.

We assume a regional economic perspective to understand intra- and inter-sectorial patterns and characterize current productive activities and possibilities of adding-value change. We also pay attention to regional structures, institutions and discourses at play in processes of decision-making at distinct state-levels, economic development at regional scale, and involvement of institutions and organizations at the local scale. Inspired on the emphasis placed by rural studies on family farming and productive systems, on agri-food systems, fair trade and new rurality, we advocate for a systemic
inclusion of social and environmental dynamics through an enhanced Sustainable Livelihoods Frameworks (Scoones, 2009) observing human, social, natural, built, and financial capitals. Complementarily, we use the analysis of local processes with the focus of rural landscapes socioecology. From the perspective proposed by UNU-IAS et al. (2014) to study socio-ecological production landscapes (SEPLs), we were inspired by the Toolkit for Indicators of Resilience in SEPLs that defines five areas of resilience research: 1) landscape diversity and ecosystem protection; 2) biodiversity (including agriculture diversity); 3) knowledge and innovation; 4) governance and social equity; and 5) livelihoods and well-being.

3). CASE STUDIES AND PRELIMINARY FINDINGS

The first case is in the Andean highlands of eastern mountains of Colombia, specifically in the basin of Lake Tota and its economic structure based on intensive agriculture, trout farming, livestock and various forms of tourism. Despite a common judgement about the unsustainability of this socioecological setting, we have accounted on the complexity of strategies deployed by local inhabitants, allowing them to tackle rapid and deep transformations of regional production structures, and managing vulnerabilities in a resilient fashion.

The second case is in the mountains of southwestern Colombia, in the valleys of the Cauca River basin. In this case, we highlight the role played by discussions and proposals on adding-value projects, under a socio-political construction of territorial appropriation, strengthening of use and governance systems, and socio-ecological transformation of landscapes, all entangled in a troubled regional development process crossed by national armed conflict dynamics. In this case, despite the conflicting socio-political setting defined by violent events and illegal coca-cultivation, local strategies mixing agricultural and traditional mining have created a window-of-opportunity for social learning processes and interconnections amongst distant rural communities.

The third case is on the Pacific coast of Colombia's Choco where the community of fishermen, environmental organizations, state institutions and tourism operators partnered in the creation of an Integrated Management Regional District to ensure sustainable use and conservation strategies. Among other results, we have been opening up routes of interconnection, rather than value chains for sustainable local development. The creation of a territorial brand and a funding strategy for the District are highlighted to integrate geographical and cultural complexity of agri-chains and fishing activities in a local sustainable development.

The fourth case is associated with the capital city (Bogotá) and its surrounding regions (Department of Cundinamarca). From a description of the agri-food system challenges in a metropolitan area, the experience of an association of agricultural producers is presented and contextualized, describing how they have developed and consolidate market connections and routes to participate in the regional agri-food system centred in Bogotá. The case also shows the transformation of the provincial production systems, the coping strategies of rural communities and livelihoods, and the effects of infrastructure and particular forms of entertainment and tourism to the socioecological resilience of representative production landscapes.

4). GENERAL REFLECTIONS FROM A WORK IN PROGRESS

The presented approach uses as units of analysis both landscapes and regional systems of value, investigates the value flows between communities, and the routes of economic interconnectedness, to understand the relations between single elements of agri-chains, to obtain an interesting perspective to study the characteristic complexity of rural landscapes.

We think that a hybrid perspective from political economy and socioecology allows a more integrative and holistic view of agri-chains by connecting communities and markets, escalating actions and territories, raising awareness of economic agents and social actors, and integrating dimensions and objectives. Processes at different scales and of different magnitudes underlie their territorial expressions. Consequently, there is only one local and global reality interacting, but with different gradients, influences, levels of organization, discourse referents and forms of relations between distinct social actors. Therefore, environmental and rural transformations become an extremely rich
and complex phenomena in which the dominant rationales are models and local forms of production and use of nature.

Measuring social vulnerability of rural communities to environmental change
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It has been widely recognized that human welfare depends on the good and services provided by nature. In the analysis of such a dependence multiple conceptual approaches have been proposed. The socio-ecological systems approach has focused on the interactions between the social and ecological system. In particular, this approach has analyzed how different land use schemes change the ecological integrity of the ecosystems and its capacity to provide ecosystem services. A change in the level of provision of ecosystem services constitutes a threat to the wellbeing of the social system. When facing such a threat the social systems might be affected in different ways depending of several aspects such as sensitivity, level exposition to the threat and adaptation capacity. These factors constitute what is known as vulnerability of the social system to the loss or degradation of ecosystem services (Adger, 2006; Eakin and Luers, 2006; Metzger et al., 2005; Paloviita et al., 2016). Vulnerability has been previously defined as the ability that a social system has to cope or adjust to a shock or to a change in the ecological system (Ciftcioglu, 2017; Hinkel, 2011). The assessment of social vulnerability within the context of ecosystem services in a territory entails different challenges in order to design and implement efficient and effective policies to reduce such vulnerability. The first one is associated to the multiplicity of beneficiaries in a territory all of them with different characteristics and therefore with different capacity to cope the change (Dumenu and Obeng, 2016; Graziano and Rizzi, 2016; Martin et al., 2016; Rasheed et al., 2016). It is then of great importance to develop indicators to assess the social vulnerability in order to capture this diversity to be able to implement targeted policies to reduce social vulnerability. Finally, the development of adequate models of spatialization of the social vulnerability would help to understand the relationship between characteristics of the territory and the vulnerability associated as well as to contribute to analysis of environmental justice.

In this paper we propose a conceptual model to assess the social vulnerability to changes in the provision of ecosystem services and we apply it to a case study. In our conceptual model social vulnerability is given by two variables: the degree of dependence of the ecosystem service under threat and the adaptation level of the beneficiary. The degree of dependence is at the same time determined by the change in the benefits level perceived by the beneficiary and the category of the human need that is satisfied with the ecosystem service. The degree of dependence of the ecosystem service differs across beneficiaries since the benefits levels and the type of needs satisfied with the ecosystem service under threat differ across them. The adaptation level of the beneficiary is given by the capacity of substitution of the ecosystem service and the capacity of adaptation of the beneficiary to the change in the supply of the ecosystem service. The capacity of substitution is related to the possibility of the beneficiary to maintain the supply of ecosystem service through the use of other natural sources, technology solutions, and even by a combination of both. The capacity of adaptation is explained by socio-economic variables, institutional relations, knowledge of ecological phenomena, access to information, services and resources, which determine the possibilities of an individual to establish (or not) strategies to face the threat.

In this conceptual framework two concepts emerge: Initial inherent vulnerability (IIV) understood as the ability that the beneficiary has to respond to a change in the level of provision of the ecosystem service in absence of adaptation measures and final inherent vulnerability understood as the level of vulnerability once the beneficiary has taken the adaptation measures present in his feasible set (Lampis, 2013).
We applied our conceptual framework to a study case in the basin of the rivers Grande and Chico (CRG), in the state of Antioquia – Colombia. The CRG basin has an area total of 127,896.29 has (1,278.96 km²). The land cover is mainly agricultural use and cattle farming (68.66% - 87,873.85 has approx) with a low fraction in forest and semi-natural areas (29.00% - 37,113.31 has). The total population in the study area is 68,056 inhabitants (CORANTIOQUIA and UNAL, 2015).

In order to gather information related to our variable of interest we implemented a series of social workshops and individual surveys with 164 households in the study area. During the years 2015-2016, we designed and subsequently applied in the field, a set of participatory tools such as participatory workshops and surveys with 150 households which allowed us to establish different profiles of beneficiaries in the zone of study. In a second phase in the field, through semi-structured interviews, local workshops and participatory social mapping with 164 stakeholders we gathered information related to our variables of interest to evaluate a vulnerability index and its spatialization.

The first group of variables we asked for was associated to the relationship of the beneficiaries with their natural resources, the importance of these in their way of life and what are the main problematic or threats for these resources. The second group of questions were oriented to understand the relationship between beneficiaries and institutions in charge of territorial and environmental management. In a third group, we asked for beneficiaries’ strategies to cope with scenarios of change in the provision of ecosystem services such as water supply and crops support. Finally, in a fourth group, we asked about socio-economic characteristics such as area of farm, land uses in farm, income, level of education, knowledge of environmental issues, participation in organizations, access to technology for production, among others. We found that aspects linked to the features individual and social, as beliefs religious (Catholicism mainly), the asymmetry in the access to information - between community leaders and other stakeholders, the availability of natural sources of substitution of ecosystem services in their farm and a weak relationship between the stakeholders and their institutions, affect it the capacity of adaptation of the beneficiaries and therefore in the possibility of reduce their initial inherent vulnerability.

LITERATURE CITED


Usefulness of two indicator sets for sustainable out-of-home meals

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Introduction

Since human nutrition is responsible for about 30% of the global natural resource use and in order to decrease resource use to a level in line with planetary boundaries, Lukas et al. (2016) proposed a resource use reduction in the nutrition sector by a factor 2 (Material Footprint) (see Lettenmeier & Laakso 2016, Lettenmeier et al. 2014). Beyond the aspect of resources use, further ecological aspects are relevant e.g. greenhouse gas emissions, biodiversity, and water use (EU Kommission 2011, UBA 2015, FAO 2014, Foresight 2011) as well as e.g. health issues (Jäger & Leitzmann 1992, Leitzmann 2003, Wirsam & Leitzmann 2010).

In Germany the out of home catering sector has a high and increasing economical and societal importance (Rückert-John et al. 2005, BVE 2016, 2015). Thus the whole catering sector is an appropriate target for sustainability transition effort firstly based on clearly defined indicators to assess its ecological, social, economic, and health impact (Lukas et al. 2016b, Rückert-John 2005).

Method

Within the project NAHGAST two sets of indicators, called "NAHGAST Meal-Basis" and "NAHGAST Meal-Pro" were developed based on desk research elaborating existing multi-criteria assessment methods and relevant research on single issues within the four dimensions ecology, society, economy, and health. The indicator sets have been developed and discussed in several project workshops and expert workshops. Then assessing a number of about 100 meals has tested the preliminary sets of indicators. However, the interim results of this application show the need for further improvements in the next phase of the project.

Interim results

The "NAHGAST Meal-Basis" (Basis) set deals with qualitative indicators, such as the amount of organic foods per meal or the percentage of food waste. This set should motivate kitchen manager to judge the sustainability of their offered meals on a rough level and to visualize future improvements. The "NAHGAST Meal-Pro" (Pro) set deals with a more sophisticated set of indicators, such as the carbon and material footprint or the cost recovery per meal. Both sets are underpinned with targets for a sustainable level for each indicator.

The reference level for both sets is a meal, usually consisting of a main component and a side dish. To be determined is therefore the sustainability of a meal. At the same time, a further set of indicators was developed to evaluate indicators (mainly social), which cannot be applied to individual meals and can only be evaluated on an operational level (e.g. training opportunities, occupational safety, and health protection in gastronomic establishments). However, this set is not to be considered here.
The division into the Basis and Pro set was made in order to have a choice of sets for different levels of expertise: The Basis set is supposed to enable practitioners in the out-of-home food and beverage service industry, which have not yet dealt intensively with the topic of sustainability, to carry out a preliminary sustainability assessment for meals. This assessment will be based on indicators, which are relatively easy to enquire, such as the share of animal, seasonal, or fair-traded products. The Pro set, on the other hand, addresses stakeholders who are familiar with sustainable production and related theoretical assumptions. They are in a position to deal with indicators that measure the specific effects of the respective meal (i.e. carbon footprint, material footprint, water and land use).

Following indicators have been chosen for NAHGAST Meal-Basis:
Ecological aspects:
• Share of animal products
• Share of seasonal products
• Share of avoidable food waste
• Share of organic products
• Share of regional products
• Use of GMO-free products
• Share of sustainably caught fish products
Social aspects:
• Share of fair-trade products
Health aspects:
• Energy (kcal)
• Amount of fruit and vegetables
• Fibre content
• Warm-keeping time of meals
Economical aspects:
• Popularity
• Cost coverage ratio

Following indicators have been chosen for NAHGAST Meal-Pro:
Ecological aspects:
• Material Footprint
• Carbon Footprint
• Water consumption
• Land requirement
• Cumulative energy demand
• Influence on biodiversity
Social aspects:
• Share of fair-trade products
• Share of animal products from appropriate animal husbandry
Health aspects:
• Energy (kcal)
• Fat amount
• Amount of easily usable carbohydrates
• Fibre content
• Salt amount
Economical aspects:
• Popularity
• Cost coverage ratio

Both sets were realized in shape of Excel tables with a quite complex formula architecture. The tables
allow entering the recipe’s data; especially every single ingredient with the exact amount in grams, in order to obtain automatically generated results.

During the implementation of the Basis and Pro sets, selected meals of the participating practice partners from the catering sector were evaluated repeatedly in order to test the tool for its practicability and to continually improve it in an iterative process. Within this process, approximately 100 previously specifically selected meals have been evaluated. The dishes had been selected using eleven categories from the stew to the schnitzel. Of all five participating practice partners, two to three dishes were placed in each category. This procedure allows comparisons between the partner’s food offers.

On the basis of the meal assessments, it is now possible to draw conclusions, which dishes are “hot spots” (or which ingredients are hot spots) with substantial potential for improvement in the direction of sustainable nutrition in the four dimensions ecology, social, economy, and health. After assessing the selected meals, scientific and practice partners have to join an intensive reflection of NAHGAST Meal-Basis and Meal-Pro and have to face some challenges regarding the tool’s coherence and the quality of results as well as options of presentation before continuing the one year case study for further testing the instrument and improving the dishes.

Conclusions & outlook
After integrating ecological, health-related, social, and economical indicators into a meal assessment tool, which consists of two sets – NAHGAST Basis and Pro – and after testing the instrument on a large number of meals, first results will be shown e.g. highlights of the meal assessment (dish categories, specific meals, ingredients). However, faced challenges will also be presented and discussed with the audience (e.g. correlation of indicators, assessment method and approach, weighting of dimensions, applicability).

Literature


Pro-environmental behavior, green identity and the role of income - a green lifestyle only for the rich one’s?
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Since the Rio-conference 1992 a global blueprint (United-Nations, 1992) for a sustainable development exists, pointing to the individual as the centre of efforts for sustainable development. Sustainability respectively a sustainable society requires different strategies to reach this goal, e.g. a change in the consumption patterns. The ecological literature indicates that sustainability can be reached through three different strategies, namely efficiency (reduction of the production input per unit), consistency (better technologies) and sufficiency (reduction of consumption) (Fischer et al., 2013). Regulation is discussed as a possible fourth category (Enquete-Commission, 2013).

One way to reach sustainability is pro-environmental behaviour. The term "pro-environmental" behaviour itself is used in the literature to describe all activities aiming at the reduction of the negative impact of the single individual (Kollmuss and Agyeman, 2002). Despite the obvious value-action gab which is proofed to be existent in various studies (Chai et al., 2015; Binder and Blankenberg, 2016a) further aspects impact on individuals behavior. An important factor is identity, the persons sense of self (Akerlof and Kranton, 2000, 2010), which has a strong impact on environmental behavior (Sexton and Sexton, 2014). The concept itself has a long tradition and its roots in psychology (e.g. Turner, 1975; Tajfel, 1978; Tajfel and Turner, 1979). The literature indicates that three elements define an individuals' social identity, namely categorization, identification, and comparison. Individuals systematize their social environment in labelled categories (Tajfel, 1982, 1978; Turner, 1975; Tajfel, 1974). They identify themselves with certain groups which helps them to distinguish between their in-group and out-groups (Stets and Burke, 2000; Tajfel, 1974). Furthermore, they compare the own group with other groups in favou of one's own group (Tajfel, 1974, 1978).

Identity and environmental behaviour are strongly related. Green self-identity increases the extent and intensity of green behavior yet even the greenest (self-identified) individuals do not consistently exhibit all pro-environmental behaviors (Binder & Blankenberg, 2016b).

Green lifestyles in general are oftentimes viewed as sacrifices. But, this also depends on the chosen measure of welfare. In the present paper, we base our work on a subjective well-being view. Welfare is not assessed by using ones income (an instrument; a means) but instead by the subjective well-being each individual derives by its life (“Beyond GDP”, Stiglitz et al., 2010; Binder, 2013, 2016b). Nevertheless, money is an important factor, given that the available amount of it also impacts on the opportunities each individual has. We will control for income classes. Analysing the gap between what
is possible and what each individual really does. Green behaviour and income classes will be matched with personal attitudes about the environment and the self-identity (green or not). Based on this subjective well-being framework our research question becomes how pro-environmental behavior, a green identity and income are linked to subjective well-being. Our paper thus contributes to the literature by assessing to what extent these factors impact on subjective well-being and how they are connected with each other, using the UKHLS panel data set. We explore whether green lifestyles are only for the rich ones. Previous research has shown that non-materialistic lifestyles even increase individuals subjective well-being (Pandelaere, 2016) and that adopting a green lifestyle assessed in the currency of subjective well-being is not a sacrifice at all (Binder and Blankenberg, 2016b).

Such findings will have a large relevance when it comes to implementing a green economy because acceptance will be higher if cutbacks in consumption will be offset in that way. Citizens might be much more likely to accept sustainability policies if these do not substantively impact on their well-being (or even improve it).

The paper is structured as follows. Background. Data. Results. Gap. Conclusion.

The environmental impact of individual behavior: self-assessment versus the ecological footprint

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An increasing number of studies have highlighted the urgent need for policies that promote environmental sustainability. Steffen et al. (2015) report that we have transgressed four of nine planetary boundaries (climate change, loss of biosphere integrity, land-system changes and altered biogeochemical cycles), while the World Wildlife Fund (WWF, 2014) reveals that we need 1.5 Earths to meet our current demands on nature as measured by the ecological footprint. As most environmental problems are rooted in human behavior (see, for instance, Gardner and Stern, 2002), social and behavioral research is crucial to address the issue of environmental sustainability (Pelletier, Lavergne & Sharp, 2008; Vlek & Steg, 2007). Changes in human behavior are needed to reduce environmental impacts (e.g., Steg & Vlek, 2009). In this regard, it is often argued that governments should look for ways to promote pro-environmental behavior. Yet, one of the preconditions for this is that individuals have a good understanding of the environmental impact of their own behaviour and of the environmental impact of pro-environmental activities (e.g. recycling or saving energy). The literature on pro-environmental behavior (e.g. Gifford & Nilsson, 2014) explores mainly how to measure this behaviour and its determinants (e.g. socio-demographic variables and attitudes towards the environment), but focuses less on the related environmental impacts (Csutora, 2012; Kennedy et al., 2015).

Our paper addresses this issue by (a) relating the determinants identified in this literature to a comprehensive measure of an individual’s impact on the environment, the Ecological Footprint (EF) and (b) comparing the individuals’ EF with how they assess their own environmental impact, which we call ‘self-assessed environmental sustainability (SAES)’. The latter allows us to explore to what extent people are able to self-assess the environmental impacts of their lifestyles. We investigate the determinants of the EF and the SAES for a sample in Flanders, Belgium (N = 1286).

Our results show first that mainly socio-demographic factors play a role in explaining the environmental impact of individuals: age and equivalent income are associated with a larger EF, whereas the number of people living in the house is found to be negatively associated to EF. Personality traits are found to be nonsignificant in the model, while the impact of attitudes towards the environment is more ambiguous. Individuals who are more concerned about the environment were found to have a lower EF, yet knowledge about environmental problems is not associated with the EF. Next, our study reveals that environmental sustainability is a difficult concept to self-assess.
correlation between the EF and the SS is small. However, when we take a closer look at the correlations between SAES and the different components of the EF, two interesting observations emerge. First, it suggests that individuals, when answering the SAES question, focus on specific aspects of their behavior — e.g. the components food, electricity, and paper use are negatively correlated with SAES, whereas the correlations between the heating, car use, and holidays components and SAES are not significantly different from zero and the use of public transportation is positively correlated to SAES.

Second, correlations are more likely to be significant when the actions underlying the different components are undertaken more actively, or on a day-to-day basis. Finally, we reveal that the respondents' self-assessed sustainability is mainly driven by variables other than their ecological footprint. Here we introduce the concept of judgment bias: individuals judge their level of environmental impact in the wrong way. Several of the traditional determinants of pro-environmental behavior can be linked to the judgment bias — e.g. individuals who are highly educated were found to underestimate their environmental sustainability. We find that the SAES answers mainly reflect concern for the environment or the extent to which they are informed about environmental problems, not their actual behavior.

These findings imply that governments should be actively participating in the sustainability transition. They can do so by promoting policies to lower the environmental impact of our societies, by informing citizens about the environmental consequences of their actions, and by highlighting the different options citizens have to reduce their ecological footprints. As for the research field working on pro-environmental behavior, our analysis strengthens the call of Csutora (2012) and Kennedy et al. (2015) that we should broaden our scope and not only focus on explaining the likelihood of individuals to engage in different types of environmental behavior, but also on the environmental impact they have through their lifestyle.

Bibliography
The Sustainable Welfare State: a Typology
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Until now there exist little research on the implication of ecological sustainability for welfare state theory. The frequent conflicts between social and environmental goals suggest that the relationship between the two may not be as symbiotic or at least independent as implicitly assumed. In this paper I present a typology of welfare states in their position to sustainability with a focus on western, developed welfare states. Starting from a sustainability proviso I argue that welfare states can be characterized by their extend of a twofold decommodification: citizen decommodification and state decommodification. Sustainable Welfare States feature high levels on both.

Citizen decommodification describes the extend to which the state relieves citizens from the need of marketization of their labour or any other need to constantly enhance their performance to ensure the meeting of their needs. This definition includes traditional concepts of decommodification in social policy, as for example characterized by Esping-Andersen [Esping-Andersen 1990:29], but is not restricted to that. Citizen decommodification is necessary in a Sustainable Welfare State because it enables citizen to step back from a growth-driving work-and-consume-circle. State decommodification describes the extend to which states can guarantee its social, economic and political system in the absence of economic growth. Both, the absence of capitalization of natural resources and a decommodified production, indicate high levels of state decommodification, and certainly "commodification is a fundamental tool for making economic growth possible" [Asara et al. 2015:378], but states could find others ways than commodification of labour, land or natural resources and remain within the growth logic for example through "the creation of debt to fuel growth or austerity policies to restore stability" [Asara et al. 2015:377]. What is essential to state decommodification is that economic growth per se is not endorsed by states nor necessary for their functioning.

One can classify countries by the levels of citizen decommodification and state decommodification. This results into four analytically different types: Firstly the Sustainable Welfare State, secondly the Eco-authoritarian State which both manage to stabilize without economic growth. On the other hand there is the Eco-investment State and the Eco-libertarian State which both need economic growth to stabilize their functioning.

Eco-authoritarian states cannot be found among western welfare states, because they are characterized by a very low level of state regulation when it comes to social and economic issues, which rule out the existence of a national welfare system. Even if citizens in these countries might be exempt from the pressure to constant performance enhancement it is not the state unburdening them from that pressure. Therefore Eco-authoritarian States have low levels of citizen decommodification. On the other hand they show high levels of state decommodification, i.e. the states are able to stabilize without economic growth.

What distinguishes Eco-authoritarian States from the other three types is the prominent absence of the state in social or economic matters.

Eco-libertarian States differ from Eco-authoritarian States in their reliance upon economic growth for political justifiability and the predominance of the market as the locus of economic distribution. Eco-libertarian States show low levels of citizen decommodification and low levels of state decommodification. Since they tend to be democratic as concerns the political, but not the economic sphere, their main challenge is to ensure that voters share the impression to have enough possibilities for securing their needs through the markets. Here economic growth is not primarily necessary for state budgeting but for political reasons.

Exactly reversed is the challenge to Eco-investment States: With a higher level of citizen decommodification, which in these states is mainly expressed in terms of economic security in times of joblessness, economic growth becomes less necessary from a political perspective but increases to be necessary for a balanced state budget. Eco-investment states are characterized by higher citizen
decommodification and low state decommodification. Conservative welfare states rest between the Eco-investment State and the Eco-libertarian State: The state budget is more depending on growth than in Eco-libertarian States but higher stratification levels [Esping-Andersen 1990:17] than social-democratic states set strong incentives for income and status competition on the individual level and result in lower citizen decommodification than social-democratic states.

What both, the Eco-libertarian and the Eco-investment State share and which became more evident with the transition to a service economy are the low levels of state decommodification. As Barry and Doran noted, in these countries serves "economic prosperity or growth as the main connection between democracy and individual freedom and social and political stability" [Barry/Doran 2006:270]. In an open economy this establishes a political focus on competitiveness and employment. With their growth-dependence all western welfare state therefore face the trilemma of the service economy [Iversen/Wren 1998], which means that they can (at best) fulfill two of the following three political goals: employment creation, equality, and budgetary restraint.

According to the follow-up study [Wren et al. 2012] this trilemma can be reduced through an increase in "high-productivity, internationally traded service sectors" [Wren et al. 2012]. The political strategy for developing a highly educated and competitive service sector is the social investment approach. A parallel to this approach can be drawn for the ecological modernization approach in environmental policies [Gough 2016], whereby higher state involvement, may it be through investment in green research or stronger environmental regulation, will ultimately strengthen the competitiveness of the national economy. Neither the social investment nor the ecological modernization paradigm (and either the combination of both) ensure that the sustainability.

The Sustainable Welfare State can be be distinguished from the others by high levels of both citizen and state decommodification. Contrary to the Eco-investment State and the Eco-libertarian State the Sustainable Welfare State is able to stabilize without economic growth, so there is no compulsion to increase competitiveness in the world market and no necessity to increase employment or productivity. Instead the Sustainable Welfare State focuses on how the basic needs of its citizen can be best met and how a high quality of life can be ensured while staying within ecological sustainability, leaving the same opportunities for other countries. Three levels of justice are therefore relevant: intergenerational, international, intranational justice. Eco-investment and Eco-libertarian states tend to solve the question of intranational justice through economic growth, which prohibits international justice (unless intergenerational justice is abandoned). Since economic growth is not an option to avoid distributional conflicts in the Sustainable Welfare State, income and wealth distribution and with it the principle of equality is back on the agenda. The Sustainable Welfare State therefore stands in opposition to Eco-libertarian States, which have ceded equality for the sake of employment growth and fiscal discipline [Iversen/Wren 1998:514].

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Integrating sustainable development into economics curriculum

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The literature identifies that teaching and integration of sustainable development into economics undergraduate courses is currently often not common place, from interviews with 54 students from three leading US universities for economics, Green (2013) identify that introductory economics courses place little emphasis on the environment and sustainability. The situation is also seen when going through the content of mainstream undergraduate economics text books, typically the economy is seen as the ‘whole’ with no discussion of where the actual inputs and material outputs to and from the economy are coming from/going to, and limits and constraints in relation to these systems. This is so, even though society is already breaching quite a number of key global environmental pressures as a result of the very high material throughputs and consumption of our societies. With generally continued exponential economic growth in countries such as the UK and America (and most other countries), and only relative decoupling of resource use and pollution from output in most situations, the sustainability of our economies is currently low. Given this situation, there is a need to transform economics to incorporate sustainable development. This needs to happen at the ‘grass roots’ level in economics curriculum and teaching of our future economic leaders. This is the subject of the current paper.

In the past when economics (and business) courses have educated on sustainable development, this is usually through a module on environmental economics, economics of the environment, or sustainable business or alternatively to tack the subject on at the end of the course. If provided as an elective module, some students may not attain exposure to sustainable development in their entire course. Recent literature has argued for integrating into main programmes.

The current paper presents research investigating a first attempt at the process of embedding sustainable development into the main programme of an economics department in a university based in the UK. The paper investigates the success of the intervention, to see if it had a ‘deep’ or ‘incremental’ effect on integrating sustainable development into economics curriculum. The study was an intervention study, methods of investigating the intervention included analysis of course material after the intervention, as well as surveys and interviews. The study was also a longitudinal form of study, there have been very few longitudinal or intervention based studies on this topic and the methodology makes use of data from both academics and students to gain different perspectives on the topic. The study finds that the effect of the intervention to integrate sustainable development into economics curriculum after 2 years resulted in incremental integration at best and not a deep integration, many modules did not show any significant incorporation of sustainable development into curriculum. A further analysis a further year later however showed that there had been some progress from the initial intervention (and update) but that there was a time delay. Interviews explored the reasons for this and barriers to integration of sustainable development. A range of key barriers are identified in the paper and discussed as well as potential solutions. Some of the findings apply in economics departments across the UK and possibly elsewhere in the world. In this way, the work can inform future attempts at integrating sustainable development into economics curriculum. Towards the end of the paper, recommendations are made for future research on this topic as a result of the findings of the paper.

Climate change concerns in academia: epistemic cultures of (dis)engagement

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Following the invitation for ecological economics to contribute to generating inclusive and reflective research, especially as advocacy for environmental and social justice through, among others, empirical
insights and real-life impacts; we present the results of empirical research of climate change concerns and related public engagement on young researchers in Croatia. The specific issues of global anthropogenic climate change links scientific and governance practices to the explicit spatial context of ecosystems and the biosphere, especially through professional cultural manifolds of anthropocentric-ecocentric spectrum. Our approach is rooted in political ecology and empirical social studies of science and technology, with focus on transformations towards sustainability. Our findings show that researchers in the technical and biotechnical sciences are significantly less concerned about rising temperatures due to climate change (even when compared to the general public), and hold more anthropocentric worldview compared to other scientists – especially natural scientists. More nuanced findings indicate that they exhibit a comparatively different culture of social engagement on behalf of complex global challenges, as well; preferring to address business for communicating their research results primarily towards industry, as well. We find that their dominant anthropocentrism significantly impacts their overall climate change concern.

In order to test our hypotheses, broadly classified as quantitative literacy (Bucchi and Neresini, 2009) and epistemic/disciplinary culture (Knorr Cetina, 1999) rooted in the dominant social paradigm (Kahan et al., 2012), we used data from two surveys conducted in Croatia. The primary source of data used in this paper was an online survey carried out in 2014 on a representative sample of 215 young researchers employed in the Croatian academic system (aged 26 to 45, with a median age of 33), from all scientific disciplines. At the time the survey was carried out, around 37% of respondents were research/teaching assistants (doctoral candidates), around 43% were postdoctoral researchers and around 20% had permanent/tenured positions. The secondary source of data used was a national survey within the ISSP module Environment carried out in 2010 on a representative sample of 1000 respondents through face-to-face interviews. This survey was used as a supplementary data source to analyse the attitudes and values of the general population in Croatia. For the purpose of our analyses, we extracted the answers of those respondents belonging to the same age group as the young researchers in the first survey, which resulted in a sub-sample of 362 respondents aged from 26 to 45. Although drawing from empirical research conducted within a particular national academic community within a small semiperipheral European country, we find no reason to assume the respondents to be parochial or of a special case within a broader European and global research community. Especially among young researches, position within a small semiperipheral nation enforces a strong pressure of international collaboration and socialisation, irrespective of scientific discipline the number of young researchers’ international publications and collaborations are above average across academic spectrum. There is also no theoretical rational to single out the biotechnical and technical sciences in Croatia as differing substantially or being more parochial in terms of their disciplinary values and social engagement when compared in an international context. The semiperipheral status of Croatian national culture and economy positions it well for connections with the global core and peripheral cultures, whilst allowing it sufficient fluidity and variability within which to test multiple hypothesis about sources of climate change concern and activation (Chase- Dunn and Hall, 1997; Domazet and Marinović Jerolimov, 2014). However, although we do have a representative sample of young Croatian researchers from different disciplines, it should be noted that the groups of respondents are rather small in size. But the very fact that the sample was limited in size leads to conclude that our research shows important trends in values and orientations of young scholars of different disciplines: namely, significant variability was found despite the small sample.

Our findings about the comparative lack of climate change concern among biotechnical and technical young researchers, and their associated culture of social disengagement portend importance with respect to their special place in the political framework and everyday functioning of Western democracies (and beyond). The engineering profession is an important locus of power relations in modern states. The large and complex technical systems in which engineers have unparalleled influence (that is largely unquestioned by society) have the ability to: curtail individual autonomy by restricting the opportunities for personal choice; tip the scale in the relationship between the political forms embodied in various technologies and the collective capacity for action; play a role in nearly every powerful institution of our time (cf. Verbeek, 2006). We propose to open up a discussion on
whether engineers are indeed public welfare watchdogs through maintenance of complex technological infrastructure supporting contemporary social metabolism of ‘developed’ societies, or whether they have instead been turned into instruments of profit. The recent work of Cech (2013, 2014) showing that engineers at US universities are socialised through their higher education into what she describes as a ‘culture of disengagement’ is our starting point, but broader discussion of the role of technology in modern growth and future degrowth societies will also not be avoided (Illich, 1973). Elements of this culture of disengagement can be found in the values and preferences expressed by the young engineering scientists analysed in our paper — which is a worrying finding. They are mostly concerned with communicating their results towards industry and (more worryingly) display an anthropocentric worldview and a lack of concern about climate change. These findings have potentially serious implications regarding the feasibility of achieving transdisciplinarity and new knowledge production that would engage with the explicit spatial context of ecosystems and the biosphere.

REFERENCES

Energy for well-being: Quantitative and qualitative insights into the relationship between energy services and human needs in Colombia
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The importance of energy for development has recently been recognised by the United Nations, with the inclusion of a specific Sustainable Development Goal related to energy (UN 2016) and the Sustainable Energy for All (UN SE4ALL 2014) initiative. The UN’s Secretary-General Ban Ki-Moon put it nicely when he stated: “Energy is the ‘Golden Thread’ connecting economic growth, social equity and environmental sustainability”. How the ‘Golden Thread’ of energy connects to environmental sustainability is widely understood, and there is a lot of research that has been done around the relationship between energy and the economy. However, and despite significant quantitative research carried out around the relationship between resource use (including energy use) and human well-being at a national level, the relationship at the household level is still largely unexplored. Exploring the latter is the goal of this study, and it is important because household level analysis can reveal particular local circumstances that might be lost when looking at the national level.
Before we proceed, however, it is important to describe what is meant here by energy use and well-being, and why Colombia was chosen as a case study. First, energy use is understood here beyond the traditional category of final consumption/demand, and instead extends further, towards energy services - which are what people ultimately want from energy (e.g. thermal comfort rather than cubic meters of gas). Such an understanding of energy use is more relevant to a household level scope of analysis. Second, well-being is framed here as the social conditions that enable people to fully participate in their society, as opposed to more individual views of well-being. This conceptualisation comes from a tradition of human needs perspectives, including the work of Doyal and Gough (1991) and Max-Neef (1991). Third, Colombia has been chosen as a case study given its relatively low energy use and relatively high human well-being at a national-level (Steinberger and Roberts 2010). The country is very diverse in terms of physical geography, as well as cultural and socio-economic characteristics, with high levels of inequality. So, when coupled to good data availability, it makes a suitable basis for the case study.

The aim of this presentation is twofold. Firstly it will discuss the quantitative insights gained into the relationship between energy services and human needs in Colombia. The analysis is based on household surveys from Colombia, which contain vast information on both human needs and energy services at the level of individual responses. Structural Equation Modelling (SEM) was chosen as the data analysis technique because it is particularly well suited to assess unobserved (latent) constructs, such as human well-being and energy services. SEM is a technique widely used in social sciences, psychology, health sciences and management, but not much applied in energy-related studies. The insights gained from this analysis will be useful to inform decision-makers about the way in which different energy services contribute to the satisfaction of different human needs.

Secondly, it will discuss the qualitative insights gained from workshops run in Antioquia, a region of Colombia. Antioquia’s capital city, Medellín, has won two city awards in the past three years* for tackling violence, undertaking “social urbanism” projects and improving social participation. Antioquia’s particular approach to urban and regional planning make it an interesting case study. The workshops intend to delve into the local realities of an urban and a rural community of Antioquia from the perspective of its inhabitants. These workshops will allow to understand in detail how energy services contribute to well-being satisfaction in urban and rural communities in the county of Antioquia. But also, they will allow relevant stakeholders to share their points of view and jointly explore alternative sustainable pathways of energy services access and use that will empower the communities to improve their human needs fulfilment.

Overall, this study presents several novel contributions in relation to information generated through both the quantitative and qualitative analysis. Such work is becoming particularly relevant now that there is a need to align climate goals with development goals.


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The metabolic pattern of the Spanish agricultural sector: energy and water requirements of an industrialized agriculture
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In the last decades, the Spanish agricultural sector has experimented with important changes in their productive structure. According to FAO data, while the volume of vegetable production has remained fairly constant during the last two decades (with some decreases due to climate variations) the production of meat has constantly increased. This change has been accompanied by a steady growth in imports of feed and exports of animal products. As well, the production of vegetables for feed has nearly doubled during the last two decades. In parallel, traditional products such as wine, olive oil, tomatoes and citrus have continuously increased their participation in international trade (i.e. exports) in volume and economic terms.

Spain is considered one of the most vulnerable European countries to climate change: this region would face further increase in temperatures and decrease in rainfall in the upcoming years and decades (European commission 2009, Agencia Estatal de Meteorología 2009). Therefore, water availability is expected to change as well: Spain would face higher inter-annual variability as well as higher incidence of heat waves and droughts, experiencing longer periods of hydric deficit along the year (Ministerio de Medio Ambiente, 2005). These impacts would be more pronounced in the south, south-east and the Mediterranean coast (CEDEX 2011), regions characterized by their high shares in agricultural production. In this context we aim at answering the following question: What are the current requirements of water and energy resources from the agricultural sector and its current metabolic pattern?

In order to answer this question we describe the evolution of the metabolism of the agricultural sector during the last 20 years in order to analyse its metabolic pattern, and assess the requirement of resources, the generation of added value and jobs. The analysis is based on the Multiscale Integrated Assessment of Societal and Ecosystem Metabolism approach (Giampietro et al, 2009)

In order to do so, we first analyse the FAO food balance sheets of the Spanish agricultural sector for the selected period. From this analysis, we identify the main crops produced, imported and exported in Spain. We assess the dependency of the Spanish agricultural sector in terms of total share of imports and their destination within the agricultural sector. As well, we assess the size of the internal loop of food within the sector; that is, the share of food used to produce food (e.g. as feed). The analysis of agricultural production is complemented with the assessment of labour and land requirements, and the production of added value. Results show that the contribution of the Agricultural sector to the Spanish economy is about 4-5% in terms of jobs creation and about 2-3% in terms of added value. This situation contrasts with that of the agro-industry, which has doubled the generation of added value during the last 20 years (overpassing the whole agricultural sector, with half of the labour requirements.

Secondly, we analyse the requirements of natural resources used within the agricultural sector. We focus on the consumption of energy carriers (i.e. liquid fossil fuels, heat and electricity) and the consumption of water. For the analysis of the energy carriers, we analyse the energy balances of the Spanish economy and we look for relations between changes in the productive structure of the agricultural sector and changes in the consumption of energy carriers. Preliminary results show an increase in the use of fuels for heating (i.e. natural gas, liquefied petroleum gas, biomass) related to the growth of intensive livestock raising and an increasing mechanization of the agricultural sector (measured in terms of energy consumption per hour of human activity allocated to the agricultural sector and per hectare of land use).

We also focus the analysis on the consumption of water. In this sense, we evaluate water requirements associated to the agricultural production using technical factors used in CropWat FAO software. Preliminary results show that variability of water requirements is related to variability of cereals
production, whose availability for the livestock industry is stabilized by means of imports. As well, the increase of water requirements is related mostly to exported crops.

**Measuring EROI (energy return on investment) on a national level using an Input-Output framework**

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The concept of energy return on energy investment (EROI) is part of the field of study of net energy analysis (NEA), and is one way of measuring and comparing the net energy availability to the economy from different energy sources and processes. In broad terms, it can be understood as “the ratio of energy returned from an energy-gathering activity compared to the energy invested in that process” (Hall & Kiltgaard 2012, p.310). Building on a long history of ideas in biophysical economics (see, for example, Cleveland, 1987), this concept has been used by (e.g. Hall and Kiltgaard (2012)) as a basis for further developing an energy-focused approach to the economy.

EROI-based studies are driven by general concerns about changing levels of energy inputs and energy outputs to and from the energy sector, and its impact on the wider economy. More specifically, these concerns are around a decline in the EROI of fossil fuels and low levels of EROI for alternative energy sources. This is important, as the higher the EROI of an energy supply technology, the more “valuable” it is in terms of producing (economically) useful energy output. In other words, a higher EROI allows for more net energy to be available to the economy, which is valuable in the sense that all economic activity relies on energy use to a greater or lesser extent. In the case of fossil fuels, it is argued that the depletion of easily recoverable fossil fuel reserves is outpacing technological advancements for the improvement of fossil fuel extraction, leading to lower levels of EROI for these fossil energy sources (see e.g. Dale et al., 2011; Gagnon et al., 2009; Lambert et al., 2013). Moreover, some authors (e.g. Dale and Benson, 2013; Hall et al., 2014) have argued that the EROIs of many renewable energy technologies necessary to decarbonise global energy supply are currently lower than the fossil fuels that they need to replace. In addition, the future trends in the EROI of renewable energy systems are very uncertain – being dependant both on the pace of technological innovation (which may increase EROI) and the need for increased back-up generation and storage (which may decrease EROI from a full energy system perspective).

Analyses of the EROI of different energy sources and their extraction/capture processes are relatively common, with Cleveland (2005), Brandt (2011), and Hall, Lambert, & Balogh (2014), amongst the most recent studies. These are important in terms of presenting a picture of the potential contribution of different energy supply technologies to the energetic needs of the economy. However, less attention has so far been paid to determining EROI values for national economies, which is an important omission given energy policy is made at the national (not energy source) level. A national-level EROI estimation requires a different methodological approach to traditional EROI analyses due to the mix of particular resource locations, exploitation times and technologies applied to “produce” energy, i.e. to extract fossil fuels and capture flows of renewable energy in a given national territory.

This study responds by developing a novel application of an Input-Output (IO) methodology using Multi-Regional Input-Output (MRIO) data. This directly addresses the need to develop a consistent and robust method for measuring EROI for national economies (EROInat). The approach is based on - to the best of our knowledge - a novel application of MRIO analysis. Its key contribution is to provide an estimation of indirect energy investments at a national level, a number that is not gathered by traditional energy agencies. Hence, we consider it a step forwards towards the call made by Murphy and Hall (2010, p.115) for improved “quantity and quality on the data on ‘energy costs of energy generating industries’”.

We found that the UK as a whole has had a declining EROI in the past decade. This information is important, particularly for a country that is aiming to transition to a low-carbon economy. Other
authors (Herendeen 2015; King et al. 2015) have attempted to connect EROI values to the price of energy and other services in order to give them more policy relevance. We argue that the methodology described here has the potential to inform national and international energy policy. Once developed further, for more countries and more years, the results can answer important questions such as:

- Which countries are extracting and capturing energy with a better return to their energy invested?
- Which countries are doing better in terms of technological development and/or resource conservation?
- How do EROInat values for different countries relate to their energy imports and exports?

The key relevance of a national-level EROI lies in its potential to inform national-level energy policy making (Carbajales-Dale et al. 2014), since over time it provides information on the relative resource depletion and technological change in a country’s energy sector. Given the emerging interest in alternative tools for energy analysis and the pressing need of a transition to a low carbon economy, this IO-based method could mark an important new direction of EROI analysis.

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The contemporary debate within ecological economics seems to be stuck in a rather unconstructive capitalism vs. no-capitalism dispute when it comes to thinking about change. On one hand, degrowth advocates and Marxist inspired scholars recognise deep-seated problems of capitalism which require to overcome the system. This view gets attacked for a lack of feasibility, especially given the short time frame left to trigger large-scale changes needed. Post-growth advocates, on the other hand, make the case for zero growth or steady state economies and the need to restructure institutions to deal with resulting distributional conflicts. This view gets attacked for a lack of feasibility too, on the grounds that it lacks a realistic understanding of capitalistic accumulation and power dynamics (Hahnel, 2012). Green growers represent a third camp who call for reforming the system from within. They get attacked from post-growthers, degrowthers and Marxists alike for not addressing fundamental flaws of the system and being too pragmatic (Spash, 2013). Moreover, advocacy for strong States to endorse green or post-growth policies become more unlikely in the current political atmosphere of rising populism and continuing neoliberalism. What remains is a widespread feeling of helplessness and frustration as the contradictions between what should be done and what is being done in practice widen.

Against this background, the question emerges what a sensible contribution from research might look like that fosters a more constructive, collaborative and fruitful debate that transcends the capitalism vs. no-capitalism divide. In other words: how can we think about change differently in a way that opens up spaces for creative thinking rather than closing them down?

Ambition of this research

This paper explores the usefulness of systematic dialectics for ecological economics. The subject of dialectics is how to capture change and interaction in thought (Ollman, 1993). Systematic dialectics as one particular branch of dialectics seems especially 'fit for purpose' for ecological economics because it was the methodology used by Marx to set up the theoretical architecture of Capital. It guided Marx to derive realistic representations of capitalism as a complex adaptive system. Marx’ account of capitalism is crucial because it offers an unparalleled explanation why system-inherent dynamics prevent the large-scale adoption of sustainability practices, i.e. structural barriers against social ecological transformation. The destruction of environments is predominantly explained as an unintended by-product of profit-seeking, labour productivity increases, competition, and the role of money in the system. Understanding these dynamics is the prerequisite for thinking constructively about change, because without a sound understanding of how the current system functions and how it is entangled with qualitative and quantitative environmental shifts, no sensible imaginaries of alternative better futures can be envisaged.

Systematic dialectics is a promising methodology to think about change towards because it -) starts from empirical reality (in motion, thus capturing change, dynamics), but does not get blinded by it (Marx’ theories of fetishism),
-) aims to grasp the whole object of inquiry (capitalism embedded in the biophysical world),
-) traces relationships and interconnections (the intertwined nature of material and social relations that are key for social ecological theory),
-) identifies structures that are more essential than others (i.e. capital more essential than interest rates), with associated claims for progressive politics (i.e. don’t tinker around controlling interest rates or rent but tackle root problems around the social relation of capital);
-) locates sources of historical change (e.g. in conflicts) and allows to incorporate fiction into reality – which is essential for envisioning sustainable futures.

This paper introduces Marx’s methodology of systematic dialectics to ecological economics. It draws on classical Marxist thinking and also the contemporary eco-Marxist debate (Foster and Burkett, 2016;
Malm, 2016; Moore, 2015) that has started to emphasise methodological issues more prominently. The aim is to open up new spaces to think differently about change, synthesise similarities between different positions within ecological economics and derive ideas how to transcend the capitalism vs. no-capitalism divide. Pioneers in ecological economics such as Kapp (1961) or Ravetz (1994) have acknowledged the importance of dialectical thinking for integrating knowledge and developing sound foundations of the field. However, such methodological investigations have remained extremely limited within ecological economics. This paper aims to address this gap to some extent.

The main research question guiding this research is: What elements of Marx’ dialectical reasoning can inspire theorising in ecological economics? (beyond naivety – utopianism – pragmatism). In other words: how can Marx’ way of thinking be applied to progressive ecological economics today.

Expected results
This paper will provide methodological insights and building blocks from Marxist methodology for ecological economic theory. The special session on ‘Developing consistent theory for social ecological economics – where do we stand?’ provides the ideal platform for discussing these elements and sharing ideas how to take this research forward.

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Global cropland demand of the EU non-food bioeconomy
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A rapidly growing share of global agricultural areas is devoted to the production of biomass for non-food purposes. These products include, for example, fibre crops, oilseeds and cereals, which are used for the production of textiles, biofuels, detergents or cosmetics. In 2010, 12% of the globally available cropland was used for non-food purposes, an increase of 37% since 1995.

Given the far-reaching global implications of an expanding non-food bioeconomy, robust methods and indicators need to be developed and applied, in order to properly assess the bioeconomy’s resource use from a footprint perspective. However, significant knowledge gaps still exist. This article presents first modelling results on Europe’s global cropland demand for non-food products generated with a newly developed hybrid land flow accounting model. It covers all cropland areas related with the production of non-food commodities derived from crop and animal products. The study uses a hybrid top-down accounting approach to track cropland embodied in biomass flows along global supply chains. The modelling framework integrates the physical accounting model LANDFLOW (Prieler et al., 2013) and version 3 of the multi-regional input-output model Exiobase (Tukker et al., 2013; Wood et al., 2015).
The advantage of applying a global top-down approach is that it avoids double-counting and tracks all global flows comprehensively and consistently from primary production to final consumption. At the same time, it is limited in detail, as it operates based on globally available agricultural and economic statistics. As a consequence, while all kinds of products from biological sources are covered - e.g. textiles, leather products, lubricants, bioplastics, etc. - the models do not allow reporting all these products separately, but for rather aggregated product groups such as vegetable oils, covering all products derived from vegetable oils including, for example, biofuels, cosmetics, detergents and lubricants.

The cropland footprint of non-food products can be approached in two – equally relevant – ways. First, quantifying the cropland footprint of the inputs required by the industry of a country to produce bio-based materials, products and fuels (“industry perspective”); and second of the bio-based materials, products and fuels consumed in a country (“consumer perspective”).

Through the analysis of global patterns of raw material producers, processors and consumers, it is shown that despite being only the fifth largest producer region, the EU is a major processor and the number one consumer region of non-food cropland, giving rise to a significant dependency on imported products and to potential impacts on distant ecosystems. The overall cropland footprint of the EU’s consumption of non-food products increased by 23% from around 23 Mha in 1995 to 28.2 Mha in 2010, after reaching a peak in the year 2007 (with 31.5 Mha). While the vast majority of cropland embodied in the EU’s food consumption in 2010 stemmed from the EU itself (more than 86.5%, see Fischer et al., 2016), for non-food products only 35% (9.9 Mha) were based on domestic land resources. The remaining 65% of the cropland (18.3 Mha) was imported from outside the EU.

With 2.7 Mha of embodied land, China was a major supplying country, accounting for almost 10% of the EU’s non-food cropland footprint, mainly in the form of vegetable oils, maize, and fibre crops (or derived products). Indonesia, with 2 Mha, also provided large areas, largely related to palm oil. The ‘Rest of Asia’ group, including Malaysia, Bangladesh, the Philippines and Thailand, among others, supplied Europe particularly with vegetable oils, rubber, plant fibres and non-food alcohol. North America also played an important role as an exporter of maize for industrial uses (e.g. in the form of starch and ethanol).

Looking at the product composition of the EU’s cropland footprint for non-food products in 2010 (28.2 Mha), more than one third (39%) was related to oilseeds, for example used to produce biofuels, detergents and cosmetics. This is more than double the embodied land of this category in 1995. Increasing consumption of vegetable oils was therefore a main determinant for the overall growth of the EU non-food bioeconomy cropland footprint. But also more traditional non-food biomass uses such as fibre crops (for textiles) and animal hides and skins (for leather products) contribute significantly to the EU’s global non-food cropland footprint.

The growing amount of land and biomass consumed by the EU bioeconomy adds to the already high land demand for food supply and indicates a growing pressure on planetary boundaries and issues related to global justice when it comes to a fair distribution of biophysical resources. This emphasizes the need for robust methods and indicators to monitor current and assess potential future developments of the EU bioeconomy. The quantitative results presented in this report are based on the latest advancements in footprint modelling to assess the land demand of non-food products. However, there is still significant room and need to expand the methodology in terms of including other commodities of key importance (e.g. timber and forest areas) as well as updating the calculations for the most recent years. Furthermore, methodologies to estimate the environmental and social impacts related to the European consumption of non-food bio-based products in regions all over the world are almost entirely missing. In order to take into account the regional differences in environmental and social conditions within producing countries, footprint methods need to move from the aggregated national to detailed regional or even local levels. Significant investment into research is therefore required to develop appropriate methods for analysing the potential environmental and social impacts of current policy and industry strategies related to the expansion of Europe’s bioeconomy.
Shaping a social-ecological economics of water: ontological, theoretical and methodological issues

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This paper stands as the introductory contribution to the special session “Towards an Ecological Economics of Water”.

According to the Dublin Statement on Water and Sustainable Development (1992), “Water has an economic value in all its competing uses and should be recognized as an economic good”. This statement is in line with a large part of mainstream academic literature (Gibbons, 1986; Winpenny, 1993; Spulber and Sabbaghi, 1994; Green, 2003; Young and Loomis, 2014) and has major policy implications on the preferred ways to manage water resources. For example, the affirmation of the economic value would enable to cope with water scarcity in semi-arid regions (Anderson and Snyder, 1997; Winpenny and Camdessus, 2003; Griffin, 2016).

We consider this statement is misleading, first and foremost because of the ontological nature of water that is thereby promoted: it is at least too narrow, and even dogmatic and pernicious. That is why we object to this view, and we promote the recognition of water as an eco-social asset (Aguilera Klink et al., 2000) or as a common patrimony (Calvo-Mendieta et al., 2014).

In a recent paper, Spash (2013) identified three main “camps” in the ecological economics community, namely, new resource economists, new environmental pragmatists and social ecological economists. These camps can be determined by their epistemological, methodological and ideological positions. In this paper, our main objective is to contribute to shape a social ecological economics of water. Thus, we consider that the third approach is particularly relevant not only because it develops a radical critique to mainstream economics, but also and chiefly because it offers bridges between critical institutional economics, political economy and political ecology (Gerber and Steppacher, 2012). By considering mainly recent developments in the field of ecological economics (Thiel, 2014), we inventory and discuss the key elements to shape a social ecological economics of water. To reveal the potential and key challenges of such an approach, it will be compared to the way (mainstream) natural resources economics usually deals with water.

According to Spash (2013: 357), “[t]here is a distinct realist element to social ecological economics. This can be seen in criticism of orthodox economists as not facing the evidence of their own irrelevance
to modern economic systems”. Moreover, the ontological, theoretical and methodological foundations of social ecological economics are compatible with the way we consider water management, not merely in terms of economic performance, but as an issue of equity, distribution and justice. It is therefore necessary to stress the power relationships inherent to any collective action related to water management (Otero et al., 2011).

Then, what may be the foundations of a social ecological economics of water? Which comprehensive ontological framework is to be built up to characterize water systems? Which concepts and theoretical tools can be used to develop such an approach? What are the main methodological issues and how can the main contemporary topics dealing with water management be reframed through a social ecological economics lens?

In order to answer these questions, the outline of our paper is the following: the first section will briefly present the way natural resource economics deals with water, in terms of allocation, distribution and evaluation, in order to stress the shortcomings of such an approach.

Section 2, the core section of the paper, will first describe the ontological nature of water seen as an eco-social asset (Aguilera-Klink, 1995; Aguilera Klink et al., 2000) and a common patrimony (Calvo-Mendieta et al., 2014), and will detail the main components of the hydro-social cycle (Linton and Budds, 2014). Thus, it will lay the foundations of the ethical and equity stakes related to water. Then, this section will lead to discuss several concepts that can be used to frame a social ecological economics of water built upon ecological economics (co-evolution, social ecological systems, etc.), old institutionalism (characterizing collective action and the teleological and volitional dimension of institutional change) and political ecology (power relationships inherent to resources management and appropriation). Finally, from a methodological point of view, this social ecological economics of water implies adopting an interdisciplinary research framework, cross-cutting approaches (Jorda-Capdevila et al., 2016) and reflexive attitude, taking into account the historical dimensions of water management and involving a comprehensive approach of field studies, data and indicators.

Reframing our understanding of water from a social ecological economics perspective has also important implications on the way we deal with the contemporary issues of water management. That is why section 3 first exposes the way this approach may tackle the traditional issues of water resource economics (allocation, distribution and evaluation), but also more specific issues (knowledge, power relationships and justice) inherent to a social ecological economics of water.

These principles lay the ground to discuss, in the 4th section, several crucial topics dealing with water resources management, namely “Integrated water resources management”, the “Water-Food-Energy nexus”, the role of “ecosystem services” in water management, but also the water-related conflicts, water security and adaptation issues. We will show how a social ecological economics of water may contribute to renew our understanding of these issues. Thus, we want to contribute to the efforts of other ecological economists (Erickson et al., 2007) to shape sustainable pathways for water management.

References
Degrowth and wellbeing

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An increasing number of scholars now argue that developed economies will need to abandon economic growth as the prime economic goal and move through a phase of degrowth to achieve a sustainable steady-state economy if we are to prevent catastrophic climate change and sustainably manage non-renewable resources in the long run. Many scholars in this debate claim that it will be possible for wellbeing levels to remain the same or even improve in phases of degrowth. This argument is often based on notions of subjective wellbeing and supported with evidence that subjective wellbeing does not increase over time with rising levels of per capita GDP (e.g. Easterlin et al., 2010). While we agree that it will be necessary to end economic growth to prevent catastrophic climate change, we stress in this presentation, which summarises the main arguments from our current Palgrave Pivot book project on postgrowth and wellbeing, that current claims about the feasibility to maintain and improve human welfare and wellbeing under post-growth require more critical debate. This will also be important for developing adequate policy proposals for maintaining and improving wellbeing under degrowth.

First we propose that this debate should adopt a more comprehensive approach to wellbeing which includes objective concepts and dimensions of wellbeing. For instance, both the capabilities and universal human needs approaches identify health, education and physical security (amongst other dimensions) as important means to achieve overall wellbeing (Gough, 2015; Nussbaum, 2003). From this perspective, it is important to ask to what extent various objective dimensions of wellbeing are related to income or economic growth. Currently, these dimensions are embedded in (welfare) state systems which rely on economic growth for their functioning (Gough and Meadowcroft, 2011). Furthermore, empirical research has shown that various objective dimensions of wellbeing, including...
people’s health and relationship status (Deeming, 2013) or social capital (measured by the extent to which people donated money to charity) (Helliwell et al., 2015), influence subjective wellbeing outcomes. If this is the case and if economic growth influences performance of these objective dimensions, it is likely that growth still indirectly matters for subjective wellbeing. It might also explain why people’s subjective wellbeing still significantly varies within and across countries with their income status (Deeming, 2013; Fritz and Koch, 2016; O’Neill, 2015).

Second we argue that we do not yet understand very well, conceptually and empirically, the multiple ways in which rapid socio-economic change, and degrowth/economic contraction in particular as a specific example of such change, affect subjective and objective wellbeing. Sociologically, we can conceptualise the generation of wellbeing as an outcome of social practices (which mediate between agency and structures and hence continuously reproduce or change agents and structures). From this perspective, socio-economic transitions will inevitably require changing structures at both social and agent levels (e.g. distribution of resources, institutions, discourses at the social; values, understandings, skills and other dispositions at the actor level), as well as technologies/infrastructures. It is likely that changes in these multiple dimensions need to be well aligned with each other to enable the maintenance or improvement of wellbeing in phases of degrowth. Therefore, problems may occur if these changes do not operate at similar time scales or if they are in other ways out of sync. An example is the relationship between the availability and distribution of various types of resources on the one hand and collective and individual understandings of life goals and related cultures and discourses on the other. While it has often been assumed in past research on subjective wellbeing that people’s expectations adapt quickly to changes in incomes and living standards, more recent research maintains that this is not necessarily the case (Helliwell et al., 2015: 16), especially if living standards are falling, which could be explained by the phenomenon of loss aversion (Tversky and Kahneman, 1991). This implies that transitioning away from a growth-based consumer society would need to be accompanied by changes in people’s values and wider cultural discourses to avoid perceptions of deteriorating living standards, sacrifice, etc. and the negative wellbeing implications that such perceptions might have.

The purpose of discussing these issues is not to argue that (subjective and/or objective) wellbeing necessarily relies on economic growth, but to stress that we need to better understand the ways in which wellbeing may currently be intertwined with economic growth (and the institutions which support growth), and hence to gain insights into required social and institutional changes to decouple wellbeing and growth. For instance, there is some evidence that greater social equality contributes positively to several dimensions of wellbeing, including health, social capital and trust (Wilkinson and Pickett, 2009). It is also plausible that greater social equality can minimise possible negative effects of economic contraction on people’s wellbeing, and several authors have emphasised that degrowth would need to be framed by more redistributive institutions to maintain or even improve wellbeing (e.g. Schneider et al., 2010). It is likely, however, that many institutional changes that constitute radical departures from current economic and social practices, including principles of distribution, will need to be embedded in wider transformations of cultures and values to become politically feasible choices.

References
Elements of a Low Carbon Industrial Strategy

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The Paris Agreement has committed countries to holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C (United Nations, 2015). The scale of these ambitions is widely regarded as needing a transformation of the economies of both industrial and developing countries (Hermwille, 2016; International Social Science Council (ISSC) and United Nations Educational Scientific and Cultural Organization (UNESCO), 2013). An important aspect of such a transformation is structural change in economic activity – a shift away from fossil fuel and material intensive industrial production to low carbon activities that foster wellbeing with reduced environmental impacts. Industrial policies have proved to be useful tools for economic restructuring in the past; a low carbon industrial strategy could contribute to sustainability transformations.

In this paper, we draw on insights from innovation systems and sustainability transitions literatures and economic analyses of industrial policies to identify important elements of a low carbon industrial strategy. These suggest that the pursuit of low carbon industrial strategies entails the creation of an industrial economic system characterised by:

• An entrepreneurial state that pursues a mission-oriented approach to supporting innovation (Mazzucato, 2014). This requires the state to have the resources and capabilities to implement appropriate policies, and to be embedded in the industrial economy through appropriate institutions so that it is informed but not captured (Rodrik, 2014).
• The missions of low carbon industrial strategies should aim to develop renewable energy industries and the implementation of circular economy practices for an economy that functions within planetary boundaries (Mathews, 2015).
• A demand side focus is as important as production, so that innovation in end-use technologies with potential for efficiency gains are not neglected (Wilson et al., 2012).
• Policies for innovation must account for the whole innovation system, from basic research through to market dissipation, and the resources and institutions that support it (Wilson and Grubler, 2015).
• Green finance is widely recognised as crucial to the success of a low carbon transformation, but the organisational forms providing finance are important in determining the direction of transformation and its success (Hall et al., 2016).

The creation of such a system implies the need for strategies that take a long-term perspective and are capable of reacting to change by learning. Mission-oriented policies must be implemented with an
understanding of the risks of failure. A portfolio approach recognises that investments are made to support long-term trends of cumulative innovation and that some technologies or processes will inevitably be dead-ends. The institutions and organisations that support innovation system, and the industrial strategies and policies that govern them, must be able to adapt to the evolving socio-technical systems in which they are embedded. As new technologies emerge and old technologies become superseded, and as social practices shift, governance arrangements must respond appropriately to mitigate the risks of incumbent lock-in.

These elements of a low carbon industrial strategy could then have the potential to contribute to a low carbon transformation, and, we argue, could be supported by a broad coalition of stakeholders. The implementation of policies according to these strategies should take an evidence based approach, with policy effectiveness assessed by metrics that reflect the goals of low carbon industrial policies. Identifying and agreeing on relevant metrics may be subject to more radical interventions than the status quo, for example by taking improvements in social wellbeing as a policy goal, rather than prioritising GDP growth.


Wind energy conflicts: a global comparative perspective

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Wind energy is expanding worldwide. Stimulated by climate change and energy concerns, large-scale facilities are being increasingly organized throughout the rural corners of the world. At global and national scales, this trend is celebrated as a clear step to promote sustainable energy transitions. At local scales, however, such processes are bringing new forms of environmental change and conflict. Whereas a considerable body of literature has approached social opposition towards wind energy projects, studies have mainly followed a managerial perspective applied to a narrow socio-geographical sample (relatively affluent communities in Europe, the U.S and Australia). As large-scale investments reach new geographical locations, more empirical evidence and analytical approaches are needed. This exploratory paper presents an inventory of wind energy conflicts located in different locations of the Americas, Europe, Africa and Asia. By analyzing this comparative dataset, the study
seeks to address the distributional dimensions related with wind energy projects, interrogating how these aspects are materialized and contested in different socio-geographical contexts.

Each conflict of the inventory was filled within the Environmental Justice Atlas database, following the general methodology of the platform. For selecting these cases, two criteria was established in advance: 1) covering those countries of the “global south” that are rapidly experiencing investments in large-scale projects; 2) Including new cases in the “global north” evidencing plural claims and actors affected by wind energy investments. While each conflict has been individually studied and systematized in the platform, the usage of pre-established categories helps to compare common trends and diverse patterns between cases.

Results are discussed in terms of two central aspects. On one side, the comparative dataset suggests the emergence of a new global “energy frontier”, aiming to supply clean electricity inputs for particular regions and economic sectors. Either if located in northern or southern countries, wind energy projects spatially expand throughout the rural peripheries, reproducing existing inequalities in energy production and consumption patterns. The expansion of these frontiers, however, drive particular impacts at the local scale, where affected communities mobilize claims and values attached to the territories at stake. While the existing literature has covered cases of affluent communities claiming aesthetic and economic values over the local landscape, this paper includes cases of conservationist groups protecting rich biodiversity areas, and marginalized communities defending multiple values attached to their livelihoods and identities.

Taking the analysis as a whole, the study hypothesizes that wind energy projects are embedded in a wider socio-political frame, where specific world views and social groups are privileged in detriment of others. By mobilizing against uneven energy transitions, disputing actors help to shed light over the trade-offs and political dimensions entailed in the seek of alternative energy futures.

Climate financial bubbles: How market sentiments shape the transition to low-carbon capital

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The macroeconomic implications of carbon budgets

Academic research on the effects of climate on financial stability is rapidly expanding (Dietz et al. 2016; Battiston et al. 2016). The aim of this literature is to study the financial implications of both climate dynamics — impacts of climate-related damages to productive capital — and climate mitigation — impacts of policies imposing a strong reduction of greenhouse gas emissions. Respecting the 1.5-2.0°C target on the increase in global temperatures as agreed during the Paris Conference in 2015 will require a large proportion of fossil fuels to be left in the ground, becoming ‘stranded’ (McGlade and Ekins 2015). The valuation of the companies operating in the sector would be negatively impacted as the reserves of oil, gas and coal represent the core assets of their businesses. Some of the companies in this field are among the largest in the world, and the wealth effects on investors holding their equities and debt could be considerable.

An equally relevant type of stranded asset is long-lived capital stocks that requires fossil fuels to operate, such as fossil-burning power plants and industrial processes, and the very large stock of infrastructure capital currently supporting and perpetuating the use of high-carbon fuels, such as mobility systems and energy grids. Imposing a carbon budget might lead a large portion of this type of capital stock to become idle (Rozenberg et al. 2015), with potentially deep impacts on both the firms owning it and the investors holding financial assets of those companies. Despite its increasing relevance in the policy debate, the academic literature on the financial implications of stranded assets, and in particular the one aiming at building economic models, is still very limited.

A Schumpeterian model of low-carbon innovation
This paper contributes to the literature on climate finance and stranded assets by developing a macroeconomic model capable of capturing some of the crucial features of the birth and expansion of innovative low-carbon technologies.

Our model employs a Stock-Flow Consistent (SFC) methodology, which makes extensive use of double entry accounting, depicting each sector as a set of interacting assets and liabilities (Godley and Lavoie 2007). SFC models are consistent in that every monetary flow is recorded as a payment for one sector and a receipt for another sector, and every financial stock is recorded as an asset for a sector and a liability for another sector. More specifically, we adopt a structure similar to the Schumpeterian three-sector model by Caiani et al. (2014), who investigate the economic and financial implications of the emergence of an innovative capital sector.

Since the purpose of our study is to better understand the transition from a high-carbon to a low-carbon economic system, we assume two types of capital stocks can be employed by firms to produce goods: a ‘brown’ high-carbon capital and a ‘green’ low-carbon capital. We assume investment to be irreversible, so that capital stocks disappear from the model only through depreciation (i.e., brown capital can’t be transformed into green capital, and vice versa). We however allow for capital underutilisation. The defining characteristic that distinguishes between brown and green capital is the level of greenhouse gas emissions when they are operated, but they are also expected to have different productivities and labour requirements.

The structure of the model
We consider a closed economy in discrete time. The economy is populated by four types of agents: households, firms producing the consumption good, firms producing the investment good, and banks. We also distinguish between a ‘brown’ and a ‘green’ investment good, characterised by different emission intensities, capital productivity and access to finance.

Households
We assume households to perform three main economic activities: supply labour, consume, and invest in financial assets. Households’ income is given by the sum of wages, dividends and capital gains. In each period they decide their consumption level depending on their expected disposable income and their wealth. There are four types of assets households can invest their savings in: cash, equities of the firms producing the consumption good, equities of the firms producing the brown investment good and equities of the firms producing the green investment good. The allocation of resources across assets is a function of their relative expected return rates, which in turn depend on expected capital gains, dividends and profits.

Productive sectors
There are three productive sectors: the consumption good sector and the brown and green investment good sectors. The consumption good is produced combining labour and physical capital, either brown or green. The investment goods are produced combining labour and the respective type of capital – brown or green. All productive sectors follow certain common behavioural rules regarding wages, costs, pricing and financing decisions. Sectoral employment levels are determined by the demand for the good produced, sectoral labour productivity, and aggregate employment rate. Firms’ growth decision depends on capacity utilisation rates, the real interest rate and the leverage ratio.

Green and brown investment goods
The two types of capital exhibit different productivities. While brown capital tends to be more productive than green, we allow productivities to change depending on the relative share of each type on the aggregate capital stock. This allows us to study technological and institutional lock-in (Kemp-Benedict, 2014). We assume green and brown capital to have different labour/capital ratios as well. In particular green capital initially requires relatively more labour in order to operate. As learning takes place we assume that labour productivity rises in the green capital sector with cumulative production. We also assume different depreciation rates between the two types of capital. This is particularly evident for power generation, in which coal and gas plants operate for almost twice the years of a wind or solar farm.
Banks

The banking sector in our model has the double role of holding deposit accounts for households and creating credit for non-financial firms. We assume banks to accommodate the entire demand for loans, but to discriminate among sectors by applying a different interest rate depending on the perceived risk of the sectors to which they are lending, in turn a function of their return rate. Interests are then transferred to households as dividend payments.

The role of expectations in shaping the transition

We use the model to study the financial implications of the transition from a brown capital-dominated to a green capital-dominated economy. More specifically, we investigate how market sentiments and expectations of financial investors influence the strength and duration of the transition and the resulting macroeconomic dynamics. The introduction of a carbon budget is likely to lead to a large drop in the valuation of the financial assets of high-carbon firms. However, only a small proportion of the financial system seems to have internalised the possibility of a ‘carbon bubble’, which makes its potential burst more worrying and worth of study.

By assuming a range of diverse attitudes across investors concerning the possibility of a low-carbon transition and a small set of future policy scenarios, we study potential cases of: 1. ‘irrational apathy’, i.e. financial inertia leading to an over-evaluation of a declining brown sector; 2. ‘misinformation’, i.e. an incorrect assessment of real dynamics; 3. ‘mistrust’, i.e. a decision not to invest in green financial asset. We show how the degree of alignment between financial actors’ expectations around future climate mitigation policies and the implemented public policies will affect macroeconomic and financial stability, as well as the smoothness, speed, and effectiveness of the low-carbon transition.

Bibliography


The role of education in the environmental Kuznets curve: evidence from Australian data

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Following different bleak reports on global environment in the seventies like that of Meadows et al. in 1972, leading academics, scientists and politicians around the world tried to catch attention to build a
social awareness that could stop environmental degradation. A few years had to elapse before economists begun to implement their ideas into formal academic work. To that end, they first resorted to the general framework of the so-called Environmental Kuznets Curve (EKC). The EKC hypothesis which is based on an inverted u-shaped relationship between economic growth and pollution is generally met (Grossman and Krueger 1995) through the channels of scale activity, product composition and technologies that are cleaner and more efficient. These are the dynamics effects that economic growth involves. However, the learning of the society over time or more precisely, the acquisition of environmental awareness could be considered as another channel to take into account. The objective of our paper emphasizes this last possibility, that is, education as a complement or even alternative to economic growth. As it is theorized with the EKC where economic growth in the early stages causes more pollution, education could follow the same pattern. Across time, increasing environmental conscience and knowledge may lead to the reduction of the environment degradation. Then, we examine the importance of education in the specification of the Environmental Kuznets Curve. To test the possible validity of our arguments we estimate a Carbon Kuznets Curve for Australia by making use of a period that goes from 1950 to 2011. Different interactions between education and economic growth regarding the evolution of CO2 are captured in a three-dimensional framework. The methodology we apply is the autoregressive distributive lag (ARDL) bounds test proposed by Pesaran et al. (2001). This methodology has the advantage of allowing I(1), I(0), and I(0) with trend variables in the same time series regression when studying long-run relationships facilitating, this way, the analysis. Moreover, potential problems derived from both serial correlation and endogeneity are easily removed with the ARDL structure when long-run and short-run components are simultaneously taken with appropriate lags. Most of empirical studies on the EKC existence are based in cross-sectional and panel analysis for countries that are necessarily different among them. Through these approaches it is assumed that the revealed joint pattern on the environment-economic growth link can be applied to an individual country’s performance. The issue of cross-sectional dependence is often neglected. In our view each country should be treated individually and therefore we focus on a time series analysis given that it provides a more accurate reflection of the EKC study. The conclusions go in the direction of lowering CO2 emissions when fundamental variables such as economic growth and education are combined. A main result of this paper is that economic growth by itself is not sufficient for reducing pollution. The effect of income, identified under the conventional specification, is mostly driven by improvement in education. Higher education plays an important role in determining the level of Australia’s CO2 emissions becoming a necessary condition for sustainability. Greater investment in higher education means more environmental awareness as well as more capacities to better handle environmental degradation. However, our model implies that there is not a simple and straightforward solution to how economy and education interact with the environment but there are different scenarios, in particular we contemplate four, where the combination of both variables may improve environment. The scenario where not only the economy is boosted but higher education is as well would be the most suitable and appreciated by society and politicians since those policies allow at the same time to reduce CO2 emissions. Thus, the best policy response will probably depend not only on the broader understanding of those interactions between socio-economic aspects and the environment but also on the priorities of government by weighing social peace, economy performance and environment protection/improvement.

Integration of global environmental change threat to human societies in energy-economy-environment models

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The scale of human activities worldwide has grown so great that they are increasingly affecting the regular functioning of the biosphere and critically threatening its equilibrium: during the last few decades, human actions have become the main driver of global environmental change. The scale of the anthropogenic disruption of the biosphere can be illustrated by the current level of some indicators such as the 9 identified Planetary Boundaries (PBs).[1] It is currently estimated that two biophysical processes (genetic diversity and biogeochemical flows) have already surpassed their PBs and other two (climate change (CC) and land-use system change) have been identified as lying in the uncertainty zone. Moreover, Global Environmental Assessments (GEAs) conclude that, if current trends are not amended, next decades will see an intensification of human alteration of the biosphere and the situation of the control variables of the PBs will worsen.[2,3] Thus, if no corrective actions are taken in the next few decades, the disruptive potential of future global environmental change will likely escalate to levels that will prevent large parts of the biosphere from being inhabited by humans, thus threatening human societies as we know them nowadays.[4,5]

Policy-recommendations to propose sustainable alternatives to the current trends are usually derived from the application of energy-economy-environment models, or Environmental Integrated Assessment Models (IAMs). However, there is a large discrepancy between natural scientists’ understanding of ecological feedbacks and the representations of environmental damage (if any) found in IAMs.[6–8] To date, these models do either not include any impact from environmental damages, or just a partial incorporation that translate into practically negligible impacts in the baseline scenarios (i.e. scenarios without additional policies) which project increases of global GDP of several times the current level by 2100. We recall that GEAs follow the conventional economics approach where GDP per capita growth and welfare are tightly connected. As a result of not considering the costs of non-action, recommendations issued from modeling exercises usually lead to misguided political advice (delayed action, sustainable policies reported as requiring net costs instead of benefits, etc.).[9]

These shortcomings have especially been pointed out for climate change, which is the most researched PB. In particular, the usefulness of the applied damage functions, which relate temperature increase with GDP loss, has been questioned given their underestimation of impacts in relation to the forecasts by physical scientists and the fact that they are not calibrated for temperature increases such as the likely ones to be reached at the end of this century in baseline scenarios (+3.7-4.8°C)[2]. In fact, current estimations of impacts of CC or environmental degradation are based upon monetized damages that omit many key factors. These deficiencies have led to questioning the usefulness of current IAMs to successfully guide policy-making towards sustainability and argue for a new generation of models.[7,10,11]

Representations of global environmental change threat to human societies in energy-economy-environment models consistent with the physical science literature have to date been scarce. In this paper we present the methodology applied to consider global environmental change impacts in the MEDEAS model, which is a global energy-economy-environment model currently under development in the context of a European H2020 project (http://www.medeas.eu/). The applied methodology builds on the aforementioned critics from a strong sustainability approach, and follows the subsequent assumptions:

(1) Focus on the CC PB as a proxy of global environmental degradation due to the current development level of the MEDEAS framework. However, some consistency is assured by the fact that recent findings suggest the existence of a two-level hierarchy in biosphere processes where CC is one of the two
identified core planetary boundaries through which the other boundaries operate.[1]

(2) Application of precautionary principle given the high uncertainties and risk of potential disruptive environmental/CC in the next decades as proposed by Pindyck (2015)[11].

(3) “Energy loss function” (ELF):
   a. Environmental/CC damages affect the energy consumption of the society, i.e. affecting the drivers of growth instead of the level of GDP output.[10]
   b. Quantitative function with associated uncertainty.

(4) Use of CO2e concentrations and total radiative forcing as drivers of CC alteration instead of temperature increases since:
   a. Global environmental change is not solely driven by temperature increase; climate is defined by many factors such as humidity, winds, solar radiation, etc.
   b. Thus, the PB of CC is defined by these two variables (350 ppm and +1.0 W/m2 relative to pre-industrial levels).[1]
   c. The large uncertainty on equilibrium climate sensitivity do not affect the policy-making process (focus on targets such as the carbon-budget[2]).

A first interpretation of these assumptions has been tested in the MEDEAS model. The version of the model applied is based on WoLiM[12] and including a feedback between the sectoral energy demands and final fuel supplies that allows to fulfill the energy demand of all the economic sectors following a “limiting factor” approach. The implementation of the damages from environmental/CC in MEDEAS is performed through the integration of an ELF that reduces the overall energy consumed by the society, assuming that when CC reaches a certain threshold not compatible with humanity as it is nowadays configured, the energy losses would reach 100% of the total energy consumption. The reduced availability of energy translates then into a reduced GDP growth in relation to the expected trend.

Here we report results applying an ELF with a logistic shape that uses CO2 concentrations from the combustion of fossil fuels and land-use change as CC indicator, assumes a very low contribution of damages nowadays and takes 1,000 ppm as the threshold of CC incompatible with humanity. Four baseline scenarios running to 2050 have been simulated. Two scenarios are adapted from the scenario BAU (business-as-usual) from Capellán-Pérez et al.[12] extrapolating historic trends assuming: (1) high oil endowments (“Scen1”) and (2) unconstrained fossil fuel extraction (“Scen2”). These two scenarios are subsequently simulated with and without ELF.

The obtained results show an increase of CO2 concentrations in the range of 450-500 ppm by 2050 depending on the scenario. For those scenarios without ELF, the total primary energy demand and supply increase in the next decades only constrained by the potential limitation of availability of energy resources (oil availability constrains GDP growth before 2030 in Scen2). In particular, Scen2 allows to compare our results with the usual findings from the IAMs of CC, given the high fossil fuel endowments assumed by these models and the negligible consideration of climate impacts.[9] In fact, Scen2 is the only scenario able to sustain the historic growth trend in GDP and total primary energy demand. In those scenarios where the ELF is considered the annual energy losses due to environmental/climate impacts range 5-8% by 2050 and the global GDP is decreasing in average per capita and absolute terms by 2030.

The results considering the ELF are thus consistent with the assessment from the physical science basis that affirm that global environmental change in general, and CC particularly, have a dangerous disruption potential for human societies globally in the next few decades.[4,5] These results will be complemented in the future by an analysis of the assumptions of the methodology and the importance of the uncertainties involved in the estimation of the ELF. Also, the proper application of the precautionary principle would require to estimate other sustainability indicators to avoid relying solely on CC as a proxy of global environmental change.

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Building on Polanyi to strengthen the social and relational aspect of ecological economics

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Ecological economics grew out of a dissatisfaction with mainstream environmental economics and its lack of attention to the scale of the economy and to the natural limits to growth. The focus was on the material aspect of the economy, such as its energy and material throughput or its fossil fuel dependency. Attention to distributional issues mostly grew out of the general perception that the economy cannot grow eternally (Røpke 2004). Apart from this aspect, social issues were not at the heart of the debates.

Many ecological economists have adopted the Daly-approach focused on three key issues: scale, efficiency and (re)distribution. Within this approach, setting the limits for the scale of the economy becomes a task for experts (i.e. natural scientists) (see e.g. O’Neill 2012). Within the expert-defined operating space, we should then have some sort of capitalism/market-based economy, because that is what is most efficient. Due to the concern with distributional issues, this economic system has some kind of social profile (social-liberal/social democratic/welfare state).

While (the social organisation of production within) capitalism is/can be alienating for reasons that Marx explained, I argue that the scale-efficiency-distribution model contributes to further distancing ourselves from the environment that sustains us. The concept of efficiency is again an expert concept foreign to lay people (although the concept of ‘economising’ is not), hence public policy based references to what is (socially) efficient is alienating rather than inclusive. The same goes for purely expert-defined capping of the physical scale of the economy.
It has been argued, especially in relation to discussions about valuation of nature (or ecosystem 'services') that modern people living in cities alienated from nature, do not understand their dependence upon nature any longer (e.g. TEEB 2010). Therefore metaphors that highlight societal dependence on ecological life support systems (e.g. biodiversity as 'capital' or ecosystems as 'services') may be more necessary than ever (e.g. Gómez-Baggethun and Martin-López 2015). However, even if economic rationality is currently dominant and has been strengthened during the neoliberal era, it is highly questionable whether playing to this kind of commensurating rationality, where relations between people, things and nature are absent, is helpful for understanding our dependence upon our biophysical environment or meaningful in the sense of contributing to the much needed change in our social-economic system.

In this time of triple crisis, it is more important than ever to formulate alternatives to the current understandings and pathways of society and the economy. In this respect, I believe Polanyi's writings can contribute valuable input to the project of reviving theory-building within ecological economics. With respect to the problematics outlined above, such an attempt should in particular draw on Polanyi's livelihood-understanding of nature and natural resources, an implicit idea in ecological economics which needs to be revived and theorised. Polanyi (1957) coined the term 'the substantive economy' to cover the economic processes concerned with securing a livelihood. Later the concept was elaborated further by one of his students (Hopkins 1957).

The concept of the substantive economy opens the possibility of a whole different approach and description of what an ecologically embedded economics could be about, including the qualitative aspects or the inherent characteristics of the means of satisfying (material) wants or needs (nature's specific qualities). This would be a different way to acknowledge incommensurability and to understand the conditions of our livelihood.

A definition of 'economic' as pertaining to the physical environment that sustains us (i.e. human livelihood) is maybe exactly what ecological economists were intuitively imagining when they first established themselves as ecological economists. According to Polanyi, human beings' dependence for their living upon nature and our fellows implies that survival depends on institutionalised interaction between a person and his/her natural surroundings. This process (being what Polanyi calls the economy), supply us with the means to satisfy our (material) wants - where the means, not the wants are material. Polanyi writes: "So long as the wants depend for their fulfilment on material objects, the reference is economic" and "(economic) bearing reference to the process of satisfying material wants". This view of the economy and economic provides a foundation for theorising about what an alternative economy embedded in the natural realm could be, and for bringing relationship (human-society, society-nature) back into our analysis.

Polanyi warns against fusing the two dimensions of 'subsistence' and 'scarcity' when studying the economy and economic processes. Currently, 'economic' designates the compound concept of securing a livelihood by economising, hence fusing subsistence and scarcity, or the substantive and the formal economy. In understanding better the conditions of our livelihood, the processes that sustain and support it will seem less distant or 'alien'. Such an approach can also contribute to theorising the economy in terms of synergistic ways of meeting human needs (Salleh 2011), that is, simultaneously satisfying a multitude of daily use values, including cultural ones, while protecting the ecosystem as a material bottom line. 'Livelihood' then provides the conceptual link between society and nature. While Polanyi defines the formal economy by its rationality, he does not elaborate much on what alternative rationalities prevails within the organisation of the substantive economy. In discussing what alternative rationalities could look like, ecofeminist studies could provide a valuable resource, having explored this extensively. O'Hara (2009) has suggested that we need a fundamental rethinking of economic conceptions of value from market-based to subsistence-based, and use-based to conservation-based, while Salleh (2011) has suggested, in line with critical theory, that with respect to nature, reciprocity must replace mastery and domination. In critical theory, and also in some eco-marxist literature, domination (and exploitation) of nature and other human beings can be traced to the same source.
In searching for alternative rationalities to the current instrumental (or economic or calculative) rationality, there are several alternatives, of which the most famous is probably Habermas' communicative rationality. Bhaskar distinguishes between instrumental, critical, emancipatory and historical rationalities (in Hartwig 2011). Alternative rationalities needs to be part of an alternative organisation of society, and must to be part of their theorising.

It might be objected that science should not study 'what should be'. However, I will draw on the philosophy (of science) of critical realism, which allows one to go beyond analysing problems in actualised social systems by identifying the yet unactualised potentials, which allow transformation towards and alternative society.

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Has there been an energy trap in the Green Revolution? Insights from a long term perspective across the world
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Although with the advent of the Green Revolution the pessimist Malthusian forecasts have been proved wrong, industrialization of farming has occurred with an important energy cost: higher energy outputs obtained with even higher energy inputs. World agriculture has experienced a socio-metabolic transition which has entailed a shift from a former Malthusian trap to a current energy trap which at a time of energy scarcity and climate change is tightly linked to big environmental problems.
The paper explains this trap by applying a new methodology of energy analysis of agro-ecosystems that for the first time distinguishes among internal reinvestment of biophysical flows and external inputs coming directly or indirectly from fossil fuels (Tello et al., 2016; Galán et al., 2016). Farm productivity depends on the quality of the funds: maintaining them and allowing for their reproduction is fundamental to maintain sustainable yields. Biomass recirculation (both harvested and unharvested) is a necessary investment for the maintenance of these funds (land, livestock, people and associated biodiversity) that provide all sorts of final products (food, feed, fuel and fibre) together with other ecosystem services.

Conventional input-output energy analysis (Hall et al., 2011) applied to the energy sector has to be complemented by an analysis of the energy flows that recirculate internally within an agroecosystem, and allow for energy production in the form of biomass. We consider the relationships of internal energy loops and storage (unharvested biomass and biomass reused within an agroecosystem) with respect to external inputs (that with the Green Revolution have increasingly been of non-biological character: chemical fertilizers, fossil fuels, pesticides). We also relate internal and external inputs with final output.

Soil management recommendations at the early stages of the Green Revolution suggested for complementarity (rather than substitutability) of internal with external inputs (Tisdale and Nelson, 1956), but this approach later disappeared, and the focus on biomass recirculation has re-emerged only in the present, with the development of agro-ecology (Guzman et al., 2011). Our hypothesis is that the Green Revolution aim to replace biomass internally recirculated by external industrial inputs has entailed a “fallacy of substitution”, because not all forms of energy are the same (Giampietro, 1997). Even if the energy content of these flows can be compared as energy carriers, their qualities, power ranges and impacts on agroecological functioning are very different. Even more, as replacing internal biotic loops by external industrial flows has led to agroecosystem’s funds degradation this has involved a vicious circle: ever greater amounts of chemical fertilizers have been needed to keep yields in soils deprived of organic matter, ever greater amounts of pesticides have been consumed as a result of losing the ecological regulation and pest and disease that biodiversity formerly performed, etc. This has been the underlying mechanism leading to the energy trap of the Green Revolution.

A spatial and temporal comparison is carried out which includes cases of:
- past traditional organic agriculture in which yields and soil fertility could only be maintained through labour-intensive processes that internally reused biomass flows;
- industrial agriculture, characterized by a high dependence of external inputs and the abandonment of internal biomass recirculation that kept vital underlying funds such as soil fertility and associated biodiversity; and
- modern organic agriculture, which combines features of both systems.

Our empirical results prove that increases in energy yields have been lower than the increases in total inputs –particularly the returns to external inputs- with a consequent loss of energy efficiency. We discuss that not matching internal organic inputs with external industrial inputs has been a mistake that negatively affected energy efficiency: the reproduction of agro-ecological funds and the maintenance of good ecological conditions could not be maintained throughout agricultural industrialization.

As a result, industrial agriculture resembles an input-output linear system with less complexity, less energy efficiency, less agro-ecological functionality, and more polluting impacts either locally (water nitrification) or globally (GHG emission). These results are also relevant to understand what a circular economy applied to agriculture should look like, as the lessons learnt from the past can be indicative of feasible pathways for a transition towards new sustainable organic farm systems. To overcome this energy trap, farmers have to search for more wise combinations of internal reuses and external inputs able to restore and enhance the underlying funds and their joint agro-ecological performance while optimizing labour productivity. Our analysis offers some insights to do so.

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Biophysical and socioeconomic of deltaic areas vulnerable to Climate Change: gender and spatial relations
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The main purpose of this article is to examine in parallel the similarities and differences of the Deltaic areas, under the project DEltas, vulnerability and Climate Change: Migration and Adaptation (DECCMA). As a starting point, the main intuition is that clear general similarities of these deltas are that they are likely to be affected by climate change and sea level rise, generating important challenges for the livelihoods. Furthermore, the change in their ecological conditions affect the socioeconomics, and also influence the decision of many households to either migrating or staying within the deltas. The migration decision is also notably influenced by many factors (ecological, demographic, political, social, etc., see e.g. Black et al., 2011) having found of notable importance the economic factors. Such approaches of holistically examining unsustainable trends, and joint analyses of economics, social and biophysical domains have been long examined by ecological economists (see e.g. Daly and Cobb, 1989, Costanza, 1991, Costanza et al. 1997, Røpke, 2004, 2005, Common and Stagl 2005).

This paper provides insights into the current socioeconomic and biophysical state of the Volta Delta (Ghana), Mahanadi Delta (India) and Ganges-Brahmaputra-Meghna (India and Bangladesh). Hybrid methods of input-output construction/regionalization, notably using the Flegg Location Quotient (FLQ), are used to develop input-output (IO) models and accounts of the environment for comparing the economic characteristics of the Delta regions and the rest of the country in each of the deltas. The main sources of data for doing the regionalization were the Census of each of the countries, Statistics and economic Surveys, consumption data, trade data, agricultural production (and fishing catch), etc. Results from the study sites indicate that the agricultural sector, trade and transport activities, and notably fishing are much predominant in the deltas than in the non-delta regions, while often the employment in most other services, financial & insurance and in some other industries, is higher in the rest of the country (outside the study sites). The work emphasizes the role and embodiment of different type of ecological impacts, but also employment (by different categories, and by gender) in final demand abroad (both in the non-delta and in the Rest of the World). The embodied work of women in the 3 deltas is most present in services, manufactures and fishing, and also in some cases (probably surprisingly) in the construction sector, while being relatively less important in agriculture and energy. Similarly, in the Mahandi delta and the Indial Bengal Delta (Indian side of the Ganges), the main high paid work is embodied in services (as the Volta delta), but also in energy. On the other hand, women are left behind both in terms of lacking recognition of the non-paid job, and with important
impacts derived from biophysical challenges and male seasonal migration, highlighting the importance of the ecological-gender relation (as introduced e.g. in India by Vandana Shiva, 1989, Mies and Shiva 1993, or Agarwal, 1988, 1992, or e.g. in a general way more recently, Power, 2006, MacGregor, 2014). In the rest of India, the construction sector has also more share of employment than in the delta, and interestingly, less in agriculture (when the share of value added is relatively higher), showing quite different patterns in the activities that male and female devote their times to in the deltas vs. the rest of the country. The Volta delta is a net importer (embodied in goods and services from other regions, higher than in exports) of all the metrics studied including agricultural land, employment, energy and CO2 emissions. The two Indian deltas are net exporters of agricultural land (also in particular only with respect to the rest of the country), embodied in goods and services sold to other regions (higher than in imports), but net importers of energy and CO2 emissions. Differently among the two deltas, the Mahanadi delta is a net importer of employment, while it occurs the opposite case in the IBD. Further implications of the examination of the economics, social and biophysical domains are also explored.

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Exploring post-carbon futures through participatory modelling
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The future might not to be forecasted, but instead to be carefully constructed: the point is to try to shed light on different possible futures in order to gain a better understanding of the system and guide
our choices and actions at the present. Revealing potential paths to a post-carbon future requires not only detailed knowledge of the current state and historical developments, but also qualified estimates of future development in particular areas of the socio-economic systems, as well as more general proposals, ideas and visions regarding future economic structures, available technologies, infrastructure and lifestyles.

The transformation process requires understanding interconnections between developments in various economic sectors. We propose to base the related scenario building on a participatory process bringing together people with expert knowledge about future developments (organizational and technological changes that are supposed to be leading to a post-carbon economy) in particular economic sectors with people coming up with multifaceted proposals, ideas and visions about a post-carbon future that will be translated into the logic of environmentally extended input-output model of 2050.

“Experts” (e.g. engineers or researchers) are stakeholders with detailed knowledge of possible developments in particular economic sectors. Similar approach was applied e.g. by Duchin and Lange (1994). People coming up with multifaceted post-carbon transformation proposals we call “engaged citizens” (we use the term “stakeholders” to indicate both groups). “Engaged citizens” can be e.g. activists (usually represented by citizen initiatives and networks), NGO analysts, or even researchers. The underlying assumption is that “engaged citizens” have both (1) knowledge of the topic, and (2) deep interest in shaping the future towards their desires. Our research design consists in combining views of “experts” with “engaged citizens”. Such an approach should assure that not only knowledge of development in particular sectors and their interconnections, but also ideas about ways to shape their development in order to achieve a post-carbon future, are taken seriously into account.

We propose to develop our research along the post-normal science (as applied e.g. by Haag and Kaupenjohann, 2001) as suitable philosophical grounding for structural ecological economics. The extended peer-review (i.e. including non-scientific knowledge) as a specific methodological approach under fundamental uncertainty was suggested by Funtowicz and Ravetz (1994), but can be tracked down already to Paul Karl Feyerabend (1978). We take this approach in order to overcome several uncertainties arising from future developments, and in order to get more compelling images of desirable future socio-economic structures, trusted by those who endeavour to bring this future (for description of constructing scenarios’ trustworthiness in uncertain conditions see e.g. Selin (2006) or Ashley et al. (1983)).

Combining views of “experts” with those of “engaged citizens” might very probably steer up controversies and clashes of views between different stakeholders. Our effort will be to identify these controversies (such as differences between “techno-enthusiasts” and “techno-sceptics” – see Kerschner and Ehlers, 2016) and address them by developing compromise or several alternative scenarios. So-called “deliberative ecological economics” suggests to overcome these difficulties with participatory deliberative methods of decision-making – bringing together different views and opinions, discussing their common points and controversies (Zografos and Howarth, 2010). We apply input-output analysis (IOA) to see the structural changes throughout the economy. IOA allows capturing inter-industry linkages and measuring their direct and also indirect effects of externally imposed changes (Kerschner and Hubacek, 2009). The basic input-output transaction table consists of rows showing “Who gives to whom?” and columns showing “Who receives from whom?” in an economy. To identify key features of the post-carbon input-output economic structure it is necessary to focus on the technical coefficients for intermediate inputs. Technical coefficient is a ratio of input to a given sector to its output, measured in monetary terms (Miller and Blair, 2009). The determinants of the technical coefficients cover technological progress (Leontief, 1983), but also infrastructure policies, substitution due to relative price changes, as well as industrial structure (Peneder, 2003). But if one wants to obtain a broader picture of a post-carbon economy, it is also necessary to think in terms of final consumption. The participatory modelling should thus address also expected or proposed changes in the final demand vectors.

We choose Austria and the Czech Republic as examples because of their similar size, enabling comparison between different types of policies and infrastructures (“East-West contrast” visible e.g. 132
on relatively developed renewable energy infrastructures in Austria, while relying on nuclear and coal sources in the Czech Republic). However, a similar approach can be used at every respective level of analysis – from regions and countries to larger socioeconomic units such as the European Union or the whole world.

Once technical coefficients and their changes over time are defined, it is possible to build future input-output table(s), showing the interacting elements (input-output relations among sectors and consumption patterns of households) required for a structural representation of the post-carbon economy. Obtaining the technical coefficients obviously requires detailed quantification of various proposals and ideas about future developments in economic sectors, as well as estimates of other socio-economic indicators that influence the final consumption. The main challenge of the scenario building is thus to define technical coefficients, by asking stakeholders to quantify their estimates of future developments in the economy, specific sectors, infrastructure, technologies and households lifestyles and consumption patterns.

We start from identifying the most directly but also indirectly (in terms of intermediate inputs) CO2 emission intensive sectors. It is then necessary to investigate in detail the current structure and their impacts on the rest of the economy. Participatory modelling should focus on describing how this structure is likely to evolve due to the changes proposed. All proposals should be based on deliberating over the expected shifts of current technological coefficients due to the proposed changes (substitutions, improvements in efficiency, decreasing/increasing etc. of inputs and outputs). We will be looking for answers to questions such as:

What technologies and procedures should be applied to lower greenhouse gas (GHG) emissions?
What materials are necessary to implement required innovations in each sector considered?
Which of them are most likely to be used and how much of them will be required?
What scale of production and consumption would be the best to achieve reducing GHG emissions to a minimum?

Replacing inputs causing high CO2 emissions will certainly mean increased demand for other materials, unless consumption decreases. But neither were these replacements happening so far. What can be observed from our calculations for Austria in the past (1995-2011), is that e.g. in case of Inland Transport sector there was a twofold increase in inputs from the Electricity, Gas and Water Supply sector (which could, under certain circumstances, signalize shift towards renewable energies), but also almost triple increase in inputs from the Coke, Refined Petroleum and Nuclear Fuel sector (which is, in fact, “business as usual”). Our research should outline possible pathways to inspire policies aiming to avoid such “business as usual” outcomes.

References:
Exploring the link between energy services and human development

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The United Nations Sustainable Development Goals (SDGs) describes energy access, in goal seven, as ensuring “... access to affordable, reliable, sustainable and modern energy for all”. However, achieving energy access for all is a daunting challenge given 9 billion people are expected to populate the earth by 2050. Steinberger and Roberts (2010) point to a strong correlation between energy access and human development (using the Human Development Index- HDI). They show that high level human development can be achieved at moderate energy and carbon levels, while warning that increasing energy and carbon past this level does not necessarily contribute to higher living standards. An important consideration within the development scope is income distribution, Jacobson et al. (2005) compared inequality and the distribution of electricity from a historic and income perspective, and showed that income distribution plays a big role in energy usage.

The energy access goals, nonetheless, make no distinction on how energy is delivered or which human energy needs are being met. Should energy access programmes prioritise the delivery of mobility or illumination, thermal comfort or cooking, communication or healthcare. Important gaps also exist between high- (HDI and UN SDG) and low- (Energy Sector Management Assistance Program (ESMAP) Tier Framework) level metrics of energy access. The energy access goals fail to address either the development pathway (from basic energy access to higher development levels) or provide comprehensive measures of the specific energy services needed. Recently, during the United Nation’s Climate Change Conference at Marrakech, Morocco, the Climate Vulnerable Forum (CVF)- conformed by 47 countries- has decided to skip the energy development pathway using non-renewables (Climate Vulnerable Forum, 2016). Instead, their plan is to use renewable energy and leapfrog their development. However, no plan is devised for energy services’ delivery.

With no established minimum access levels, there is a risk that providing energy access for all may still fall well below the levels required to satisfy basic human needs. For example, providing solar lanterns to households in a village may meet the energy access requirements but fail to deliver any meaningful human development. Therefore, having agreed specifications of human need requirements alongside improved frameworks for linking the energy systems/services to human needs/development are required.

In response, our research aims to understand the links between the energy system, human development and technology development: can we understand the link between human development and the provision of energy services? Can we measure and define different levels of energy service provision, and perhaps a basic minimum level ‘basket’ of energy services? Can we understand the roles of energy technology innovation in the development of country level energy systems which meet human needs?

This presentation will explore the provision of energy from historic International Energy Agency (IEA) data at country level for 50 countries (both OECD and non-OECD) and disaggregated by the type of energy service delivered. The investigation will compare energy services for many countries at different stages of economic and human development and then specifically look at the historical transition of energy service delivery for a few specific countries. Thus, the work will attempt to...
understand which energy services are linked strongly to human development and therefore how energy access goals can be tailored to meet human energy needs and deliver rapid and sustainable human development.

The complexity of this analysis lies in the difficulty in classifying energy services and human needs, gathering sufficient data, and mapping primary energy statistics onto energy services. We are aware of the challenges and barriers at three key stages:

• Averaging energy data at the country level (sub-populations within a country develop at different rates).
• Translating the identified trends into robust development pathways (should historical trends by applied to the current context of developing countries? What alternative pathways would satisfy the needs in the energy services’ basket?).
• Comparing energy systems across countries with vastly different material and economic resources.

This first attempt to quantify energy services, explore their links to human development, and develop country-specific energy system roadmaps has the potential to steer ‘energy access’ efforts towards those actions which can meet human energy needs more efficiently and increase the pace of human development. Our aim is to increase awareness in the energy services required to propose improved pathways, which will contribute to understanding the nexus between SDGs’ climate and development goals.

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Emissions in a decarbonised economy? Global lessons from a consumption-based investigation of Iceland using MRIO analysis

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Globally, greenhouse gas emissions reduction strategies have tended to focus on lowering the carbon intensity of stationary energy production, primarily in the global north. With these stationary energy production goals within reach, an increasing number of cities have set targets for becoming carbon neutral in the near future (eg, Adelaide City Council, 2016; Reykjavikurborg, 2016b). However, these carbon neutrality plans tend to ignore the indirect (embodied) emissions in goods and services demanded by the society. Global consumption-based analyses have clearly demonstrated the importance of accounting for emissions embodied in products, particularly those traded internationally (Kanemoto et al., 2016; Peters et al., 2012; Peters, 2010; Sato, 2014; Tukker & Jansen, 2006). Such assessments also depict how far away the carbon neutrality target is for many regions. As a result consumption-based emissions accounts are becoming increasingly relevant for policy and decision making (Davis & Caldeira, 2010; Minx et al., 2009).

This paper will present a case study of the consumption-based carbon footprint of Iceland, with a particular focus on household consumption. Iceland presents a unique case due to the almost entirely decarbonised stationary energy supply sector and an announced target for carbon neutrality, but at the same time strong reliance on imported goods and high standard of living. As such, Iceland presents
an interesting demonstration case for the rich economies of the world, where climate mitigation currently focuses strongly on energy supply decarbonisation. Once future stationary energy supplies are decarbonised, countries will face the same challenges that Iceland faces today; the decarbonisation of transport and emissions embodied in consumer products, particularly imported goods from countries with higher production intensities than their own.

The study aims to quantify important consumption-based emissions metrics for policy analysis, as well as spatially map global emissions resulting from Icelandic consumption. Consumption-based carbon footprints are calculated for Iceland and specifically for Icelandic households. The household analysis is further analysed by household variables such as household size, settlement type and number of vehicles owned. An Environmentally Extended Multi-Regional Input-Output (MRIO) method is used (Kitzes, 2013; Wiedmann, 2009; Wiedmann et al., 2011). The Eora MRIO database is utilised for the analysis (Lenzen et al., 2012; Lenzen et al., 2013), and is combined with the 2010-12 Icelandic household expenditure survey for increased data accuracy.

Initial results suggest that the consumption-based CF is almost 50% higher than the production-based account for the country, confirming that Iceland is a net outsourcer of emissions, and that as hypothesised households are the primary cause. More than half of total consumption-based emissions are produced in other countries and are embodied in imported products. Initial household consumption-based emissions results suggest that transport related emissions account for more than half of the CF, with food and beverage consumption also a large component. Spatially, emissions resulting from Icelandic consumption have a global distribution, and the magnitude and location of these emissions is presented on world maps. A number of developing African nations, the USA and China incur the most outsourced emissions on account of Icelandic household consumption.

The implications of the study are relevant both in Iceland and globally, particularly in high income developed economies. The study highlights the important of consumption focussed mitigation policy in targeting GHG emissions arising from food, transport and durable goods if global emissions are to be reduced to ‘near zero’ levels by 2100 (IPCC, 2014). The initial results suggest that a focus on transport sector emissions mitigation strategies is critical, and that transport related embodied emissions should be considered when designing mitigation policy. Secondly, it would seem there is significant evidence of carbon leakage in Iceland, an issue that is increasingly important in other rich countries globally. Without global policy intervention, rich nations may continue reducing emissions whilst global emissions continue to rise (Aichele & Felbermayr, 2011; Barrett et al., 2013). Thirdly, the study contributes to the growing evidence in support of the ‘low carbon illusion of cities’ hypothesis, where there may be a perception that a city’s emissions responsibility is complete once everything is electrified renewably and production outsourced, and as a result demand reduction strategies can be avoided (Heinonen et al., 2013). For example, there is currently evidence of this in the City of Reykjavik’s ‘carbon neutral’ plan which claims its residents have a carbon footprint of 2.8 tCO2eq, almost entirely from driving (Reykjavikurborg, 2016a, 2016b), whilst in contrast the initial findings of this study suggest a CF of more than 3 times that amount per resident. Such ‘low carbon illusions’ could be extremely detrimental to effective greenhouse gas reduction on a global scale, as cities will believe they are doing the right thing but in reality their emissions responsibility will silently increase. Thus, the results of this study aim to contribute to a better understanding of emissions responsibility both globally and in Iceland, and add qualitative support to the design of consumption-based emissions reduction strategies in the decarbonising nations globally.

References

Downscaling the need for common resources while saving money. Lessons from an innovative socio-sanitary structure run by a humanitarian NGO: Emergency’s Salam hospital in Khartoum, Sudan

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A really equitable use of common resources is more and more a must to face the compelling issues of ecological sustainability and climate change, yet it also represents an often neglected responsibility to overcome a culture of social injustice, exploitation, and war at a global level. In the world of humanitarian NGOs, paradoxical counter-productive effects might follow frequently necessary monetary savings if a systemic vision is not adopted. For this research, an Italian NGO – ‘Emergency’ –
has been chosen as a case study, for its undertaking a significant care for sustainability alongside an 
ethical spending sobriety, respectful of its donors.

The emergy method has been applied to one of the hospitals that such NGO planned, built, and 
currently runs in areas of crisis: the Salam Centre for Cardiac Surgery in Khartoum, Sudan. The structure 
offers free high standard assistance to people from many African and non-African countries. On 
average, nearly 800 patients are admitted every year, and over 700 of these undergo an open-heart 
surgical operation. Sudanese nurses and medical doctors are also trained inside the Salam Centre. The 
functioning of Emergency’s healthcare provision system significantly relies on voluntary donations, 
whose flows have therefore been investigated and highlighted in this work. Among the research 
questions is the evaluation of the NGO’s efforts to save Commons since the planning phase until the 
everyday management of a complex structure in a complex environment. In addition to this, the whole 
‘Emergency model’ is analyzed as a possible example for more applications in the sanitary and non-
 sanitary field.

Building technologies, energy systems, hospital operations, and donation mechanisms are taken into 
account. A focus is dedicated to the architectural low-tech innovation while targeting energy 
efficiency. Parameters are proposed for the comparison with other structures, as well as for the 
assessment of socio-economic effects of the hospital in both its support and its benefit areas.

**Will be ecological economics replaced by green or bioeconomy within green growth and degrowth transformation?**

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Nowadays scientific articles as same as popular literature very often use the terms ecological 
economics, bioeconomy and green economy like a synonymous expressions. The same situation is with 
terpretation of sustainable development, green growth and degrowth. All these terms serve like 
representatives of one big family of an alternative green way of our future. Sustainability is added like a label for all of these newly emerged approaches of economic practice.

Unfortunately the differences among expression mentioned above are really serious and their 
miinterpretation by politicians is really dangerous from the perspective of ecological economics. The 
crucial question is what is the role of ecological economy within the three types of transforming 
terpretations of growth e.g. sustainable development, green growth and degrowth. Recent policy of EU seems to support bioeconomy and green economy. Ecological economy does not have such a political and social support. Anyway the implementation of the ecological economics ideas needs the state support as the basic condition for their application. What are the main reasons of low attention and political support of the ecological economics on global and national level in comparison with other green form of economy?

These questions cannot be answered without the analysis of relationship among ecological economics, 
green economy and bioeconomy as same as some history of appearance of these new theories 
together with sustainable development, green growth and degrowth philosophy.

From the late seventies we are witness of some greening in economic thinking. This change is reflected 
in appearance of sustainable development philosophy (SD) as a qualitative alternative to the endless 
quantitative economic growth. The publication of the Brundtland Commission Report highlighted the 
fact that current patterns of resource consumption and environmental degradation could not continue 
in recent way (Brundtland Commission - World Commission on Environment and Development -WCED, 
1987). In fact SD is mixture of scientific knowledge system, environmental values, ideology, social 
actions, moral attitudes, qualitative patterns as well as quantitative. The real core of sustainable 
development is ecological economics a new paradigm of economy which incorporated thermodynamic 
laws into economic theory. The most important ideas are size of economy related to carrying capacity
of our planet, equity within nations and among generations, replacement non-renewable resources by renewable ones and principle of complementarity of resources instead of their subsidiarity (Daly, Farley 2004).

Global financial crisis in 2008 brought new challenges and a new perspective of their solution - green economy and a green growth strategy. According to the definition of the Organisation for Economic Cooperation and Development (OECD, 2011), green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyze investment and innovation which will underpin sustained growth and give rise to new economic opportunities (UNEP, 2011). The political application of the green growth concept has its origins in the Asia and Pacific Region at the Fifth Ministerial Conference on Environment and Development (MCED) held in March 2005 in Seoul.

In the same time as the green growth strategy the idea of degrowth appeared in the first degrowth conference in Paris 2008. Sustainable degrowth may be defined as an equitable downscaling of production and consumption that increases human wellbeing and enhances ecological conditions at the local and global level, in the short and long term. The paradigmatic proposition of degrowth is therefore that human progress without economic growth is possible. (D’Alisa, Demaria, Kallis, 2014). People who defend degrowth come from different philosophical horizons, movements and intellectual sources as one of them is mentioned ecological economics. Sustainable degrowth goes also beyond decoupling material and energy use from growth denying the imperative of growth is not synonymous with turning back the clock to a fictitious pre-industrial, communal past. Sustainable degrowth is about constructing an alternative sustainable future.

Within the concept of green growth ecological economics as a former economic principle of sustainable development was replaced by green economy as a new core tool for sustainable development realization. The term green economy was first coined in a pioneering 1989 report for the Government of the United Kingdom by a group of leading environmental economists entitled Blueprint for a Green Economy (Pearce et al. 1989). The revival of the green economy as a concept appeared in UNEP’s Global Green New Deal document (UNEP 2009), where the green economy served as a concept for overcoming present financial, environmental and resource crises. Green economy has many definitions as we can see from the number of publications focused on this topic (Allen 2012; Barbier 2009; Huberman 2010). The most famous and frequently quoted is the UNEP Report 2011 definition. UNEP defines a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP 2011). From the 2012 the concept of bioeconomy started to be supported in political documents of EU and US (European Commission 2012, The White House 2012). These documents do not deal with any kind of serious comparison or analyzes of ecological economics, green economy and bioeconomy. There is a broad range of political definitions as same as scientific definition of bio-economy. It is not clear whether it is a new branch of economy, a new economic paradigm or just a specific part of the green economy based on biological resources and the application of biotechnology (Maciejczak 2015).

At present we have a choice between three alternative green types of future policy ways as regards responding to global challenges such as climate changes, poverty and social inequity in general. There are sustainable development, green growth or degrowth with different types of economic theories and practices in a range from ecological economics to bioeconomy. Without serious scientific analyzes of the main presumptions and basic principles of these different alternatives it could be easily made a radical step back to the economic growth under the political flag of green development and sustainability.

There is hidden a real threat of decoupling growth and sustainability. It is just a small step to exclude green from growth or put growth alone without the requirement of sustainable development. Replacement growth to development within political documents and debates has even become a reality as it was shown above in case of latest European Document and Summit titles. In recapitulation of the main international documents we end up, in a curious way, from sustainable development as defined in the Our Common Future document (World Commission on Environment and Development 1987), through green growth as defined in the Green New Deal concept in 2008, to ‘unleashing growth’
at the EU Lisbon Summit in 2013. The role of ecological economics and its principles must be putting back to the centre of our political discussion about sustainable economic future. There are three main ideas that must be posed in any discussion dealing with the role of market forces, the scale of economic decision and the growth versus development.

References:

Intersections between mobility, carbon footprint, urban form, and well-being: preliminary results of a softGIS study in Helsinki Metropolitan Region
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Travel is an important source of carbon emissions on both local and global scales. At the same time, mobility has an important role in human well-being, economic activity, health, social relations, leisure, culture and identity (Urry, 2007). During recent years, sustainable mobility emerged as a new paradigm in research and planning practice, and an important aspect of sustainable development (Banister, 2008). The links between mobility and sustainability have been most pronounced in urban context. There is now a considerable body of literature linking urban form to health (Groenewegen et al., 2012) and travel behavior (Ewing and Cervero, 2010; Naess, 2012) and certain urban forms have been promoted as more “sustainable” or “happy” than others (e.g. Montgomery, 2013). Some aspects of mobility have also been linked with well-being related issues such as social exclusion and access to services (Patterson and Farber, 2015). One promising way of studying the many aspects of sustainability is identification and description of mobility styles (Barr and Prillwitz, 2012). Still, the various aspects of urban sustainability are often studied separately, even though there are many
potential interrelationships and trade-offs between mobility, wellbeing, urban form, and environmental footprints.

This study provides an exploratory analysis that jointly looks at multiple aspects of urban sustainability using a geographically explicit dataset. The presentation includes preliminary results from a “Spatially sensitive understanding of urban sustainability (SUSSU)” project. It is an interdisciplinary undertaking aimed at linking various aspects of urban sustainability such as mobility, consumption, pro-environmental behaviors, urban form and wellbeing. We present an analysis of data collected in Helsinki Metropolitan Area (municipalities of Helsinki, Espoo, and Vantaa) in August-September 2016. The data set includes answers by ca. 900 young adults (25-40 years old) inhabiting the region. The data was collected using softGIS method (Kahila and Kytta, 2009) which combines online survey with interactive maps, and allows respondents to mark visited locations. SoftGIS data allow to study human behavior in the urban region in a detailed and geographically explicit way.

We start the presentation with a description of daily mobility of individual respondents within the urban region using the concept of activity spaces (Patterson and Farber, 2015). Activity spaces describe individual mobility patterns by including all locations visited by individuals on a regular basis, as well as travel modes used to reach the locations. Activity spaces may be described in terms of their spatial extent, level of centrality, frequency of travel, travel modes, types of destinations, as well as location and orientation within the urban region. In the article we use more than 30 variables to describe individual activity spaces of Helsinki residents, identify distinct dimensions of individual mobility using factor analysis, and then group the residents into clusters representing their urban mobility styles. Then we describe members of each cluster in terms of three main aspects relevant for sustainable development of urban regions:

1. Urban form and location within the urban region. We use the Travel-related Urban Zone classification provided by Finnish Environment Institute (Söderström et al., 2015) to explore relationships between urban form and mobility, and answer questions such as whether people living in central “walkable” areas have smaller and more concentrated activity spaces than people living in suburban “car-oriented” areas?
2. Greenhouse gas emissions calculated with Life Cycle Assessment (LCA) approach and based on travel modes, fuel efficiency and distances calculated from survey answers. We associate the emissions with each mobility style to identify those with higher and lower travel-related carbon footprints (i.e. desirable or undesirable from the perspective of emission reduction).
3. Well-being levels reported in the survey in aspects such as self-rated health, eudaimonic well-being, and satisfaction with life domains. This aspect will be used to investigate potential trade-offs between energy efficiency and well-being that have been associated with activity spaces of different sizes and shapes (Patterson and Farber, 2015).

The analysis will be conducted in an exploratory manner using descriptive statistics and charts. In some cases, members of the clusters will be compared using analysis of variance. We take a broad multivariate perspective to be able to explore relationships between multiple dimensions of urban lifestyles and their environmental burden, that have seldom been studied together. Apart from presenting empirical results, the presentation will also include a reflection on academic and policy implications of the trade-offs between well-being, carbon emissions, mobility, and urban form.

References
From Green Growth to Degrowth: \ An Integrated System-Dynamic Analysis
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This paper is based on a previous model that provides a macroeconomic framework to evaluate the social and economic consequences generated by a shift of investment to low-carbon options (Bernardo and D’Alessandro, 2016). While the focus of that paper is to compare the effect of different combinations of three strategies for carbon emissions reductions, here we integrate that framework by considering the economic impacts of environmental degradation.

We assume that natural capital is characterized by a critical depensation curve (see, for instance, D’Alessandro, 2007). Critical depensation allows for explicit investigation of irreversibility in the dynamics. When the resource stock falls below a certain threshold the regeneration rate becomes negative and the natural capital is likely to become extinct. The dynamics of the resource stock shows three equilibria, two of which are stable: that implying extinction of the resource and that of carrying-capacity level—the maximum stock that the limited environment can support. The third equilibrium is unstable and it is the critical level for the renewable resource, the threshold to extinction. Under this framework, sustainable green growth is very difficult to achieve. On the contrary, an effective contribution capable of widening the sustainability window would come from increases in awareness. However, this process leads to a sustainable path which implies a reduction in the scale of the economy and degrowth.

In this perspective our paper is a contribution to the green growth discourse. This literature highlights two different arguments (Huberty et al., 2011; Jacobs, 2013). The first, the standard argument, states that the costs of emission reduction can have an imperceptible impact on economic growth (Jacobs, 1991; Ekins, 2000), and that, without tackling environmental damage, the cost to growth of climate change will be greater (Stern et al., 2007). According to the second, and stronger, argument, emission reduction and environmental protection are not only compatible with economic growth but they may even foster it. The last world economic crisis has stimulated the development of this new narrative, which aims to combine the capacity to tackle short-term macroeconomic fluctuations with attempts at long-term sustainability (Bowen and Fankhauser, 2011). In the Keynesian view, a green fiscal stimulus will enhance low-carbon investment by contributing to achieve two goals: output increase and emission reduction. By contrast, we highlight the emergence of a critical trade-off based on a different mechanism. An increase in low-carbon investment can induce a decrease in "traditional" investment. This slows down economic growth. However, low-carbon investment may create "green" jobs and foster the development of a sustainable energy sector, which can sustain a higher level of employment in an economy with a lower or negative rate of growth. As a result, the cost of the transition to a low-carbon economy may be high in terms of GDP growth but low (or even negative) in
terms of unemployment. Furthermore, the increase in households' awareness reduces the risk of collapse but, at the same time, it shrinks effective demand.

In order to explore the overall dynamics of the system, we consider a standard growth model where energy is a complementary input in the final sector. Though the model is designed to address long-run growth, we highlight the short-run impacts of wage and employment changes on income distribution. Parker (1998) points out that cyclical downturns and unemployment have a regressive effect on income distribution. On the contrary, upturns have an equalizing effect. Moreover, Bilter and Hoynes (2015) confirmed the previous consideration, showing that recessions reduce earnings across the low-income population. Finally, according to Kumhof and Rancire (2010) and Piketty (2014), inequality increases when there is stagnation in the economy. Accordingly, we built a modified Lokta-Volterra model in which wage and employment are endogenously determined and profit and labour share follow the dynamics previously described (Goodwin, 1967; Shaikh, 2004; Canry, 2005; Taylor et al., 2016). Moreover, since total investment depends on functional distribution, the cyclical dynamics in the labour market induce cycles in investment and growth. Furthermore, the increase in low-carbon investments affects the level of employment in the energy sector which, in turn, affects the dynamics of the wage rate and hence employment in the final sector. In other words, this paper explores the consequences of a shift of investment towards the "green" sector in an economy where the wage rate and employment dynamics impact on income distribution, investment and growth. We investigate this issue, making use of system dynamics to identify and develop alternative scenarios. System dynamics is a suitable tool for the analysis of complex systems: it has a high degree of flexibility and a graphical structure which allows identification of feedback mechanisms (Costanza and Ruth, 1998; Costanza et al., 1993). We apply the model to Italy, although this analysis must not be considered a proper calibration with validation process, but an experiment to understand the long- and short-term dynamics of the system.

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Different narratives are proposed in research, policy making and corporate governance to adapt to or transform the economy through different sustainability paradigms. In this article, we review those that are currently being mainstreamed most vigorously at the global level: Circular economy, Green economy, and Bioeconomy (EEA, 2013; EC, 2015; USA, 2012; OECD, 2011; UNEP, 2011). These globally mainstreamed sustainability narratives have different standpoints and also possibly imply different sustainability visions (weak, strong). Furthermore, they are understood and applied in research and policy making in different ways due to a certain internal diversity of conceptualizations. Some literature has dedicated attention to the analysis of the diverse aspects and voices within the individual sustainability narratives (Boons et al., 2011; Borel-Saladin and Turok, 2013; Bugge et al., 2016; D’Amato et al., 2016). However, a systematic, comparative analysis of the three sustainability narratives is missing. The aim of this article is thus to address the above-mentioned research gap, by comparing the content of the current main sustainability narratives (CE, GE, BE) to aid a better understanding of the different sustainability visions and strategies.

The research questions addressed by this article are articulated as follows:
1. What are the publication patterns in time and space, the most popular publication platforms, and the keywords and topics that characterize the three narratives (CE, GE, BE), based on the available peer-reviewed literature?
2. What sustainability paradigms are adopted, and which sustainability dimensions are emphasized by the three narratives (CE, GE, BE), based on the identified keywords and topics?
The results are drawn from a bibliometric review of literature published within the past three decades, coupled with a conceptual analysis. The bibliometric analysis was performed as follows. We searched literature related to CE, GE and BE using the search engine Web of Sciences (core collection). We searched the literature available from 1990 to present, by topic, using the following strings: “circular economy”; “green economy”; “bioeconomy” or “bio-economy”. We thus obtained our datasets, i.e. three bodies of literature, one for each narrative. For the three datasets, we downloaded the full record and cited references.

The analysis, performed with the software R, include descriptive statistics such as publications per year; the geographical distribution of publications by country (based on authors’ affiliations); the most popular publication platforms, such as journals, books, conference proceedings. Furthermore, the abstracts were analysed using Latent Dirichlet Allocation (Blei et al., 2003), which identified the salient (most frequent) terms within each narrative, and clusters them into topics based on terms co-occurrence.

The conceptual analysis, based on the literature review, was performed by positioning the three narratives within a conceptual framework of different sustainability realms (cf. Franceschini, and Panswera, 2015).

The results show that the three narratives have different geographical distributions, with Chinese dominance in CE research, a strong European BE focus and a mostly global reach for GE. Such findings can be explained in light of the main political focus in different regions, such as the national blueprint for bioeconomy published in the USA in 2012, the EU communication on a circular economy action plan in 2015, and the national law on CE introduce in China in 2008. Future research attention could perhaps be dedicated to the more systematic investigation of which CE, GE and BE strategies are promoted in different countries or regions, taking into account indexed journals, as well as policy documents and grey literature in other languages.

Content-wise, for what concerns environmental sustainability, GE acts as an ‘umbrella’ narrative, including several concepts from CE and BE narratives (e.g. eco-efficiency; renewables), as well as additional concepts, e.g. nature-based solutions. In particular, CE and BE are resource-focused, whereas in principle GE acknowledges the underpinning role of all ecological processes. Regarding the social dimension, GE is more inclusive of some aspects at local level (eco-tourism and enterprises, education) and of the environmental dimension. A part of BE literature, however, discusses local processes with the issues of biosecurity and rural policies.

By positioning the three narratives within a conceptual framework of different sustainability realms, we find that GE research is the one most inclusive concepts and closely related to strong sustainability. All narratives are however fail to address de-growth and thus are oriented towards a weaker understanding of sustainability. These findings are in line with previous research on individual narratives (Bugge et al., 2016; Loiseau et al. 2016, 2016; Murray et al., 2015; Ollikainen, 2014)

Our study is limited in that it paints a static representation of the relative positions of such narratives and their contribution to sustainability transitions. We do find and acknowledge that such narratives are multi-faceted, plastic and actively evolving, and thus their positioning could benefit from a more nuanced interpretation. The three narratives have in fact undergone a conceptual evolution since their original formulation decades ago. Further research could focus on how individual narratives have changed in time, and how they have influenced each other (Garud and Gehman, 2012). A related aspect to be further discussed regards the characteristics that have contributed to the successful popularization and implementation of the three narratives. This also relates to the need for further investigating synergies and limits of these narratives and possibly harmonising their divergences. At policy level, there is need to refine, clarify and systematize contemporary policy narratives, while monitoring and improving the overall instrument landscape and the efficiency, efficacy and consistency of individual instruments (Rogge and Reichardt, 2013).

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**Energy and growth in a stock-flow-fund ecological macroeconomic model**

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This presentation will focus on how energy and growth can be analysed via a stock-flow-fund ecological macroeconomic model. The stock-flow-fund approach to ecological macroeconomic modelling has been recently developed by Dafermos, Nikolaidi and Galanis (2017) and relies on a novel synthesis of the stock-flow consistent approach of Godley and Lavoie (2007) with the flow-fund model of Georgescu-Roegen (1971, ch. 9; 1979, 1984). The key feature of this approach is the joint analysis of monetary and physical stocks and flows using the accounting principles and the laws of thermodynamics. The skeleton of the model relies on four matrices: (1) the physical flow matrix which portrays the inflows and the outflows of matter and energy that take place as a result of the production process; (2) the physical stock-flow matrix which presents the dynamic change in material and non-renewable energy reserves, the atmospheric CO2 concentration, the socio-economic stock and the stock of hazardous waste; (3) the transactions flow matrix which shows the financial transactions that take place between the various sectors of the economy; (4) the balance sheet matrix which includes the assets and the liabilities of the institutional sectors of the economy.
In the stock-flow fund ecological macroeconomic framework economic growth is determined via aggregate demand, in line with the post-Keynesian tradition. Finance and income distribution play a non-neutral role. In particular, aggregate demand is affected by changes in the wage income share. This relies on the Kaleckian assumption that the propensity to consume out of wage income is higher than the propensity to consume out of capital income. Also, investment demand is curbed when banks are less willing to provide credit to firms or when firms have accumulated a significant amount of debt. The transactions flow matrix and the balance sheet matrix permit a detailed exploration of the interactions between demand, credit and debt.

However, demand is not the only determinant of economic growth. Economic growth is also affected by supply constraints. This is formalised via a Leontief-type production function in which capital, labour, energy and matter are used as inputs. Drawing on Georgescu-Roegen, a distinction is made between stock-flow resources (energy and matter) and fund-service resources (capital and labour). Capital and labour productivity as well as energy and material efficiency are allowed to change endogenously.

The model pays particular attention to the impact of energy use on climate change. Higher use of energy leads, ceteris paribus, to more carbon emissions that enter into the atmosphere and, via a carbon cycle, affect radiative forcing and atmospheric temperature. The global warming that is caused by economic growth and higher use of energy has various feedback effects on the economy. In particular, climate change destroys the fund-service resources (capital and labour) reducing the supply-determined output. This happens because climate-related phenomena destroy capital and its productivity and can lead to health problems that reduce labour force and labour productivity. Climate change also affects adversely the expectations of households and firms, reducing consumption and investment demand.

Within this framework energy influences economic growth via four channels. First, the depletion of non-renewable energy reserves can reduce significantly the supply-determined output. Hence, the model captures the long-run limits to growth that might arise due to the exhaustion of fossil fuels. Second, improvements in energy intensity that lead to lower energy costs have a positive impact on investment demand. Third, the rise in atmospheric temperature that is caused by the use of non-renewable energy destroys the fund-service resources increasing the possibility that the supply constraints might be binding. Fourth, the climate damages that emanate from the combustion of fossil fuels affect the expectations of households and firms, and this can lead to lower consumption and investment demand and, thus, to lower economic growth.

A distinct feature of the stock-flow fund framework is also that finance affects the use of energy not only because credit influences economic growth but also because banks and financial markets affect the availability of finance for green projects that can reduce energy intensity and the reliance on non-renewables. Hence, it is explicitly taken into account that a financial system that facilitates the financing of green investment can have beneficial effect in the way that energy is used. In the presentation, all the above-mentioned features of the model will be briefly explained and comparisons will be made with other theoretical approaches to the relationship between energy and economic growth. Moreover, there will be a discussion of the data that can be used in a stock-flow fund model in order to analyse the interactions between energy and growth.

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Modelling sustainable energy system development under energy and environmental constraints

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The emerging threat of climate change and the projected depletion of energy sources have motivated the development of models that link energy, economic and environment systems. These models, also known as “E3” models or Environmental Integrated Assessment Models (IAMs), began to be developed in 1970s with “The limits to growth” report [1]. Currently, dozens of IAM models exist [2,3].

Despite Environmental IAMs integrate modules from different disciplines most models are characterized by a sequential structure where feedbacks between submodules are scarce. Feedbacks exist mostly inside each submodule. However, the appropriate representation of the links between economy, energy and environment requires the modelling of multiple feedbacks and non-linearities. System Dynamics (SD) models open a consistent way to include feedbacks and disequilibrium dynamics [4] consequently their application in IAMs is justified. However, even in the case of current SD models, the represented feedbacks between subsystems are limited. Also, there is a large discrepancy between natural scientists’ understanding of ecological feedbacks and the representations of environmental damage (if any) found in IAMs [5].

Furthermore, most models consider that both fossil and renewable energy resources are abundant. However, fossil fuels are finite and non-renewable on a human scale. These resources are thus limited physically and, more stringently, economically. The fact that the peak of conventional oil has already occurred has been largely admitted in Academia as well as by international agencies [6] and the recent [7] suggests that the peak of all liquids may have also been reached. Similar constraints exist for the other fossil fuels [8]. On the other hand, recent studies of the limits of renewable sources show that their potentials might be even lower than the current final consumption of energy by means of fossil fuels [9–11]. Last but not least, almost no model considers mineral resources availability, which is also subject to depletion. Moreover, there is an important link between energy and minerals because energy is necessary to obtain minerals [12].

The world model MEDEAS, arise in order to fill these gaps and is being developed in the context of a European H2020 project. It is being developed with a SD approach and intends to shed light on these issues. The dynamic behaviour of the economy in the MEDEAS model is restricted by at least four environmental limits: energy resources, climate change, availability of materials and availability of land. MEDEAS is currently under development, taking WoLiM model [13] as a starting point. MEDEAS improves several issues of WoLiM: disaggregation of economic sectors, several feedbacks between submodules, higher disaggregation of energy sources, land-use, materials availability constraints and a simple representation of the climate system.

The objective of the MEDEAS model is to explore transition pathways towards sustainability at global and EU-level. This paper describes the first version of MEDEAS world model. MEDEAS is conceptually structured in six different modules (Economy, Energy, Materials, Land, Climate and Social), each one interrelated with the others and hence with the whole system. Changes in variables of one module dynamically cause variations in variables of other modules, which induce feedbacks in the system. The dynamic evolution of variables is non-linear. Non-linear dependencies better reflects reality, overcoming that way the limits of traditional linear modelling.

MEDEAS estimates the future energy consumption as the result of confronting the energy consumption required (demand side) and the energy supply availability (supply side). The energy demand is estimated in the Economy module, according to the dynamic behaviour of each economic
sector. The energy supply availability is estimated in the Energy module according to the availability of the energy resources and the energy transformation capacity of each type of energy. If energy availability is less than the consumption required, the system faces scarcity, leading to the dynamic adjustment of the variables of the model.

In the Energy module, energy availability is separated by renewable and non-renewable energy resources. Renewable energy sources are disaggregated in onshore wind, offshore wind, solar, oceanic, geothermal, hydro and biomass. Non-renewable energy resources are disaggregated in conventional and unconventional oil, conventional and unconventional gas, coal and uranium. At the same time, the model computes the Energy Return On Energy Investment (EROEI).

Input-Output Tables (IOT) and the energy intensities of each economic sector is the core of the Economic module. Throughout the IOT and an econometric demand function, sectorial requirements of consumption and production are estimated. Therefore, energy consumption is not only expressed by type of energy, but is also disaggregated by economic sectors.

Some social indicators will be obtained in the Social module depending on the economic and environmental performance, which could eventually provide feedbacks yet to be developed to the Economy module.

Furthermore, energy consumption produces CO2 emissions, allocated at the Climate module. These emissions and other greenhouse gases (GHG) emissions cause climate change, which in turn impacts human societies. The implementation of the damages from environmental/climate change in MEDEAS is performed through the integration of an “energy loss function” that reduces the overall energy consumed by the society to deal with these impacts. Climate change also affects social indicators like live expectancy.

The Material module confronts material requirements with material availability. The interdependencies between the energy and material sector will be modelled. For example, the materials for deploying renewable technologies will be explicitly modelled, as well as the (increasing) energy requirements for declining ore grades.

In the Land module the land requirements derived from each scenario are compared with the land availability. The land requirements for CO2 absorption, urbanisation, food and energy crops, forests, biodiversity conservation etc. are considered. Hence, the link with the energy system is crucial and land availability may limit the sustainable potential of renewable resources.

Policies provide the framework in which the trend of exogenous variables is set, and thus the behaviour of each module in different scenarios. Additionally, the model is flexible to allow any user to design his own scenarios and modify the main assumptions of the model.

At present, a simplified version of the MEDEAS model has been developed and the validation tests are satisfactory. Initial results simulating a BAU scenario show that current global GDP per capita growth could not be maintained in the following decades. Growth may stop in the 2020s due to the scarcity of liquids sources driven by oil depletion. The results indicate that global average GDP per capita would be in 2050 around 10,000$ per capita (very similar to actual levels). Renewable sources could cover in 2050 near of 100% of electricity demand but could not replace all energy consumption. Even in the case of a high renewable scenario development, the GDP per capita growth would halt in 2030 and reach 11,500 $ per capita by 2050. These initial results also show that if the consumption of non-renewable sources does not stop the impact of climate change would have to potential to substantially impact our society in the next few decades.

References:
Towards environmental justice in an EU context

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The paper aims at developing a concept and assessment framework to inform policy makers and other relevant stakeholders on the possibilities to assess issues related to the debate on environmental inequalities and justice in an EU context. Challenges related to environmental inequalities have emerged in several areas, ranging from environmental pollution to climate change and land tenure and are likely to develop further as a tradeoff of economic growth and liberalization in a physically constrained world. Zwickl (2015) concludes that environmental inequality, defined as the unequal access to environmental goods and bads, is under-researched and, most notably, under-represented in economic and environmental policy in the EU, as compared to the US where a large and growing empirical knowledge base underpins disproportionate exposure to environmental hazards by race, ethnic and income groups. In the EU, environmental inequalities have been reported in the fields of energy, climate change and environmental taxation, but a comprehensive, inclusive concept on the relevant issues and its wider implications is lacking. As environmental impacts are to be perceived as social impacts, the relevance of the conceptualization of environmental inequality and justice is evident in the context of distribution of, and responsibility for, these inequalities. The review in this paper is a contribution to close this gap.

From empirical data it can be derived that environmental inequality is mainly affecting stakeholders in the vicinity of production facilities. However, as a result of globalization and outsourcing of production activities by highly developed markets such as the EU, environmental inequality has become a multi-geography problem linking local consumption to global production activities (Ivanova et al. 2015, Steen-Olsen et al. 2012; Giljum et al. 2015). Furthermore, research on the topic at the global scale has shown that income inequalities are increasingly associated with environmental inequality (Robbins, 2012). As the problem of environmental inequality is complex with multiple dimensions and layers
affecting each other, we have tried to answer the following research questions:

1. How can the complex problem of environmental justice be conceptualized at the EU member state level? Which dimensions of environmental inequality can be distinguished?
2. What methodologies and databases are available to calculate and monitor environmental inequalities at the EU member state level?
3. Which indicators could inform economic actors, policy makers and the society at large on environmental and distributional goals at the EU member state level?

First, a concept of environmental justice has been developed on the basis of a literature review of reports, initiatives and case studies on environmental inequality in EU member states. The review shows that three contemporary dimensions of environmental inequality have emerged within the EU: (1) vulnerability and exposure of specific areas or population groups to environmental disaster and risk, and (2) environmental taxation and the related issue of energy poverty, (3) access to environmental goods such as parks and clean air in relation to health. In addition, the concept of environmental inequality shows to have multiple dimensions that relate the EU to global inequalities: (1) impacts related to global extraction of materials, (2) environmental impacts related to manufacturing activities and (3) consumption activities of socio-demographic groups in the EU that drive environmental inequalities. Finally, an overarching political dimension has been identified that involves the participation and ‘say’ of stakeholders in issues of environmental inequality and justice.

Secondly, we have explored and evaluated the available environmental, economic and socio-demographic databases for the purpose of linking economic structures and consumer activities with environmental pollution and other related inequalities. We have explored the possibilities to map the datasets at the grid cell level for Austria, allowing us to combine different impact categories at the spatially explicit level. Furthermore, we have explored multi regional input-output methodologies to be able to link extraction, production and consumption activities from the member state level to the global level and vice versa.

Finally, as the output of a stakeholder workshop, we have been able to define a novel indicator framework on the basis of the developed concept, the available databases and feasible methodologies, which potentially allows to inform policy makers and other relevant stakeholders on issues of environmental inequality and the development thereof. An important outcome is that the relevant dimensions of environmental inequality show to be context dependent, meaning that a certain country may host e.g. heavy industry, or is prone to water scarcity, whereas others may not. Environmental policy may thus need to distinguish between inequality and justice.

Understanding pro-environmental behavior using the theory of planned behavior
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Many studies have highlighted the urgent need for policies that promote environmental sustainability. Steffen et al. (2015) report that we have transgressed four of nine planetary boundaries (climate change, loss of biosphere integrity, land-system changes and altered biogeochemical cycles). These problems are caused by human behavior. When humanity’s demand for biocapacity (humanity’s ecological footprint) is compared with the Earth’s supply of biocapacity, the former surpasses the latter by 50% - i.e. we need 1.5 Earths to meet our current demands on nature (WWF, 2014).

Societies are confronted with the difficult task to steer behavior towards more environmentally friendly behavior to reduce environmental impacts and to reduce the ecological footprint (see e.g. Steg & Vlek, 2009). It is often argued that policymakers should take the lead and aim to change behavioral patterns, as relying on technological change may not suffice (Jackson, 2009). However, promoting pro-environmental behavior is easier said than done, as many behaviors are locked-in in terms of technological development or behavioral habits, while access to more environmentally friendly alternatives may be lacking for some groups in society. In order to stimulate pro-environmental
behavior, it is important that policymakers better understand the underlying determinants of pro-environmental behavior.

Several theories to understand human behavior have been developed over the past few decades. We will make use of one of these theories – the Theory of Planned Behavior (TPB) put forward by Ajzen (1991) – to focus on the pro-environmental behavior of students. TPB states that behavior is influenced by both intentions and perceived behavioral control. The latter concept depends on the extent to which individuals are able to change their behavior, and the availability and accessibility of options. Intentions, in turn, are shaped by the interrelation between attitudes towards the behavior, subjective norms and values and perceived behavioral control. The TPB model can then be used by policymakers to foster behavioral changes that will benefit the transition towards a more sustainable society.

We apply the Theory of Planned Behavior to a sample of students at Ghent University, Belgium. Analyzing student behavior has several advantages. Students are similar from a socio-demographic point of view (e.g. age), but the focus on this very specific sample also allows us to focus on very specific choices with respect to behaviors in the survey, which would be more difficult in a survey aimed at a broader sample. Take the example of commuting. Roughly half of the students have a room in Ghent, and go to their home town during the weekend. The fact that these students have rather predictable commutes (one short daily commute and one longer commute on a weekly basis) enables us to split up the group neatly and to ask very specific questions about the choices made with respect to commuting behavior. Understanding student behavior is also interesting because they are at the start of their decision-making life, and behavioral change is easier earlier in life than later in life. They are the citizens of tomorrow, they still have to take many important decisions in life, all many of them with an environmental impact (e.g. where to live and work, how to raise their children...).

We aim to analyze three specific behaviors with environmental impacts that are well-known to most students: meat consumption, travelling behavior (commuting and long distance travel) and recycling behavior. Next, we will assess to what extent the model can be applied to the overall environmental impact of the sum of behaviors of the students by focusing on their ecological footprints. Our survey contains three types of questions. First, a number of questions are included to measure the ecological footprint (EF) of each student. The EF will be calculated using the footprint calculator of Ecolife, a Belgian environmental ngo, that was developed for WWF Belgium. Next, we include questions about attitudes, subjective norms, perceived behavioral control and intentions with respect to each of the three behaviors and pro-environmental behavior in general. A last series of questions focuses the students’ behavior and socio-demographic variables (gender, social background, knowledge about environmental problems, ...).

The survey will enable us to apply four Theory of Planned Behavior models. It will be distributed in January 2017 to around 600 students following several courses at Ghent University. A prior survey, with a simpler setup focusing only on the carbon footprint and meat consumption, has been filled out by a group of 169 students at Ghent University in May 2016. Here, we found that for both behaviors, intentions depend on attitudes and subjective norms, but not on perceived behavioral control. The main difference between the two models, though, was the relation between intentions and behavior. For meat consumption, intentions strongly determined behavior whereas for the carbon footprint no relation between intentions and behavior was found – i.e. having more sustainable intentions did not result in having a lower ecological footprint. In neither of the two models, perceived behavioral control was found to be a determinant of behavior.

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Steffen W., Richardson K., Rockström J., Cornell S. E., Fetzer I., Bennett E. M., Biggs R., Carpenter S. R.,
Hydropower expansion in the Western Himalayas: mapping resistances to the “consensus of infrastructures”

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Extended abstract

The increase of the social metabolism of our industrial economies in terms of flows of materials and energy have led to the expansion of commodity extraction frontier worldwide (Fischer-Kowalski, M., & Haberl, H, 2007; Krausmann et al., 2009; Martinez-Alier et al., 2010; Singh et al., 2012). At the same time, social environmental conflicts are mounting, as well as the number of communities and groups organizing for environmental justice (Schlosberg, 2004). Conflicts can be considered as an intrinsic feature of what political economists and sociologists call the “consensus of commodities” (Svampa, 2013), a mindset that is locking communities in an export-oriented extractivist economy (Gudynas, 2013) of raw materials.

However, the debate should not only focus on mobile commodities. Energy generation should also be addressed, especially when it requires large infrastructure, technologies, and acquisition of land. This article analyses the hydropower expansion in the Himalayan state of Himachal Pradesh in India, one of the hotspots in the development of this technology, whose energy program aims to exploit the whole 27,000MW identified potential, both from small and large plants. Large-scale renewable energies are in fact widely promoted both by governments and the industrial sector, justified by their alleged sustainability and crucial role against climate change. However, the pace hydropower develops and the cumulative impacts it brings along make the technology highly conflictive and contentious and leads to socio-environmental conflicts.

The article has the following structure: we first present the collaborative mapping project at EJAtlas for Himachal Pradesh to dig out ground data on the plants, on the impacts, and on the reasons of opposition. The mapping process relied on activist-led research and co-production of knowledge (Brown, 1997; Fals-Borda, 1987; Jasanoff, 2004; Durose et al. 2011), carried out by both activists and local residents in the project affected areas and other experts of the hydroenergy sector. As Escobar (2008) argues, social movements are important spaces of knowledge production that do not only enact politics through protest and cultural contestation but are generators or facilitators of diverse types of knowledge creation. Second, we explain how hydropower technology led to the expansion of an internal extraction frontier. We argue that the new hydropower extraction frontiers rely on a ‘consensus of infrastructures’ that sustains the commodity chains, as built environment lies at the core of territorial and resource control for fuelling any extractivist project. In India, although hydropower is not a commodity to be exported outside national boundaries and its ‘material premises’ remain on the local ground, it provides an eloquent example of inner primary commodity flows based on a form of extractivism within India. In the next section, we investigate what discourses inform and shape the opposition to dams, and show in detail the main arguments for opposition by local communities, state and national level environmental groups and activists. This way, we aim at investigating the nature of such socio-environmental conflicts and what is actually the dispute about. We argue that the “consensus” is being challenged on three major grounds at local and national level, a. Socio-environmental impacts, b. Systematic violation and dilution of environmental laws, c. Undemocratic and sometimes violent character of the hydropower frontier expansion. The final section shows the contributions of our research to degrowth, political ecology and environmental justice literature and
deeper discusses the meaning of anti-dam arguments. We argue that the latter show a growing mistrust in the very promises of development that hydropower is supposed to bring about and therefore represents fundamental contradictions in the consensus of infrastructure and energy technology; the mistrust increasingly generates rejection of projects, challenges the way energy is being generated, questions the irreversible consequences this energy model will bring along in the territory, and finally raises the questions of “whose development, and for whom?”. Therefore, even if renewable energy related technology plays a central role in future energy programs, it needs to be re-thought in order to include a critical reflection on the political project behind them. Degrowth inspired works have already addressed some of these issues especially in the European context (Jenkins 2016; Kunze and Bekker 2014); however, degrowth research still needs to engage with non-European contexts and to do so, it needs to strengthen alliances with other movements and disciplines. Literature on ‘appropriate technologies’ (Schumacher, 1973), some also stemming from the Indian context (Alvares, 1980; Reddy, 1991), can fruitfully inspire a debate on a re-politicized assessment of energy needs (Asara 2012). It cannot avoid re-thinking social structures and questioning the current hegemonic energy paradigm, based on a centralized control over energy generation and distribution, a consumption-based growth-oriented idea of wellbeing, and a technocratic understanding of technology. Given the contradictions of so-called “renewable” but irreversible hydropower technology and the financial constraints hydro plants are going through, we need to also question the generally accepted tenet that prosperity, modernity and development will only happen through universal connection to the electricity grid, and investigate the political implications of it (Gupta, 2015). This requires putting together disciplines and knowledge systems that can inform a reflection on what sort of energy technology is not only viable but also desirable, and under which political project such reflection should happen.

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Capital accumulation, degrowth and environmental conflicts

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The entry of degrowth into the academic arena since 2008 has attracted a considerable interest, but has also been widely criticized. In particular, marxists have questioned the fact that the most well-known degrowth proponents, such as Latouche, have not sufficiently discussed and questioned capitalism (Saed, 2012). It has been highlighted the lack of a discussion on the relations between degrowth and both the capitalist mode of production (Foster, 2010) and the process of capital accumulation (Altvater, 2011). Even if Latouche (2012) outlined the anti-capitalist root of the degrowth paradigm, we agree with the above criticism that this dimension has to be further analytically explored. This article tries to move a step forward in this line. First, it intends to discuss the relations between capital accumulation, economic growth and social metabolism. Second, it argues that capital accumulates expanding social metabolism and capitalist markets through dispossession (Harvey, 2003) and contamination (Demaria and D’Alisa forthcoming). Third, it argues that both dispossession and contamination result into environmental injustices which lead to conflicts where different actors emerge reacting to capital accumulation. Therefore, the article proposes that in fact degrowth necessarily calls into question capital accumulation and that environmental conflicts represent a political arena where this is already happening. Two case studies about waste-related environmental conflicts are discussed. First the building of an incinerator in Naples (Italy) is introduced, where contamination is the main strategy of the capital accumulation. Second the case of New Delhi (India) is discussed, where the two described processes of dispossession and contamination take place simultaneously: waste is diverted (see expropriated) from wastepickers to incinerators built with Clean Development Mechanism (CDM) investments from Kyoto Protocol, which pollutes the locals and the environment. Introduction Looking at socio-ecological processes, we have seen that the changes and expansion of social metabolism can lead to socio-environmental conflicts, from the extraction of resources to the disposal of waste (Martinez-Alier, 2002; Martinez-Alier et all., 2010). More efforts can be devoted at the theorisation of this phenomenon, in particular in clarifying its driving forces and the correspondent typologies of conflicts. The multidimensional crisis that our societies are facing shows the instability and the crisis tendencies of capitalism. It offers the possibility to revitalize the theory of over-accumulation, meaning that the economic crisis is due to a lack for capital of opportunities for profitable investments. Potential solutions can be found in the search for lower costs of inputs (i.e. land, raw materials, labour,...) and widening of markets (i.e. trade with non-capitalist social formations). Capitalist development appears in need of something ‘outside of itself’ and for this reason
continuously opening up ‘territories’ (Harvey, 2003). The question of interest here is how this process interacts with social metabolism and which are the social and environmental consequences.

Theoretical framework applied to waste management

In this article we intend to apply this framework of analysis to one particular sector: waste management. The complexity of the waste sector and its social, economic, and political implications make it the quintessential for ecological economics (Barata 2002, pag. 117, Bisson K., Proops J. 2002). A system of waste management could be said to be integrated and sustainable. However this should not only refer to the sense of perfectly matched technical options of waste treatment (Nelles et al. 2010) but to a common bad implying a wide range of environmental, economic, social and political factors (Barata 2002). Therefore waste management should be 144/637 addressed more as a social and political process rather then as a pure technical matter (K. Bisson, J. Proops 2002, Winiwarter V. 2002). The complexity reached by the sector of waste management seems to be translated into profitability opportunities, meaning a very tempting market for the over-accumulated capital in search of profitable businesses. Our hypothesis is that that the appropriation of bad commons such as waste is one of the several strategies for expanding the scale and scope of capital accumulation as Prudham (2007) explain properly in the case of biotechnology. These socio-ecological processes are justified and legitimized by a narrative of progress and (sustainable) development that turn out to be challenged when socio-environmental conflicts emerge. Therefore this paper attempts to link two lines of thoughts, ecological economics and political ecology, to show how capitalism appropriates nature and labour force to expand his dominion via dispossession (expropriation of rights) and contamination (cost-shifting). We intend to argue that the neo-liberal project is about the release of assets (both inputs and outputs of the social metabolism) at a very low cost. In the case of dispossession, something that was pre-existing outside the capitalist system is brought inside (i.e. privatization of the public assets or commons). Normally a specific social group is dispossessed by another one to obtain profit. In the case of contamination an appropriation of de-facto property rights takes place resulting is the shifting of costs and risks (i.e. exploiting the sinks over their sustainable assimilative capacity). The consequences most likely fall upon the most vulnerable social groups, but the society as a whole can be affected. Such unequal distribution can be intra-generational and/or intergenerational.

Case studies

Two case studies are discussed. First we look in Naples (Italy) at the contamination of an extended population group via massive incineration. Second we discuss a combination of the two dynamics of accumulation with a case in Delhi (India) where the wastepickers are dispossessed of the waste that has to be burned into the incinerators. The intention is to explore the explicative ability of the two concepts: accumulation by dispossession (Harvey 2003) and accumulation by contamination.

Discussion and Conclusions

Socio-environmental conflicts have emerged in the two cases. Socio-environmental conflicts can be seen as a reaction to the expansion of capitalist accumulation that deteriorates the social and environmental conditions. In the case of dispossession people complain about the expropriation of their means of production, while in the case of contamination people complain about the costs shifted to the detriment of their environment and health.

Bibliography


The diversity of methods in synthesising knowledge

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Effective, unbiased and transparent methods of knowledge synthesis are a crucial element of science-policy-society interactions. A vast and rapidly expanding body of knowledge is relevant to many policy decisions. This includes scientific knowledge, technical know-how, and experiential knowledge held by experts and indigenous and local knowledge. Synthesizing knowledge within timescales relevant to policy makers is a real challenge, but many methods are now available to do so.

The EKLIPSE expert working group on methods has identified 21 knowledge synthesis methods, which could be used to answer questions from policymakers or other stakeholders. They range from focus groups, which can be done in just a few days and gather local place-based knowledge, including opinions and values from small groups; to structured systematic reviews, which follow an a priori protocol, can take a year or more, require substantial scientific expertise to complete and address a narrow, well-defined scientific question.

The methods can draw on four different sources of tacit or codified knowledge: scientific, indigenous and local knowledge, technical know-how, and anecdotal evidence. They can also use different types of information, including quantitative or qualitative data and monetarised information. In this talk we provide an overview of the 21 knowledge synthesis methods and present the EKLIPSE approach to deciding which is the most appropriate method, using examples of recent knowledge requests from European policymakers and NGOs.

We have developed detailed guidance on each method, providing information on how it works, what it can achieve, what type of questions can be tackled, how much it costs, and what specialist resources are required. The EKLIPSE guidance summarises the relative strengths and weaknesses of each method. We have collected example case studies to illustrate the use of each of the different methods to inform design or implementation of environmental policies across Europe. Building on previous work (Pullin et al. 2016), and in partnership with policymakers, we have devised a set of ten questions to ask during a dialogue between knowledge-holders and knowledge requesters.
Categorical responses by requesters to each question will help inform the choice of method(s) for addressing a given request, during a dialogue between knowledge-holders and knowledge requesters. For example, the first question is: “What type of question is it?” If the knowledge need is about future emerging issues, knowledge synthesis methods that characterise people’s expertise and opinions (e.g., focus groups) are far more applicable than summaries of existing published science (e.g., structured systematic review). Another important consideration is: “How much time is available before you need the results?” If results are required within two months, then a quick scoping review could be developed but systematic maps cannot usually be completed in that short time.

The 21 knowledge synthesis methods are:

1. Systematic review
2. Solution scanning
3. Summaries and synopses
4. Meta-analysis
5. Rapid Evidence Assessment
6. Quick Scoping Review
7. Systematic map
8. Vote counting
9. Non-systematic literature reviews
10. Expert consultation
11. Expert elicitation/consultation with Delphi process
12. Causal chain analysis (CCA)
13. Bayesian belief networks (BBN)
14. Focus groups
15. Discourse analysis
16. Joint fact finding (JFF) and double sided critique (DSC)
17. Scenario analysis
18. Structured Decision Making
19. Collaborative Adaptive management
20. Participatory mapping
21. Multi Criteria Decision Analysis (MCA/MCDA)

This is not an exhaustive list of knowledge synthesis methods, but those we considered to be most useful to characterise, for current science-policy-society interfaces in the field of environment and natural resource management.

Most methods can be used alone, or in combination with others. For example, solution scanning, which can engage a wide range of stakeholders and be achieved relatively quickly (Sutherland et al. 2014), usefully feeds into either systematic mapping, followed by systematic review for specific questions, or it can form the basis of Causal Chain Analysis, perhaps ending with a Bayesian Belief Network to gain a fuller understanding of a system. The combination of methods selected will be tailored to address a particular request and needs of the requestor.

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Labour Productivity at the industry level as a determinant of Job Satisfaction
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Labour productivity, as a measure of performance, is an essential indicator for workers, organizations, industries and governments. In fact, the ability of a country to increase productivity is considered an important determinant of its ability to achieve higher standards of living (Krugman 1994). As economic theory suggests, if labour productivity increases, this translates into higher compensation for workers, usually in the form of wages; organizations and industries increase their profits, as they become more competitive, and governments raise more revenue from taxes. Therefore, higher labour productivity leads to economic growth, which is perceived to drive material wellbeing upwards. However, material and emotional wellbeing are not synonymous. While global economies focus on continuous productivity growth, the question of whether productivity is positively related to workers’ wellbeing, and in particular with their job satisfaction, has received less attention.

This paper explores this relationship, by examining the effects of industrial labour productivity on job satisfaction in an inter-industry, cross-country analysis. This is done by matching data from the EU KLEMS for industrial labour productivity levels in 2009 for 33 industries of the economy with data on job satisfaction in 2010 from the European Social Survey (ESS5) for eight European countries. The research was motivated by the special case of the personal services sector, which includes education, healthcare, arts and other personalized services, such as hairdressing. This labour intensive sector has low labour productivity, due to the handicraft element of its operations and the necessity for human interaction that cannot be substituted by technological innovation. Since it makes use of a so-called affective labour that is mission oriented, it is characterised by relatively high levels of job satisfaction, despite the low remunerating rewards that its workers receive.

To estimate the relationship between industrial labour productivity and job satisfaction, an ordered probit model is employed in an econometric analysis, regressing job satisfaction on industrial labour productivity and controlling for all other factors that help explain the level of job satisfaction, namely demographic, intrinsic, extrinsic and employment characteristics. To the best of my knowledge, this is the first study that addresses the relationship between job satisfaction and labour productivity by matching individual and industry level data for a group of advanced economies, hence providing a sector analysis in an international perspective. Therefore, with its innovative method, it contributes significantly to the job-satisfaction-labour productivity literature.

The findings reveal that the relationship is negative, mainly driven by organizational attitudes and the form of production systems. The division of labour, a productivity enhancement strategy, is the key to economic growth, as Adam Smith (1887) argues. It operates via the separation of projects into small tasks performed by specialized workers. However, mechanization and division of labour into sometimes meaningless small tasks, may result in feelings of alienation from work as Marx’s (1972) theory suggests. Workers might feel alienated from the product of their labour and from each other, which negatively affect job satisfaction (Chiaburu et al. 2014). As economies strive to increase labour productivity, there is higher pressure put on production, which, above a certain level, may increase the stress levels of workers and negatively affect their wellbeing.

The policy implications from this finding suggest that there is a great need in our times for investment in skills and training at the personal services sector that provide high job satisfaction, despite their small contribution to the total output of the economy and its growth. Since governments measure what they value the most, it is crucial to motivate a structural change towards economic measures that prioritize emotional wellbeing over material wellbeing. The first step would be to keep national accounts of wellbeing. Identifying human evolution solely by the level of total output and its growth and relentlessly pursuing increases in labour productivity have a negative impact on the emotional wellbeing of workers, as found by this analysis and therefore the ruthless pursuit of productivity growth should be abandoned.
References

Positively looping towards sustainability. A complex and evolutionary methodology for transitional decision-making and agency
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Transition to sustainability rests on the capability of multiple stakeholders (individual and collective) to choose and pursue (locally and globally) the complex end of the sustainable society and economy [Kemp et al., 2007; Safarzynska, Frenken and van den Bergh, 2012]. The possibility of success of this purpose depends on socio-economic-ecological factors characterized by complexity and evolutionary emergence. These factors, are far away from agent’s direct control and capability of choice, and they reflect radical uncertainty [Alchian, 1950; Funtowicz and Ravetz, 1994; Baumgartner, 2009], incommensurability [Martinez-Alier et al. 1999; Munda, 2012], indeterminateness, path-dependency, and irreversibility [Georgescu-Roegen, 1971; van den Bergh and Kallis, 2013]. This represents a hard challenge both to science and policy decision-makers, which can refer to knowledge and actual possibilities of choice which are strictly limited by necessity of evolutionary and complex reality. The paper faces the challenge of transition to sustainability from the perspective of agency, which we conceive as the (limited and conditioned) possibility of intentional action and self-organization shown by human agent and societies [Gowdy, 2007; Beddoe et al., 2009].
The problem of transitional agency entails two interwoven issues. One concerns theory and how scientific method can orient decision-making in the face of radical uncertainty and complexity [Vercelli, 1998; Saloranta, 2001], The other is practical and regards the limits and conditions of self-organization towards ends, whose conformity to future evolutionary stability can’t be demonstrated in advance [Funtowicz and Ravetz, 1990; Munda, 2012]. We propose an unified epistemological perspective capable of reintegrating the theoretical and the practical aspects, through a concrete methodology based on the integration between top-down policies and bottom-up collective actions. The main novelty is a new decision-making schema, which should represent a standard method for building and updating knowledge in the context of complexity and social-economic-ecological co-evolution.
Our model can be generalized to any complex system, where different stakeholders are asked to find new solutions and/or to promote new ends. In any circumstances the aim is to transit from a set of ‘undesirable states’ (in any complex system, we can think at a given set of key nodes and relations as identifying a given ‘state’) to new ‘desiderata’ (a new set of nodes and relations). The actions to be taken and the establishment of new ends are both endogenous and interconnected through an evolving process that includes different levels of decision, knowledge formation, and actions. However, the complex nature of each ‘state’ leads inevitably to different degrees of conflict given the heterogeneous and asymmetric set of interests, powers, informations, and Visions (in the Schumpeterian sense) involved. The circular schema, described below, should reduce the level of (potential) conflict by widening the base of decision-makers, and of participants in the interactive process of knowledge formation and collective agency. As a consequence, our schema provides an effective procedure to “Think globally, [and] act locally” [Ostrom, 2009], because it contains as its internal mechanism of development the modality through which local practices and decisions progressively forms wider and wider networks of initiatives with large scale effects.
The intuition behind our methodology is that in order to face problem-solving and to prompt and maintain intentional transition in the context of complexity and coevolution, it is necessary to endogenize the modalities through which complexity and coevolution works. From this consideration we derive the circular diagram of knowledge formation and collective practice (Fig. 1), which we conceive as a spiral in order to convey the idea that it is a self-enforcing process which can grow at each round on several dimensions: number and types of participants in decision-making, their organization, explicatory power of the produced knowledge, variety and quantity of relevant objects of scientific inquiry, recognition of complex causal links, control of the conditions and of potential effects of the involved agency, etc. Four interconnected phases (Ps) structure the knowledge-agency process of problem-solving and action that we propose:

P1: At this level stakeholders (local administrations, communities, scholar, etc.) are involved in interactive decision-making and are asked to set-up a framework of the problems at stake and to define a set of possible interventions (e.g. the implementation of pilot projects on specific issue of particular interest, such as: urban agriculture, use of renewable energy, etc.). This phase produces the result of a preliminary inspection of the capacities of action and of interests of local agents, together with a first collection of data which can be referred to for envisaging expected results and further strategies.

P2: Qualitative network mapping interacts with the participatory decision making methods of the initial phase. The aim is the definition of the key variables and the identification of relevant causal and complex links and feedbacks involved by them. These insights and references are directly derived from extensive stakeholder engagement which can be obtained through focus groups, collective interview, citizen-science initiatives. Hence, the construction of the scientific picture adheres to transitional practices and it can lead to the definition of new potential ends/strategies of intervention.

P3: Systemic models, based on the network map, though context-dependent, are thought to assess the key feature of the system at hand and its evolution in time, by the application of standard mathematica methodologies (Network Theory, Input-Output, System Dynamics). The aim is to build a coherent and integrated analytical framework in order to estimate quantitatively: the socio-economic-ecological impact of each course of action (in case of competing strategies/pilot projects), the expected effects of an extension (in space and time) of the activities set up by P1-2, and the expected results under alternative (future) scenarios,

P4: Dissemination of the qualitative and quantitative results has the purpose of broadcasting information, boosting knowledge, so fostering environmental awareness. Dissemination enhances interaction among the involved agents and community, but also enlarges it to new stakeholders and new transitional activities. In this way, this last phase creates a feedback loop on the decision-making and agency phase, fostering the integration between top-down and bottom-up levels, reducing potential conflicts and promoting institutional innovations.

To provide a general overview of the potentials of our proposal, we sum up the distinctive epistemological features of our methodology:
it internalizes complexity into agency;
it thinks at decision-making as evolutive procedure;
it fosters interaction between top-down policies and bottom-up collective actions;
it unifies theory formation and transitional practices;
it connects local decisions and practices to global results;
it builds quantitative analysis on qualitative and participatory network descriptions;
it puts the communication of results as a key to awareness through interaction.

**Raw Material Use of Nations - A Cross-Country Analysis Illustrating the Performance of Enhanced Resource Indicators**

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Referring to historical observations from the last decades it seems that relative or even absolute decoupling of environmental pressures from global socio-economic developments might be more difficult to achieve with regards to raw material extractions than with regard to CO2 emissions: In the period from 1980 to 2013 global material extractions more than doubled (+136%) whereas global CO2 emissions did only increase by 84%. Given that global real GDP mounted by 157% over the same time period only a very slight decoupling of global material extractions from global economic growth has been observed in the recent past. Furthermore, with global population increasing by 62% within the observation range, this implies that global average material use per capita grew by more than 1% p.a. It is obvious that a prolongation of these historical patterns towards the coming decades is not only unsustainable but would endanger fundamentally our whole earth system and the ability to stay within a safe operating range (Bringezu, 2015). As recently stated by the UNEP International Resource Panel “decoupling of material use and related environmental impacts from economic growth is a strategy that will be instrumental for ensuring future human well-being based on much lower material throughput” (UNEP 2016, p. 18). Against this background in September 2015 Responsible consumption and production was adopted as one key Sustainable Development Goal (SDG) at an UN Summit. In a globalized world the task of monitoring achievements towards this SDG asks for comprehensive Multi Regional accounting frameworks which are able to map the individual contributions of different national economies within international supply chains. Thus, apart from aggregated analyses of global average figures, enhanced resource indicators have to be assessed, which facilitate disaggregated analyses of the material flows related to international supply chains. In this regard Material Flow Analysis (MFA) by means of global Multi Regional Input-Output (MRIO) frameworks advanced to a commonly used methodology in sustainability research over the past years. Accordingly, a multitude of studies already applied MRIO databases. From this literature the so-called “Raw Material Consumption” (RMC) or Material Footprint (MF) concept emerges as the predominantly applied indicator for mappings of raw material flows along international supply chains. However, progress towards sustainable development of nations does neither have to be monitored by means of consumption based indicators alone. Nor does the RMC indicator suggest itself for assessments of national resource productivity developments. Comprehensive representations of all raw material uses initiating from overall domestic economic activities should rather be based on the broader “Raw Material Input” (RMI) concept. Based on recent research findings from the project “SimRess - Models, potential and long-term scenarios for resource efficiency” our paper starts with methodological annotations on resource indicator definitions. These annotations do not only deal with the questions on the concepts for the accounting of material flows as we do also highlight relevant conceptual issues: It is shown that commonly applied resource productivity measures for national economies are flawed by building ratios, where GDP is used as numerator which does however not fit to the applied denominator concept (e.g. RMI, DMC).
In a second step own assessments for historical developments of enhanced resource indicators for selected countries (Germany, France, USA, Japan, China & India), based on the WIOD/GINFORS database will be discussed. These assessments show, that the previously discussed conceptual issues matter a lot with regard to the level and performance of national contributions to global resource extractions and the monitoring of progress towards enhanced resource productivity. For example own assessments for resource productivity advancements in France and Germany in the period from 2000 to 2013 using the (GDP+IMP)/RMI concept show an average annual progress of 1.3% for France and 0.9% for Germany whilst the respective figures from official statistics using the GDP/DMC concept assess about twice as fast progress (2.1% p.a. for France and 1.8% p.a. for Germany).

In a third step the own assessments for historical developments of enhanced national resource indicators are compared with respective assessments based on different data sources (e.g. UNEP 2016) or different methodologies (e.g. Umweltbundesamt 2016). It is shown, that although data availabilities and methodologies have been significantly improved in the recent past still concerns on data quality issues have to be recognized.

The closing chapter deals with an outlook from two perspectives: On the one hand core results for plausible pathways of global raw material extractions up to 2050 and the contribution of different countries/regions to these estimated developments are presented. These results have been generated on base of the dynamic, econometric environmentally-extended MRIO model GINFORS3 and show that without significant additional efforts the global material extractions will further increase (up to ~140 Gigatons in 2050). On the other hand the identified further research needs are summarized.

References

The “counterfeit” hydropower boom as a way of water grabbing: The case of Martin Brod, Bosnia and Herzegovina
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Introduction
In 1987, Joseph Bensman, in his article entitled Mediterranean and Total Bureaucracies: Some Editions to the Weberian Theory of Bureaucracy, discusses that bureaucracy was adopted without the transformation of the social structure of the society in the Mediterranean countries. This created a hybrid form which exhibited major characteristics of an ideal type of bureaucracy but failed to exhibit its spirit and served other ends, such as bribery, baksheesh, and the purchase of favours for facilitating bureaucratic administration (Bensman, 1987). Since 1987, the political economy of the Mediterranean countries along with their place in international economic networks has changed dramatically but the characteristics of their bureaucratic system stayed the same in many of them, especially in the developing and transition countries. Contrary to popular view which suggests economic growth in order to fight against corrupted practices; as in the case of Greece, loans from the international aid and development organisations (i.e. international finance institutions, international development
companies, international aid agencies), usually, escalate the number of corrupted practices and actors in such countries. However, these organisations keep providing money for future potential investments. One central question is why these international aid and development organisations continue providing funds and loans to such countries although these funds and loans, usually, foster already existing corruption.

This paper will contribute to the answer by focusing on a small scale example. Bosnia and Herzegovina (BiH), which has a highly decentralised and complex administrative system, is selected as the case study country in order to see how it is manifested. International aid and development organisations, such as the European Bank, the European Bank for Reconstruction and Development, the GIZ, and the USAID lend and/or granted millions of dollars to the country in order to assist in the construction of at least 167 future private hydropower plants. This, in official discourse, is to strengthen country’s capacity in the international energy sector (IHA, 2016). However, a high degree of corruption mainly due to the coupling of administrative decentralisation and economic liberalisation makes investments in BiH less profitable and appealing for potential investors (Divjak & Pugh, 2008), including those thinking of investing in dams (Prelac, 2014).

In this paper, the case of Martin Brod village will be used to illustrate how a transition country involves a wide array of actors tapping into global discourses on the benefits of HPPs in order to access international aid, local favours, and personal gains. As such the paper add insights into the so-called hydropower boom arguing that many of these projects might foster corruption but still are continued to be funded and/or granted by international aid and development organisations. The authors utilise concepts developed in the literature discussing the corruption in transition economies and the role of international aid and development organisations in such countries.

Description of the case
BiH consists of two autonomous entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska. The FBiH is composed of ten cantons. Martin Brod, the case study for this paper, administratively belongs to the Municipality of Bihac – a part of the Una-Sana Canton of the FBiH. The local community of Martin Brod includes four more settlements around the main village. Before the Bosnian War (1992-1995), the village had a busy international train station which had connections with important city centres, e.g. Zagreb, Belgrade, and Munich. The number of permanent inhabitants was more than triple the current population and the economic standards of the inhabitants were much better than today. Today, the majority of people live on their pensions. The nearest public transportation option is 15 km away and the village is relatively remote. Two rivers, the Una and the Unac, run through the village. Although the water resources are consequently very rich, during the summer the water level of Unac River decreases dramatically.

Methodology
This paper draws upon primary and secondary data sources collected during fieldwork carried out in Martin Brod and Bihac, Bosnia and Herzegovina between July-October, 2016. Secondary data sources are official data sets and reports. Primary data were collected by using ethnographic research methods mainly participant observation, as well as quantitative data collection methods such as household surveys. During fieldwork, 35 semi-structured interviews were conducted with inhabitants of Martin Brod, activists, local NGO representatives, and local authorities. In addition 34 household surveys were conducted with permanent inhabitants of Martin Brod providing almost a total coverage of households in the village (38).

Preliminary results
During the 1970s, Socialist Federal Republic of Yugoslavia (1945-1991) planned a dam project on the Unac River in Martin Brod. However, the project was cancelled during the very early construction phase due to landslide damages and was categorised as non-feasible. In 2011, the main public energy company of the FBiH, Elektroprivreda BiH, revived the project and started to search for a potential private investor. In the same year, they came up with an additional small HPP on the Una River, again within Martin Brod. The settlers, local stakeholders, and local NGOs reacted against both of these projects due largely to ecological concerns.
The project lived on, however, and in winter 2014, a Russian investor visited the village in order to discuss the project with the villagers. This meeting was facilitated by the Una National Park management, took place in the youth centre and included a large part of the villagers. The investor promised employment opportunities for the inhabitants if the dam went ahead. The villagers remained sceptical of the project but also of this “Russian investor” and with the help of local journalists they found out that he had a company with only USD 5,500 capital. In 2015, the pro-HPP mayor of Bihac withdrew his support from the project after receiving around 15000 petition signatures from Bihac against the project. According to data collected during fieldwork, almost all the villagers signed this petition. The project has since been frozen but not completely cancelled by the officials. A major reason for this, according to the official discourse, is that these projects serve the goal of limiting greenhouse-gas emissions in line with the EU goals in order largely to take part in energy trade with the EU countries (IHA, 2016). In order to do so, recently, the European Investment Bank announced to lend USD 51.8 million and the European Bank for Reconstruction and Development will lend USD 46.4 million for the construction of new hydropower plants in the country. Two of these hydropower plants are in Martin Brod.

While the capacity and the number of these two projects are more or less clear; neither names of investors, nor any other detail, such as project maps, feasibility reports, and impact assessment reports, are clear. This breeds the suspicion regarding the future of the projects. However, local and national authorities pursue their plans of finding investors for these projects, even while one of these are announced as unfeasible by the time of Yugoslavia.

That personal gains are strongly connected to the dam project became clear during many interviews and fieldwork. One interviewee explained that the possibility of accessing personal gains might abstain a local authority, even at the lowest level, from distributing the information to the inhabitants of the village and even going ahead with a project deemed unfeasible already more than forty years ago. Danijel, a summer house vacationist, explained corruption as a cultural phenomenon of BiH, namely a successful “thief” is applauded but not criticised. He added that the corruption is fed by the politicians who have no willing to change the situation at all.

Discussion and conclusion

The global HPP boom is currently being discussed in various pieces of literature, a particular insight emerging from this literature is that most of the dams are at a project planning stage and the large bulk of these projected HPP are found in transient and developing countries (Zarfl et al., 2015). In addition, these projects receive great loans from international aid and development organisations even in countries where corruption is a great matter. In spite of the fact that the future of these is suspicious, loans and grants are kept being distributed. Unsuccessful projects which were funded by such organisations might even result in great government-debt crisis, as partially it can be seen in the case of Greece. Thereby, a hydropower boom financed by international loans, in a country with weak political and economic system and where corruption is a great issue, might cause great financial challenges for BiH. Using a case study from BiH, the results in this paper indicate that the high financial gains to be made from various projects donors including major ones like USAID, can result in a situation where plans for dams are made knowing full well that they will be abused by corrupted actors. In Martin Brod, this was clearly the case. While the central question which asks why, then, these organisations keep granting loans to such countries is a broad issue for this paper; what the authors of this paper are doing is to add another brick to the answer by discussing this in a smaller case. Applying theoretical insights from our results indicate that in particular, the combination of corruption and international loans breed corruption rather than development.
Degrowth-compatible environmentalism in Europe – a cross-national empirical analysis
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Looking at the European political landscape, one must be struck by the apparent lack of environmentalist political activation in the centre and east of Europe (CEE). Political activation that would loudly call for a political discussion of the present self-reproduction and future aspirations of (Eastern) European societies, including environmental justice of different geographical scopes; despite a long history of civil society infrastructure in Eastern Europe even preceding the transition period. A political activation recorded through the instruments of representative democracy, well established after 25 years of transition. We review empirical cross-national survey data that could arguably contribute to the understanding of possible confluences between environmental justice and degrowth movements. If the environmental degradation is ever more present in the media, if the global networking is tighter than ever before allowing for both information and empathy with hitherto unfamiliar and severely affected regions of the world, why is there no political response in Eastern Europe to match that threat? Is this a case of political communities insufficiently sensitive to environmentalism and its justice aspects?

Rather than focusing on individual concern and behaviours, in recent analyses we have also looked into commitment to general societal development characteristics through indicators in the ISSP (ISSP 2012) survey expressing general normative economy environment trade-offs, and its global justice consequences. From a global perspective the European countries within dataset are less prone to affirming the historical connection between growth and environmental deterioration and breach of global environmental limits by unimpeded economic growth. The non-European of countries in the dataset are very diverse culturally and historically, but the overall proportion of their respective samples supportive of ‘growth criticism’ is significantly higher than in the overall European group. Further separation of the European group into roughly Eastern and Northern-Western subgroups (originally: semiperiphery and core), indicates that the Eastern countries are dragging overall European averages down on indicators of individual activation and willingness for material sacrifice, despite their comparative affluence from a global perspective.

But according to indicators of the normative level of support for environmental limits of economic growth Eastern European countries’ do not differ from Western European ones. The prosperity thesis trend, often taken to describe the standard prevalence of environmentalism in Europe, slackens and reverses on these degrowth-compatible measures. This makes the boundary between Eastern and Western European countries exhibit cracks, and the correlation with average national income (the central tenet of the prosperity hypothesis) is no longer so strong. Moreover, when analysing the whole sample of European respondents, irrespective of nationality, we find that support for the redistributive role of governments is positively associated with the normative criticism of impact of economic growth on environmental stability and the disagreement with trade-off between environment and jobs. Degrowth-minded environmentalists in Europe, whatever country they are from have a significantly higher redistributive orientation than than the general population. In light of the above, this is an indication of a different ideal-type environmentalism. A possible degrowth-supportive environmentalism, concurrent with global environmental justice. We take a deeper look into one of the country’s more recent and expanded dataset to seek for possible theoretically justifiable connections between environmental justice and degrowth, applicable to democratic politics. To highlight commonalities and divergences between European countries, our analysis focuses on sacrifice and activation potential, environmental risk perception and optimism-caution range of attitudes to standard development, as well national contributions to global environmental governance through a set of indices and indicators. Our particular framing and the interpretation of empirical social survey data suggests that the structural lack of environmentalism in the European southern and
eastern semiperiphery is a product of the hegemonic socionatural imaginary. Whilst there are differences in prosperity, environmental impact and environmental activation between the societies of core and semiperipheral Europe, surprising commonalities are uncovered through a degrowth-compatible framing.

References:

Useful Exergy and Economic Growth
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Useful exergy measures energy flows in economies at the useful stage (hence going beyond the primary and final stages), using the exergy metric (which correctly adds up heat and work, taking into account the lower capacity of heat to deliver work).

Ayres and Warr (2005) originally introduced and developed the idea that useful exergy could have high capacity in explaining the Solow residual or total factor productivity growth. Their approach involved: (a) relaxing the cost share assumption, with energy having a much higher output elasticity than its cost share; (b) using the LINEX production function; (c) measuring capital using capital stock; (d) measuring labour considering hours worked.; (e) measuring energy using useful exergy.

Recently, Santos et al. (2016) and Santos et al. (in prep.) have developed a method for testing for the existence of aggregated production functions using cointegration analysis and Granger causality. This approach involves: (a) testing for the existence of an aggregate Cobb-Douglas production function and a possible second relation between the production factors; (b) relaxing the cost share assumption; (c) testing for Granger causality (in both directions) between output and production factors; (d) measuring capital as capital stock or as capital services; (e) measuring labour as hours worked or hours worked corrected for skill level; (f) measuring energy as primary energy, final exergy or useful exergy.

Applying this method to Portugal, 1960-2009, Santos and co-authors find that: (a) when not considering energy variables, an aggregated production is frequently not found; (b) stronger relations are obtained by considering capital services instead of capital stock, human capital corrected labour instead of labour and useful exergy instead of primary energy or final exergy. The best model has two co-integrating relations: (a) a Cobb-Douglas production function of capital and labour, with elasticities close to the observed cost shares (roughly 1/3 and 2/3); (b) a relation roughly giving capital as proportional to useful exergy (UE) times the square of the useful exergy to labour ratio (UE/L).

Calculating capital based on this second co-integration relation, the Solow residual essentially disappears.

How can we interpret this novel second co-integration relation? Useful exergy is the tool which is required to “do” things. Increasing labour productivity necessarily requires more useful exergy per worker. So, if, e.g., we double UE but keep UE/L constant, then capital doubles, i.e., we just have doubled the number of machines and the number of workers, but have not increased the energy “wielded” by labour. However, if we double UE but increase UE/L, capital more than doubles, i.e., it is more productive because it allows labour to wield more useful exergy.

The role of useful exergy in promoting economic growth is hence made clear and so also of increasing energy efficiency, which reduces the cost of useful exergy. This insight is reinforced if we look at the periodisation of economic growth in Portugal in da Silva and Lains (2013). They show that, considering capital services instead of capital stock, total factor productivity growth is on average 2.1%/year, in 1950-1974, but -0.1% in 1974-2001. In the same periods, energy efficiency (aggregate final-to-useful exergy efficiency) respectively changed from 9% to 18% and from 18% to 20%, a clear relation between total factor productivity growth and increasing energy efficiency.
So, we see that energy, and energy efficiency, has a crucial role in economic growth (a point also made by, e.g., Kander et al., 2014). Note, however, that we neither can state, nor believe, that energy by itself explains or generates economic growth. We just consider that energy in a necessary condition for the engineering, managerial and institutional innovations that lead to economic growth. All these taken together constitute development blocks that are the core of economic growth (as analysed by Kander et al., 2014).

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Assessing sustainable biophysical human-nature connectedness at regional scales
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Human societies are inherently connected to and dependent on the biosphere and its functions (Folke et al 2011) through the flow of materials and energy (Haberl et al 2014). However, modern societies have been able to gradually disconnect themselves from the productivity of their immediate regional environment by means of industrial technology and long-distance trade (Kastner et al., 2015; Wiedmann et al., 2015). Despite growing calls for societal reconnection to the biosphere (Andersson et al 2014, Folke et al 2016), what this means from a biophysical perspective remains poorly understood.

In this contribution, we conceptualize and quantify biophysical human-nature connectedness at regional scales and discuss how such knowledge may contribute to regional scale transformational processes. We distinguish two mechanisms by which primordial connectedness of people to regional ecosystems has been circumvented via the use of external inputs. First, ‘biospheric disconnection’ refers to people drawing on non-renewable minerals from outside the biosphere (e.g. fossils, metals and other minerals). Second, ‘spatial disconnection’ arises from the imports and exports of biomass products via inter-regional trade.

Both mechanisms allow for greater regional resource use than would be possible otherwise, however, both biospheric and spatial disconnection have potentially far reaching consequences for sustainability. Biospheric disconnection is characterized by a strong dependence on industrial inputs which delay or displace ecological constraints (Martinez-Alier et al., 2016; Norgaard, 1988). This raises concerns about intergenerational justice, because it creates societal structures that cannot be maintained indefinitely, and diminishes the biosphere’s life-supporting conditions for future generations (e.g. through causing climate change). Similarly, spatial disconnection can result in the net appropriation of resources which create unsustainable lifestyle patterns (Brand and Wissen, 2013, 2012) through teleconnections (Tukker et al., 2014; Wiedmann et al., 2015) that potentially disadvantage the ‘source’ regions. Spatial disconnection may thus compromise intragenerational justice, especially if the teleconnections are strong and unbalanced (Dorninger and Eisenmenger, 2016; Teixidó-Figueras et al., 2016).
By increasingly accessing material and energy flows from either distant places or non-renewables drawn from outside the biosphere, societies have developed fundamentally unsustainable institutions that prevent humans directly experiencing their impacts and reliance on natural ecosystems. Industry, technology and long-distance trade have enabled a disconnect of human activities from the primary production of their regional environment (Yu et al., 2013), and from the biosphere by relying on industrial mineral resources (i.e. fossils, metals, and other minerals extracted from the lithosphere (Cumming et al., 2014)).

This in turn leads to overconsumption and environmental burden shifting to future and distant generations. People not directly connected to, and confronted with, natural limits, are less likely to feel the urge for change. In order to facilitate a sustainability transformation we need to strive for the reconnection of people to nature in biophysical terms, which can be seen as a precondition for encouraging a genuine cognitive reconnection of humans to nature. In that sense, the quality, quantity and origin of material and energy flows appropriated by humans both reflects and shapes their values and mindsets. Thus, a biophysical reconnection, which would imply a strengthened link to the regionally available renewable resources, may help facilitate transformational change. By accounting for both economic and biophysical processes, we integrate concepts such as self-sufficiency, resource use, land use intensity, waste flows, and environmental feedback loops into the framework. Thus, the framework provides a new lens through which land use sustainability can be investigated, which goes beyond ‘on site’ efficiency thinking, (Fischer et al 2014, von Wehrden et al 2014). Furthermore, using the HANPP indicator for assessing connectedness to the regional ecosystems, allows quantification of the trophic energy that remains available in the ecosystems for other species.

The highly industrialized and intensively managed land use system of the federal state of Lower Saxony, Germany, serves as the case study region. It is characterized by a high degree of land use intensity as measured by HANPP (Haberl et al., 2014), dependency on imports (mostly fodder crops), industrial meat production, use of machinery and agrochemicals, and subsequent cause of emissions and waste production. The high degree of reliance on external inputs in the land use system, i.e. biomass imports and inputs of non-renewables, not only causes serious sustainability problems related to environmental burden shifting to distant regions and future generations, but also a prevention of the direct experience of these exploitative measures by its inhabitants.

In sum, biophysical human-nature disconnectedness has profound consequences for the cognitive human-nature connectedness, how people feel connectedness to nature, how they realize their dependence and impacts on ecosystems. Instead of making human-nature connections evermore complex and opaque by increasing external inputs via industrial technology, a genuine reconnected system will have a higher internal self-reliance, through a more self-sufficient land use system. Such regionally reconnected systems may facilitate more foresightful, responsible and conscious behaviors.

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The CO2 conflicting claims problem: production-based accounting vs consumption

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Climate change can be seen as the result of an unsolved carbon budget bankruptcy. Limiting the global cumulative CO2 to 1,440 Gt, over the period 2000-2050, would yield a 50% probability of exceeding the 2°C of the average temperature above pre-industrial levels (Meinshausen et al., 2009). However, it is estimated that the world’s cumulative emissions for the period in question will range from 1,758 to 2,736 Gt (IPCC, 2000). Consequently, environmental global governance will find itself in a situation of

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carbon bankruptcy: countries will have claimed more cumulative emissions (1,758-2,736 Gt) by 2050 than those actually available.

Such situations fits the conflicting claims approach. Specifically, a conflicting claims problem is a particular case of the distribution problem, in which the amount to be distributed, the endowment is not enough to satisfy the agents' claims on it. This model describes the situation faced by a court that has to distribute the net worth of a bankrupt firm among its creditors. However, it also corresponds with cost-sharing, taxation, or rationing problems. The formal analysis of situations like these, which originates in a seminal paper by O'Neill (1982), shows that a vast number of well-behaved solutions have been defined for solving conflicting claims problems, being the proportional, the constrained equal awards, the constrained equal losses, the Talmud and the random arrival rules the prominent concepts used (see Moulin, 2002, and Thomson, 2015, for a survey).

An illustrative example of conflicting claims problems is the fishing quotas reduction, in which the agent's claim can be understood as the previous captures, and the endowment is the new (lower) level of joint captures (Iñarra and Prellezo, 2008). A similar example is given by milk quotas among European Union (EU) members. In both examples, proportionality is the main principle used. Another example of conflicting claims situations is the September 11th Victim Compensation Fund (VCF), where the income each victim would have earned in a full lifetime was estimated and the individual claim is the legal right to be compensated. Similarly, bankruptcy laws consider the claimants identity to establish a priority rule. Specifically, bankruptcy codes normally list all claims that should be treated identically in various categories and assigns to them lexicographic priorities (Kamiski, 2006). Pulido et al. (2002) analyze, under the name of bankruptcy problems with references, the real-life case of allocating a given amount of money among the various degree courses that are offered at a (public) Spanish university. The (verifiable) monetary needs of each course constitute their claims. Additionally, there exist reference values for each course, which are set by the government independently, below their claims. Other relevant practical cases also involving more complex rationing situations could be protocols for the reduction of pollution (Giménez-Gómez et al., 2016), water distribution in drought periods, or even some resource allocation procedures in the public health care sector, in which past consumption could be considered as an entitlement, and current needs as a claim (see, for instance, Hougaard and Moreno-Ternero, 2012, and, Moreno-Ternero and Roemer, 2012).

It is noteworthy that Giménez-Gómez et al. (2016) implement this approach to the climate change negotiations. Specifically, they argue that tackling climate change negotiations as a conflicting claims problem is potentially a more effective tool than the more usual agreement-dependent approaches. Furthermore, they applied four solutions (the proportional, the constrained equal awards, the constrained equal losses, and the Talmud rules) to the IPCC (2000) data following the probabilistic model of Meinshausen et al. (2009).

The current article analyses the CO2 problem from a double different perspective. On the one hand, we extend the production-based accounting data used by Giménez-Gómez et al. (2016) in terms of more groups of negotiation (more regional groups given the available data) and on the other hand, we also analyse the conflicting CO2 problem from the point of view of the embodied trade and, therefore, the consumption-based estimates.

The endowment (the resources to be distributed) is the available carbon budget. We use the probabilistic model of Meinshausen et al. (2009) where different carbon budgets with different associated risks are provided for the period 2000-2050. The creditors (the agents claiming the resources) are represented by the emitting countries. Their aggregate claims cannot be fully satisfied by the available carbon budget. Countries' claims are approximated by the emissions' projections made by the IPCC for different world regions (IPCC, 2000): specifically, we use the A1FI scenario, as it is the most carbon intense, and we assume that most natural behavior for countries, in a carbon bankruptcy framework, would be to claim their maximum emissions. These claims can be interpreted as (i) the maximum amount of emissions' rights a country could claim for; or (ii) the cumulative emissions that would be emitted in the case that a commitment to cooperate was not achieved (Frame and Hepburn, 2012). However, real claims could be different to those used here. Indeed, probably one of the main contributions of this approach to climate negotiations from a conflicting claims problem is that parties
are free to make their carbon claims. The Intended Nationally Determined Contributions (INDC) in the Paris agreement respond to this same logic. Then, considering the different risk scenarios of exceeding the 2ºC limit, we allocate available cumulative emissions by using rationing techniques. We also extend and complement the aforementioned results by analysing both contexts with more actual applied solutions (the random arrival, the alpha-min, and the adjusted proportional rules). Furthermore, we provide a guarantee justification to the allocation proposed by the different solution, with the aim of ensuring to the small contaminant countries a minimum level of rights. Finally, we not only propose a list of minimum social desirable principles that should be fulfilled by any solutions, but also, a more restrictive set that may provide insights to the way a compromise between regions is met.

References

Political Rigour in transformative and transgressive research
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The definition of the researcher within the context of transformative environmental justice, sustainability, and environmental education is constantly expanding. We are living in what Sardar (2010) calls the post-normal times, “the in between period where old orthodoxies are dying, new ones have not yet emerged, and nothing really makes sense” characterized by complexity, chaos and contradictions. The researcher, navigating these conditions of transition, uncertainty, shifting power dynamics, high stakes yet urgent need for decisions, requires tremendous creativity, imagination and acknowledgement of her own ignorance. She becomes what Ravetz and Functowicz (2003) call “The Post Normal Researcher” who is aware that the paradigm of normal science and its problem solving approach is obsolete and that research dealing with incommensurability is inevitably normative and political.

Under these conditions the researcher may transform from a passive-rational-objective observer, to an intuitive mercurial "participant" who can be an engaged practitioner, activist, change agent, interventionist, artist, transformer, participant, apprentice, mentor, lobbyist, advocate, spokesperson, teacher, student, friend, traditional healer, as well as other possible identities at the same time. While there has been a flourishing expansion of research beyond the positivist confines of traditional science, there are many new intuitive, reflexive and transformative arrangements that contemporary researchers in environmental justice and sustainability are adopting. This paper addresses the myriad ways in which the researcher/activist/practitioner/intervener engages in the complex learning environments they live and work in, while also addressing the ethical challenges they face.
The authors provide a veritable ‘field-guide’ or ‘tarot deck’ of these new species or archetypes of researchers that are emerging in transformative and transgressive movements towards sustainability and environmental justice. This includes well-known archetypes such as the citizen-scientist, the activist-scholar and the action researcher, as well as new permutations such as the slow and care-full scholar, the researcher as active participant, the myth-maker and debunker researcher, the empathetic apprentice and the researcher as alchemist, observing her own process of personal transformation.

This paper draws from diverse literatures including feminist scholarship and ethics of care, indigenous and decolonizing methodologies, queer theory, embodied phenomenology, counter-hegemonic mapping, and non-oppressive research to examine what the praxis of scholarship for transformation could look like and how it can inform ecological economics. The authors attempt to capture brief descriptions of the various archetypes of caring, empathetic, responsible, politically rigorous and delicate forms of research they have adopted in order to cope with the wicked sustainability challenges they engage with on a daily basis. A common theme that emerges from all of these new researcher-arrangements is a high level of reflexivity, responsible participation within the spaces they research, and an overall ‘ethics of care’ or ‘care-full research’ that is expanding beyond the moral imperative confines of ‘Do-no-harm’. This interdisciplinary exploration of knowledge production approaches within and without the academy holds considerable potential to enrich and inform ecological economics.

To this end, the paper concludes with a discussion and criteria on the need for political rigour in transformative research. With regards to what they term “political rigour”, the authors reflect on the positivist framework, based on internal validity, external validity, reliability and objectivity as well as the interpretivist, naturalist or constructivist frameworks new criteria consistent with their assumptions and limitations: credibility, transferability, dependability and confirmability. In response, the authors provide a preliminary list of 10 (#) principles for “political rigor” emergent among the different “researcher archetypes that they have catalogued including values such as Reciprocity, Care-fullness, Accessibility, Fallibility and Transgression.

Evaluating Austrian resource efficiency. Material and energy use in relation to CO2 emissions, biodiversity and ecosystem services both from a production- and consumption-based perspective

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In recent years, the issue of resource efficiency prominently entered the policy arena. In 2011, the EU published a flagship initiative on a “resource efficient Europe” (European Commission, 2011a) followed by a roadmap guiding the implementation of the initiative (European Commission, 2011b). Similar policy documents were published by the Organization for Economic Cooperation and Development (OECD) (OECD, 2011, 2004), the United Nations Environment Program (UNEP, 2011, 2007) and most recently the UN Sustainable Development Goals (UN, 2015). In their programmes, the EU promotes a material use indicator as resource efficiency headline indicator, that is, domestic material consumption (DMC) (EC 2011b; Fischer-Kowalski et al. 2011), but recommends to complement it with a dashboard of indicators on energy, water, land, as well as carbon (EC 2011b, 21). In 2014 the EU complemented its resource efficiency policy with a programme on a circular economy (European Commission, 2014). In this presentation, we present the full set of environmental accounts for Austrian for the years 1960 to 2013, including material use, energy use, land use, water use and CO2 emissions. All indicators on resource use will be presented from a production-based perspective (domestic or territorial accounts) as well as a consumption-based perspective (footprint-type indicators). The footprint calculations use the multi-regional Input-Output Model Eora (Lenzen et al., 2013, 2012). Second, we will discuss Austrian resource efficiency and will evaluate Austrian development in relation to the EU targets.
formulated in the Energy Strategy (European Commission, 2010) and the resource efficiency targets specified in the Austrian Resource Efficiency Action Plan (BM LFUW, 2012). The pressure indicators on material and energy flows, water and land use will then be put in relation to potential impacts, that is biodiversity loss, forgone carbon sequestration in order to evaluate damages done to the environment, both domestically by Austria production as well as globally in relation to Austrian consumption patterns.

Indicators for measuring progress towards a circular economy are still in discussion but center around a combination of material use indicators and waste statistics in order to address recycling. In our presentation we will discuss different perspectives on a circular economy and will empirically test different indicators.

For all production-based resource use indicators, a decoupling from economic growth is observed, that is, resource use grows at slower rates as compared to GDP. However, none of the resource use indicators follow a declining trend, which would indicate an absolute decrease of the pressure on the domestic environment. Highest productivity gains are observed for land use and material productivity whereas productivities in relation to CO2 emissions and energy use increased at a slower pace. Resource use measured from a consumption-perspective does not show similar strong decoupling trends as for the production-based measures.

With regard to energy and climate change, the EU has published the Energy Strategy (European Commission, 2010) with three goals defined therein: (1) reduce greenhouse gas emissions by 20%; (2) increase the share of renewable energy to 20%; and (3) improve the energy efficiency by 20%. All targets are referring to the base year 1990 and should be reached by 2020. Concerning the first target, Austria has not yet reduced CO2 emissions, but increased CO2 emissions by 13% between 1990 and 2012. With regard to target (2), we see that the share of renewable energy is relatively high in Austria attributed to the large share of hydropower: In 2012, 30% of the energy inputs were derived from renewable sources, which exceeds the requirements of the EU program. Austrian energy efficiency as addressed by target (3) increased by 25% between 1990 and 2020. However, efficiency gains are mainly based on GDP growth, but no absolute reduction of energy use could be achieved. Consumption-based measures change the picture with regard to target (1) and (3).

With regard to the material use, the EU is currently discussing possible targets, but did not yet agree on a particular one. In contrast, on the national level, the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management published a resource efficiency action plan in 2012 (BM LFUW 2012) with the following targets: Material productivity should increase by 50% between 2008 and 2020 at a reduction of DMC by 20%. Data on material use reveals that Austria so far failed to reach the addressed targets: Between 2008 and 2020, DMC decreased by only 2%, resulting in an increase of material efficiency by only 4%. Considering upstream material requirements of Austrian net-imports (i.e. following a consumption based approach) even worsen the picture. Significant action has to be taken in order to achieve a real reduction of environmental pressure in relation to resource requirements.

Linking pressure indicators more closely to potential impacts on the natural system, we use an approach developed in the EU FP7 project “DESIRE” where we estimated biodiversity loss as well as forgone carbon sequestration in Austria but also induced globally in relation to Austrian production as well as consumption patterns. Interesting results show spatially explicit hotspots of environmental degradation.

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The starting point of the paper is the very true statement that “Today’s challenges require true engagement and novel solutions from ecological economics. Academic and practitioner communities must enact meaningful participative and mutually empowering activities across disciplines and different knowledge systems.” The key analytical question is to what degree have ecological economics entered into such meaningful, participative and mutually empowering activities with the climate movement. The focus is the policies of the climate movement in regard to the COP21 and what contribution could potentially have come from ecological economics.

One year before the COP21 there emerged an umbrella network called coalitionclimate21.org, named after the web-site. The network was created by the two main “currents” in the climate movement in order to coordinate activities before, in and after the COP21. The coalitionclimate21 network was an alliance of the two main “currents” of what is often called the climate movement. That movement is by the very nature very diverse broadly defined, and still very heterogeneous even if we define it more narrowly as the NGOs that are concerned about climate change. But very roughly this movement has been divided into a more lobby oriented, more market-friendly “camp” often identified by the umbrella organisation Climate Action Network (CAN, www.climatenetwork.org). The CAN is often seen as the “right wing” of the climate movement contrasted by the “left wing” often associated by the Climate Justice Now! network (http://climatejustice.blogspot.no) being more critical of emission trading and more mass action...
oriented.
The paper will discuss to what extent ecological economics did discuss the different attitudes to economic issues, in particular the attitudes to “pricing carbon” in the climate movement and what kind of advice has been given by ecological economics. There is a vast literature on the role of the environmental NGOs in the COP process, but as has become more and more obvious that taking part in this process in itself will not give any significant results (Pandey, 2015). After the “break-down” of the COP-process in Copenhagen in 2009 it has become clear to all parts of the climate movement that it is only grass-roots political mobilisation that can bring forth the political changes needed. It is of course a “problem” that ecological economics itself is very methodological heterogeneous as discussed for example in Røpke (2004, 2005) and Spash (2013). The paper analyses primarily discusses the activities of social ecological economic “current”. That is the current in ecological economics which is deeply critical of neo-classical theory, like for example Clive Spash. There are of course other well-known ecological economists that have written about environmental justice, including climate justice. The most well-known being Juan Martinez-Alier. One of his most recent papers (Martinez-Alier, Temper, Del Bene, & Scheidel, 2016) and in a book review entitled climate justice (Martinez-Alier, 2015) illustrates some of the problems that even ecological economist very concerned climate justice has in formulating a set of concrete policies that can get mass support. Martinez and his co-authors do not discuss the social justice problem related to a “keep it [fossil fuel] in the soil” line of environmental action. Because if such a Naomi Klein like “Blockadia” strategy was really successful it would lead to rapid reduction in the supply of fossil fuel, which would then lead to a steep rise in energy prices resulting in a general rise in prices of goods and services. Like any significant price increase it would hurt the poor more than there rich, would be so-called regressive. If not combined with progressive redistribution policies, the immediate material interests of ordinary people, so they will be opposed to “putting a price on carbon” via a drastically reduced supply of fossil fuel. Since there will be no carbon tax or emission allowance revenue to redistribute in the case of “Blockadia” it demands even more political mobilisation to “tax the rich” in order create make ordinary people interested in “greening” the economy.

This lack of understanding of the socially regressive consequences of a Blockadia strategy is also indicated by the fact that the proposal for a progressive carbon tax by the well-know climate scientist and activist James Hansen, the so-called “carbon fee and dividend” has not been discussed at be well-know ecological economists to this author’s knowledge.

The same goes for proposals to tax international transport and redistributing the tax revenue to the Global South. This proposal is put forward by both organisations of the ruling elites, like IMF and OECD Transport forum, and by well known climate NGO’s like WWF and Oxfam (2011). This lack of discussion of concrete policies that tries to align ordinary people’s immediate material interests with the just as material, but longer term, interests in a stable climate is in a relatively stark contrast to the amount of correct critique of emission trading. But if the EU ETS fundamentally fails because it is unable to get a sufficiently high – and steadily rising price on carbon – how should that be done? How to get mass political support for ever increasing petrol prices? That is the simple, key question that has to be posed if ecological economists are going to contribute to the urgently needed political mobilisation needed to avoid cataclysmic climate change.

References

Market or Fine? Does framing matter for cooperation in resource use dilemmas?
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Institutions affect human behavior by providing incentives, framing the decision situation, and signaling normatively appropriate behavior (Bowles, 1998; Sagoff, 2008; Vatn, 2009). The vast literature on economic institutions and policies investigates how economic incentives influence human behavior via changing material payoffs. Recent studies suggest that incentives may affect individual behavior via undermining or reinforcing other-regarding preferences as well (e.g. Bowles, 2008; Bowles & Polanía-Reyes, 2012; Cardenas et al., 2000; Fehr & Leibbrandt, 2011). If this is not taken into account, economic policies can have unintended consequences and even backfire (Gneezy, Meier, & Rey-Biel, 2011; Gneezy & Rustichini, 2000).

One of the mechanisms through which incentives can endorse or weaken other-regarding behavior is related with framing (Bowles & Polanía-Reyes, 2012; Dufwenberg, Gächter, & Hennig-Schmidt, 2011). This implies that if the institution entailing incentives entails a normative signal as to the appropriate behavior in a certain decision context, then individual behavior may change even if economic incentives stay the same.

The effect of market institutions on human behavior has been ambiguous so far. On the one hand, markets arguably improve trust, lead to more gentle behavior towards others, and reinforces virtues of humans (Chen, 2011; Reeson & Tisdell, 2010). On the other hand, markets are claimed to undermine moral behavior, weaken cooperation, and adversely affect other-regarding preferences by evoking a fully rational “market instinct” (Falk & Szech, 2013; Reeson & Tisdell, 2010). Both theoretical as well as experimental studies have investigated the influence of market institutions on moral and cooperative behavior, yet, the results have been inconsistent so far. The effect of markets on cooperation is crucial for resource use conflicts in which cooperation is required as a way to achieve socially efficient outcomes and sustainable use of resources. In the realm of environmental policies, the overuse of resources has traditionally been attributed to the lack of markets, and various types of market institutions have often been introduced or at least endorsed to deal with the resource use dilemma. Against this background, the present study aims to experimentally test the effects of introducing a market-like institution on cooperation in a resource use dilemma. Based on a framed field experiment conducted with 240 small-scale fishers in Turkey, average extraction under a market-like institution is compared to that under the baseline treatment, which represents the open-access regime. Next, I compare average results of the market-like institution to a fine treatment, in which the economic incentive is exactly the same as under the market-like institution, but the framing of the decision context changes from the purchase of an extraction right to the payment of a fine for overuse of the resource. That is, without changing the economic incentives, I change the institutional framing of the incentive, and assess whether this has any influence on cooperative behavior. Framing effects have been found to be at work in public goods games so far, yet, investigation of these effects using ecologically relevant institutions in resource use conflicts has been rare. The focus on the framing of the decision as a market-like institution as opposed to a fine adds to the policy relevance of the field experiments. The present study suggests that even the framing of the decision as a market institution—without changing any economic incentives—may have unintended consequences on
cooperation. More specifically, the study used framed field experiments to evaluate the effects of an external fine, a market-like institution, and a communication condition in a resource use dilemma. The experiments involved twelve sessions for each treatment (baseline, fine, market and communication treatments), with five participants per session. In total, therefore, 240 small-scale fishers in Turkey have participated in the field experiments. The first stage of the experiment represented an open-access regime without any external intervention for all sessions. In the second stage, each group was assigned randomly to one of the four treatments, and played the game either under the baseline, fine, market or communication treatment.

The main focus of the field study was to determine whether there is any significant difference with respect to cooperation when an economic incentive is framed as a fine, as opposed to a (fixed) market price of an extraction right. Framing effects have been well-documented in public goods games (Kay & Ross, 2003; Liberman et al., 2004). However, according to a thorough literature search, they have not been specifically investigated so far for resource use, although this is an important aspect for environmental policies in real life. Moreover, there is detailed theoretical discussion on the effect of markets on moral and environmental behavior (e.g. O'Neill, 2001; Spash, 2010; Vatn, 2005), but again, this effect has not been directly tested empirically in a resource use dilemma so far, to the best of my knowledge. Considering the recent dominance and importance of environmental markets for common-pool resources such as climate, fish stocks, water use rights, it is very important to investigate experimentally the effects of market-like mechanisms on cooperation and resource use. Assessing the effects of market framing is a first step towards this end.

While the framing effect between the fine and market treatment was set as the main research interest, I have also included a baseline treatment and a (face-to-face) communication treatment. The positive effect of communication is well-established in the experimental literature (Cardenas et al., 2000; Cardenas, 2011; Ghate et al., 2013; Handberg & Angelsen, 2015; Sally, 1995), yet, the influence of fines is still not that clear. And neither of them has been tested in a field study in Turkey. Another interesting aim for this research was therefore to test whether the positive effect of communication also holds for the citizens in Turkey, a country with a significantly low level of trust towards institutions and other members of the society (OECD, 2011; World Values Survey, 2016).

Framed field experiments were preferred in this study, as they are commonly used to investigate cooperation in resource use dilemmas with actual resource users, since they do not use abstract language for the instructions, and instead precisely specify the context to the participants in the experiments. Therefore, it increases experimental control in the field, since, otherwise, participants may impose their own contexts onto the game and that may compromise internal validity (Harrison & List, 2004). Moreover, to facilitate comprehension of the rules of the game, we used a linear public goods game, which is easier to understand for our target group of fishers than a more complex non-linear game.

More specifically, the study aimed at answering the following research questions:

• To what extent do individuals choose an extraction level that is close to the socially efficient outcome in a resource dilemma in the absence of any policy intervention? (Baseline treatment)

• How does a symbolic (low) fine affect resource use? Does a (weak) material incentive framed in form of a fine for over-extraction reduce or increase resource use? (Fine treatment)

• Similarly, how does a market-like incentive (the same level of material incentive as above) affect resource use? Does this material incentive framed as the fixed price of an extraction right reduce or increase resource use? (Market treatment)

• If face-to-face communication is allowed in the group but no incentive mechanism is applied, how does this affect resource use? (Communication treatment)

The economic model that is employed in this study is based on a (linear) public goods game. The difference from the usual public goods game is that the subjects extract from a common-pool resource base, instead of contributing to a common project. This model is very suitable for our purposes for two reasons. First, it facilitates the test of framing effects without complicating the game. And secondly, it is easier to use with our target group of fishers, since the two corner solutions of the game, “extract
everything” or “do not extract anything” (the Nash equilibrium and the social optimum, respectively), are easy to understand since similar outcomes are possible in the real life resource use problem of fishers. Overall, the basic model represents an open-access regime that is currently present for most species in fishing in the country, in which extracting as much as possible gives strictly higher individual payoff regardless of what the others are extracting. The results of the study reveal that both communication and a symbolic (low) fine are effective in reducing extraction. The findings further imply that there is a framing effect between the fine and market conditions. When the economic incentive was framed as a fine as opposed to a market-like institution, it reduced extraction more. This implies that institutional context matters to individual behavior, and that the same level of economic incentive may perform differently if the institutional context is changed. This finding also supports the hypothesis that market reasoning may lead to unintended outcomes in resource use dilemmas. If this is not taken into account, environmental policies may backfire.

Feed the planet: sustainability aspects of digital agriculture and urban farming
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Feed the planet: sustainability aspects of digital agriculture and urban farming
Industrial societies in times of scarcity, austerity and even during vast mass production were always fabricating things, and finding solutions domestically, manually and in community. This search for accessible ways to solve problems may shift swiftly toward entrepreneurship creating new business models, and survival paths within the local economy. Design in times of scarcity and austerity turns toward self-reliant and self-sufficient forms of production, thus from industrial toward industrious as put by Bianchini and Maffei (2013). Designers vastly produced by the HEIs and concentrated in the (former) centers of the industry (now nodes of management and communication rather than production) now face a global market to compete in, with global-portfolios of designers of expanding holdings and large companies. The Do-It-Yourself (DIY) ethic has been prevalent for creating an alternative for production and the market captured by the industry (e.g. vast literature on punks creating their own scenes of music, production, communities, and audience). DIY creates answers in opposition to, complementing with, or plainly overcoming what is covered by the industry, creating entry points for makers (designers) who are not willing to design toothpaste-tubes instead of cars (metaphor of Anderson 2012). We also know, that these efforts later can be overtaken by the industry, molding into the ‘mainstream’ paradigm. Industrious design and DIY are very close in their ethics. Agriculture especially fueled by the green revolution, of pesticides, fertilizers, of development of resistant crops, and expansion of irrigation plants has turned industrial and global. The estimation of the UN report foresees 9,7 billion inhabiting the globe by 2050 creating population pressure, with further demand for food production, that shall be raised by 70% according to the same report. The current trends of industrial agriculture of expansion of crop lands, or utilization of fertilizers is unsustainable in the long run causing soil erosion, over-use of chemicals, reduce vegetation and deploy water resource management. With a growing population, the grain-supply per capita is reducing. At the same time global distribution is far of being fair and even: in many countries in Africa and Latin-America food import has increased for compensating local deficits (FAO report). Who, and how will feed the planet is a viable problem addressed by many. Analyzing the resources and the growth in demand call for a change in diets and agricultural production. A strand of research and development follows the path of rationalization and raising effectiveness of industrial agriculture. Automatized trucks performing precision planting (so that no seed is wasted) being developed, or communicating trucks and vehicles being designed to take over the process from seeding to harvesting (Burgess 2016) are illustrating the well-known song of industrial effort of raising efficiency and rationalization backed by technology, on the same fields. Digital agriculture and digital
farming however might have the potential to create more sustainable solutions and understanding of agriculture eliminating deployment and degradation of nature.

It is clear that a global and massive de-urbanization is not going to happen in the long run, with the expansively booming population growth. Shifting all agricultural production toward more sustainable forms is a challenge that must be faced, and cannot be avoided. In search for viable solutions, both in industry and on micro level urban farming, home-grown veggies and eating clean has created a number of projects framed by the discourse of the new urban ecology, food for the future, and sustainable forms of self-supplying on a local level. The new green revolution of digital agriculture features connected gardens producing clean veggies with personalized (!) nutrients that enter our kitchen, urban farms and restaurants.

This paper is addressing to conceptualize the sustainability aspects of digital agriculture, and urban farming while spanning the DIY-effort in engineering a sustainable living, where urban and digital environment are taken as given. I rely on cases inspired by the DIY ethics, where: 1) makers elaborate solutions reshaping the forms of low-scale, and home-grown production at a local level. Emergent digital farmers (makers) swiftly turn into entrepreneurs. Adjustable urban gardens, green houses, boxes, and lab-looking compositions of in-house devices to cultivate our own garden, incorporated into the kitchen and living space might grow toward the ambition to reformulate agriculture at an industrial level. Further cases covered illustrate: 2) the concern about food engineering for feeding the planet in a sustainable way: adding worms to the ‘ink’, growing algae, and encapsulating nutrients and foods (olive oil capsules, wine bombs, and worm-pills). Experimentation for creating balanced and rationally designed ‘edibles’ from sustainable production of ingredients of the raw, like worms, insects, algae, duckweed that seem unattractive in post-industrial societies, transcends them into attractive dishes is in the realm of conscious and ’healthy’ food consumption and the broader goal toward ‘feeding the planet’. A clear message is that the green revolution of pesticides is being overcome by the revolution of digital gardening shifting to a sustainable and clean understanding of green.

References:

How to not achieve a viable voluntary carbon market: an ecological economic analysis of the relationship between institutional performance and non-conservation creep in the Atlantic Forest
Katharine Farrell¹, Jennifer Hartl¹

Following adoption of the REDD (United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) agenda by the Conference of the
Parties to the UN Framework Convention on Climate Change in 2012, and the Paris Agreement in 2015, there is an urgent need to develop clear and concrete recommendations regarding how international demand for forest conservation can be effectively matched up, through markets, with locally provided, conservation relevant ecosystem services maintenance projects. We aim here to address that challenge by conducting an ex-post analysis of conditions leading up to the establishment and eventual abandonment of voluntary carbon sequestration market initiative directed by the Carbon, Community & Biodiversity Alliance (CCBA). The aim of that initiative was to establish a conservation corridor between the Pau Brazil and Monte Pascoal National Parks, in the Atlantic Forest on the eastern coast of Brazil where ranching and eucalyptus plantations have led to substantial deforestation. Specifically, we ask, which institutions have shaped de facto land use change in study area across time, from 1961, when the national parks were established, up until 2012, when the CCBA payment for ecosystem services project, launched in 2009 was postponed indefinitely. The research focuses on the two municipalities of Itabela and Porto Seguro, within which the corridor is located. Data regarding local, national and international institutions regulating land use in the study area and data regarding changes in land use allocations and distributions across the municipalities are combined using Hagedorn’s Institutions of Sustainability (IoS) framework and Giampietro and Mayumi’s Multi-Scale-Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) material flow accounting tool. We find that a lack of land available for inclusion in the corridor project may help to explain its eventual failure, as MuSIASEM estimates suggest roughly twice the officially designated area was actually dedicated to non-conservation land-uses in 2012, with that excess constituting roughly 20% of the total combined area of the two municipalities. Based on reference to the IoS results, we can attribute this non-conservation creep to the successive addition of a steadily increasing number of poorly performing regulatory institutions, which failed to counteract the financial incentives associated with the strong presence of a stable local demand for the non-conservation-use products derived from eucalyptus. We conclude with recommendations regarding how the institutional regulatory context might be improved in future, in order to better support successful establishment of viable voluntary carbon market initiatives.

The objective of the research is to support the development of clear and concrete recommendations regarding how international demand for forest conservation can be effectively matched up, through markets, with locally provided, conservation relevant ecosystem services maintenance projects. A key contribution toward developing such recommendations is to improve understanding of the conditions present in cases where this has not been achieved, which is the focus of this research. Specifically, we ask, which institutions have shaped de facto land use change in study area across time, from 1961, when Brazil’s current national parks system was established, up until 2012, when a voluntary carbon sequestration market initiative directed by the Carbon, Community & Biodiversity Alliance (CCBA), launched in 2009 was postponed indefinitely. The aim of that initiative was to establish a conservation corridor between the Pau Brazil and Monte Pascoal National Parks, in the Atlantic Forest on the eastern coast of Brazil where ranching and eucalyptus plantations have led to substantial deforestation. The research focuses on the two municipalities of Itabela and Porto Seguro, within which the proposed corridor is located.

We conduct an ex-post analysis of conditions leading up to the establishment and eventual abandonment the CCBA voluntary carbon sequestration market initiative using a combination of secondary data sources, including the relevant Brazilian law, official government statistics concerning land use allocation and material flows, relevant academic literature and reports from a series of non-governmental organizations, including the CCBA. Data regarding the local, national and international institutions regulating land use in the study area are analyzed using Hagedorn’s Institutions of Sustainability (IoS) framework. Data regarding changes in land use allocation and distribution and in material flows are analyzed using Giampietro and Mayumi’s material flow accounting tool Multi-Scale-Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM). The IoS framework is employed to trace the development of the official (institution and governance driven) and the de facto (transaction and actor driven) regulation of land use in the study region, over five time steps. For each time step an IoS representation is generated, in order to specify the institutional context within which
decisions regarding the allocation and distribution of land are being taken in that time step (i.e. an action situation). Five complementary land use and material flow representations are then generated, using the MuSIASEM tool, in order to provide details regarding the actual land allocation and material flow conditions that correspond to each of these five action situations.

Based on reference to the combination of IoS and MuSIASEM results, we can attribute the failure of the CCBA project to what we refer to as ‘non-conservation creep,’ where the successive addition of a steadily increasing number of poorly performing regulatory institutions have failed to counteract the financial incentives associated with the strong presence of a stable local demand from the paper pulp mill for non-conservation-use products derived from eucalyptus. We conclude with recommendations regarding how the institutional regulatory context might be improved in future, in order to better support successful establishment of viable voluntary carbon market initiatives.

Human Needs and Socio Ecological Economic Development
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Measuring welfare in economics typically means determining the level of preference satisfaction. An important aspect of preference theory is that the substance of welfare remains unclarified. This translates into questions about which indicator is suitable for measuring welfare. We depict the rational for making commodities the substance of welfare (i.e. commodity welfare) and measures like GDP per capita the predominant indicator for welfare in Neoclassical Economics. Although the limitations of GDP as an indicator for welfare have been dealt with extensively in the literature and the critique of GDP is widely accepted, GDP remains the main focus of economic theory and policy up to date, facilitating commodification and marketization in societies.

In the debate about the substance of welfare beyond Neoclassical Economics, two approaches are dominant: Happiness Economics and the Capabilities Approach. Both are in line with preference theory but reject commodity welfare. While Happiness Economics considers feelings of happiness the direct result of preference satisfaction, the Capabilities Approach focuses on the possibility for preference satisfaction (i.e. capabilities) rather than preference satisfaction itself. The Stiglitz-Sen-Fitoussi Report (Stiglitz et al., 2009), one of the most prominent inquiries into an alternative measure of welfare, extensively discusses the shortcomings of commodity welfare. It then suggests the Happiness Economics approach and the Capability Approach as two valid ways forward, while accepting the shortcomings of both. The report declares the choice between the two as a normative one. Another approach to welfare is arguing that instead of preferences, the satisfaction of human needs determines welfare (e.g. Doyal and Gough, 1991). Human Need Based Approaches reject and criticize preference theory for its unrealistic and rigid assumptions (e.g. Gough, 2015). Need based approaches to welfare can be found in particular in relation with debates about development (Max-Neef, 1992; Alkire, 2002), and more recently in debates about sustainability (O’Neill, 2011; Gough, 2015). One of the arguments in favour of a human needs approach is that it is able to capture changing aspirations and social influences on personal goals and preferences. Adaptive phenomena or endogenous preferences and their influence on welfare are excluded by preference theory (Gough, 2015, p.1193). The necessity for a methodological framework which is able to incorporate endogenous preferences has been highlighted in Heterodox Economics (Hodgson, 1988). For example Zizzo (2003) and Rodrigues (2004) worked on the empirical and conceptual relevance of endogenous preferences. Based on a well-established concept of human needs in economics and psychology we illustrate that consumerism can lead to the adaptation of non-beneficial preferences (i.e. preferences dwarfing instead of fostering the satisfaction of human needs).

In order to guide economic policy and make human need satisfaction a viable alternative, superseding commodity welfare, it is necessary to tackle the challenge of identifying a measurable indicator for the
level of need satisfaction. We look for such an indicator in economic and psychological literature about human needs. The relation between psychology and economics has been the subject of longstanding discussion (Kahneman, 2003; Earl, 2005; Hands, 2009; Glaze, 2016). However, with only few exceptions (e.g. Gough, 2015), this debate has largely ignored positive psychology. We argue that Self-Determination Theory (SDT), a hugely influential framework stemming from positive psychology can add considerable value to tackle the measurement issue in economics. Similar to the Aristotelian concept of Eudaimonia, SDT is concerned with the processes and content of living. Satisfaction of human needs and welfare results from living a good life, defined as pursuing ends of intrinsic worth.

SDT shows empirically that the level of human need satisfaction is tied to the extent of intrinsic motivation and the acceptance and integration of external regulations into one’s own values. This makes intrinsic motivation a reliable indicator for the measurement of the level of human needs satisfaction.

People can pursue goals for intrinsic or extrinsic reasons. Intrinsic goals are ends to themselves and lead to internal feelings of worth, which results from human need satisfaction. Extrinsic goals derive their worth from a different end than their own, they rely on external indicators of worth (Deci and Ryan, 2008a; Ryan and Deci, 2000). Poor human need satisfaction due to excessive extrinsic goals leads to the adoption of a preference structure which is shown to undermine human needs satisfaction. If human needs are thwarted, they are substituted with external indicators of worth, which do not contribute to need satisfaction (Deci and Ryan, 2008a).

Self-determination theory emphasizes the role of the consumerist culture and the economic institutions in determining extrinsic aspirations. Advertising and the glorification of wealth and power directly thwarts human needs satisfaction by creating insecurities and anxieties (Deci and Ryan, 2012; Ryan and Deci, 2011). But also corporate culture with its controlling use of competition and rewards undermines basic needs satisfaction and leads to the adoption of extrinsic goals (Deci and Ryan, 2012). The pursuit and even attainment of extrinsic goals however does not contribute to human needs satisfaction. This creates a vicious cycle. Intrinsic goals are further substituted with extrinsic goals (Deci and Ryan, 2008b, 2012). Commodification of the human life appears as the result of a social environment created by the societal focus on the accumulation of commodities. Based on empirical research, Self-Determination Theory highlights that policies propagated by Neoclassical Economics may have detrimental effects on welfare. A Human Needs Based Approach to welfare allows to rewrite the mission statement of economics beyond materialism and consumerism. It has the potential to substantially change economic theory – like Bentham’s utilitarian psychology and the Marginalist Revolution changed economic theory in the second half of the 19th century.

Bibliography
Anthropogenic impacts on ecosystems are driving biodiversity loss to rates which are only comparable to previous extinction events [1]. However, human well-being depends on the goods and services that ecosystems provide as a result of its abiotic and biotic components, and the interactions between both [2], and decisions on whether to protect or destroy ecosystems will affect nature and people across different scales. The interlinkage, interdependence, and complexity of both social and ecological systems is now recognized through integrated concepts, such as social-ecological systems [3]–[5]. Sustainable social-ecological systems are those that thrive societies without compromising the capacity of ecological systems to meet the needs of current and future generations [6, p. 2]. Understanding how to manage and govern social-ecological systems towards sustainability is, therefore, key to overcome current conservation and development challenges. However, the operationalization of integrative concepts such as social-ecological systems and sustainability science is still challenged by traditional disciplinary approaches [6], [7].

The designation of protected areas has been the most used policy instrument worldwide to protect wildlife. Until 2020, the global area dedicated to nature protection is expected to increase respectively 1.6% and 6.6% in terrestrial and marine ecosystems [8]. However, protected areas management effectiveness, i.e. the extent to which they deliver the goals for which they were designated [9], have been questioned (e.g. [10], [11]), and many conflicts have emerged with local populations, as a result of the implementation of protected areas (e.g. [12], [13]). The need to acknowledge the social-ecological nature of protected areas is now recognized: the complex ecological processes at different
scales that influences and are influenced by protected areas cannot be separated from the broad, and also complex, social and economic systems in which protected areas are established [14]. According to a social-ecological approach, the management of protected areas have to be adaptive, involving the local population, considering a diversity of values and knowledge systems, and integrated in the landscape, in order to foster multifunctional and resilient landscapes [15]. Biosphere reserves - the key component for the implementation of the UNESCO Men and Biosphere (MAB) Programme [16] - is, in this respect, a particular interesting case study due to its focus in the relationship and interdependence between people and nature, bringing tangibility to concepts related to sustainability of social-ecological systems [17]. The ambition and the complexity of the actual MAB strategy can be understood by its vision - “(...) build thriving societies in harmony within the biosphere” [18] - and by the high number of actions and actors that are required to achieve BRs outcomes [19]. Biosphere reserves (BRs) have three functions - conservation of biodiversity, economic and human development, and logistic support, including e.g. environmental education and research (Article 3; [16]). The criteria for the designation of a BR includes the need for the establishment of appropriate zoning, the guarantee of an adequate size for the conservation of the biological values, and the provision of governance arrangements to promote the participation of a range of stakeholders in the design and management of the reserve (Article 4; [16]). Current interest in BRs implementation is revealed by the growing number of designated sites in a diversity of countries [20]. However, the assessment of the performance of BRs in achieving their goals is limited by the lack of systematic and comprehensive evaluation of BR’s management and governance effectiveness [21], and the generalized data scarcity, due to the lack of compliance with the BR’s mandatory reporting [22, p. 37] and the lack of accessible data about protected areas monitoring [23]. Consequently, large scale studies about BR’s management effectiveness have relied on the perceptions of BRs managers to access the performance of the reserve [24] or the factors related to its success [21]. Also, because BRs aim to achieve multiple goals, there is a need to systematize the information about how and where those goals have been studied, in order to understand the main research shortfalls in the field. This study used the systematic quantitative literature review method [25] to analyse peer-review studies focused on BRs management and governance effectiveness. This method is well suited for analyzing transdisciplinary research and provides a general view about the research subject and the main gaps occurring in the literature [25]. It is, therefore, an appropriate method to: i) identify which BR goals have been studied in BRs management effectiveness literature; ii) identify where, by whom and using which methods, studies about BR management effectiveness have been performed; and iii) identify the main research gaps in the field. By providing a systematic overview of the literature about BRs management effectiveness, the obtained results contribute to identify researcher’s efforts and concerns, and to discuss issues to improve the BRs role in promoting sustainable social-ecological systems.

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What makes a community? Resettlement and sense of community
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Environmentally-induced displacement is an emergent reality in the Philippines. The country’s exposure to multiple recurring hazards such as typhoons, flood, landslides and earthquakes, confluences with the socio-economic vulnerabilities of communities including unsustainable livelihoods, lack of access to productive assets, and settlement in environmentally dangerous areas. These conditions contribute to the country’s high level of risk for human displacement. The internal Displacement Monitoring Center (IDMC) records more than 7 million people in 2013 and more than 2 million in 2015 displaced by disasters. The Typhoon Haiyan alone has displaced more than four million people in 2013. While some families have returned to their previous homes or relocated elsewhere, thousands of people still lack safe and sustainable resettlement. In the recent years, various local government units and the National Housing Authority (NHA) endorse post-disaster resettlement as well as a housing program for informal settlement families residing in danger zones in Metro Manila. Since 2013, some 120,472 informal settler families in environmentally-risky communities were relocated by the Department of Interior and Local Government (DILG) from Metro Manila to off-city resettlements.

While conceived as a sustainable solution, the reality of resettlement poses a variety of challenges for displaced families. These include unsafe housing infrastructure, insecure livelihoods, lack of access to basic services and even lack of social cohesion.

This paper elucidates aspects of environmentally-induced resettlement as a social-ecological system, from the lens of community psychology. Relocation and resettlement, as initiated by the government or other large institutions, often render relocatees voiceless in the resettlement process. Furthermore, despite the massive movement and relocation of people in the Philippines due to environmental pressures, there is a dearth of knowledge illuminating how displaced communities are linked through social ties, and share common perspectives which can propel their engagement in joint actions. The research hoped to contribute to perspectives and practices towards community empowerment in displaced communities.

There has been a recent shift away from individual-focused practices into community psychology especially in health care and people’s well-being. Psychologists question the value of psychotherapy alone in treating large numbers of people with low well-being. The development of community psychology centers on understanding the individual and the community, conflicts, and even social movements.

This sense of community, sometimes called social cohesion, is defined as the sentiment of having more similarities with a group, interdependent to others, and feeling that one is a member of a much larger and stable group. Previous studies pointed out that it is composed of four factors: membership, influence, fulfillment of needs, and shared emotional connections. It has been shown to be a strong predictor of behaviors such as participation, helping, and volunteering of community folks for their fellow community members. Other previous studies pointed out that sense of community is related to civic forms of engagement, protest activities, public deliberation, and political campaigning or voting.

Sense of community can help in various areas such as community development, social capital, service provision, self-help groups, and prevention and resilience in mental health interventions.

Sense of community is a social asset that is commonly overlooked by the local government, businesses, and other large institutions concerned with resettlement. Community economy, solidarity economy, and social entrepreneurship are alternative ways of creating linked prosperity. However, they all start with community relationships.

Relocation is found to have negative effects on sense of community. In a post-disaster resettlement in Taiwan, the community was not able to attain a consensus whether to relocate or not prior to
resettlement. Some groups did not want to transfer permanently while others wanted to which resulted in a low sense of community. Another study that focused on the effects of post-disaster relocation found that some relocation processes resulted to unfavorable social conditions. For example, more than 1000 people of different social, economic and cultural backgrounds were brought to live together in resettlement sites after a tsunami in Sri Lanka. It is challenging to attain sense of community in this instance because the relocatees had different socio-economic and cultural classes. The research studied a resettlement area in Laguna province, in the south of Metro Manila. The government initiated this involuntary resettlement, claiming residents were previously informal settlers living in proclaimed danger zones and areas for public use. The most recent recorded population of the resettlement community is 3,476 people who share a community elementary school, high school, health center, and a church.

This study examined the factors that are related to relocation and sense of community. It described the diverse experiences of the community regarding their displacement and relocation. It also described the factors related to sense of community of the area. Finally, it described the relationship between relocation and sense of community. A total of 24 participants took part in three FGD’s in this study. The discussions were transcribed and analyzed through thematic analysis using a qualitative data analysis software. This approach was deemed apt to highlight local experiences and knowledge when it comes to relocation and sense of community.

Results showed that the relocatees recognize the following categories related to their sense of community: Adaptation and survival, Building relationships, Volunteering for remuneration, Participation and deeper involvement, Developed unity and cohesion. These results of the study are contributions to designing programs that increase individual and community well-being, prioritizing the health and the rights of the relocatees. It expounds on the impact of relocation to the behavior and institutional structures in the resettlement area. Finally, it provides recommendation on sustainable and just relocation programs.

Industrial transformation pathways of China and India and their implications for the future

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In this contribution, we will make an effort to compare India and China, the two most populated countries of the world that may be expected to mold global future, in the long run. We utilize data bases built up in the course of our efforts at Long-Term Socioecological Research (LTSER), our analyses of the global course of energy transitions, and our more recent interest in the interrelation between energy transitions and social revolutions. We observe these two countries, given very different political and cultural traditions, to have taken an astonishingly similar course during the past three centuries in terms of their macro socio-ecological features. This time frame, depending on interpretation, covers two major socioecological transitions: the transition from biomass based, agrarian economies to fossil fuel based, industrial capitalist economies. It also covers, in essence, a transition beyond the fossil fuel based regime.

• In 1700, as agrarian societies, the metabolic profile of China and India have been very similar (population size, urban share, standard of living): China had 140, India 165 million inhabitants, the urban share was 5-6%, and annual incomes were estimated at about 600 GK$.
• Up to the end of WWII, all of this remains largely unchanged, except for population growth: China grew slightly stronger, to a population of 530 million, while India has grown to 410 million.
• In both countries during that period, the standard of living has been declining, income not keeping up with population.
• But from about 1947 on, the development trajectories of India and China look very different. Why is this so, and what does that tell about the future?
Up to the mid-20th century, both countries had been trapped in the systemic link of land and labour characteristic for the agrarian socio-metabolic regime. What makes up this trap?

• Land is the principal source of energy. The EROEI of biomass is relatively low.
• Human labour is the principal source of mechanical work. From low EROEI follows high workloads and low surplus (low net energy returns beyond feeding the worker).
• A vicious cycle has evolved: high workloads in agriculture require children to help > high fertility > higher food demand > intensification of land use, more work/ha > even higher workload per person.
• Small elites / colonial masters (< 5% of the population) control the land, keep the workers on the land in personal dependency (servanthood, slavery,...) and use the surplus for their consumption.

In order to leave this trap and to take off towards an industrial transformation, three interlinked conditions must be fulfilled: (1) A new energy source with a higher EROEI than biomass: fossil fuels. This, in principle, frees human labour power from food production. (2) A liberation of people from personal dependence (servanthood, slavery...) on land and landlords, to be able to use their labour power on other activities. (3) A re-investment of the surplus generated into infrastructure development and further production (and not into elite or colonialist consumption). Conditions (2) and (3) usually require the political disempowerment of feudal and/or colonial masters.

We will shortly describe how in India and China, such a political disempowerment has actually taken place in the late 1940s, in different radicality and with different development programmes – and different consequences for the future pathway.

We will show the pathways of these two countries (occasionally also in comparison to other countries like Japan) on a macro level quantitatively across the past 200 years, in terms of population, urban share, income, energy use and social inequality.

We seek to describe and to explain the similarities these two countries exhibit in their transitions, and also the differences that increasingly show in the most recent decades. Our toolbox is small: we do not aspire to a full-blast socioecological, even less a historical reconstruction. But we do make the effort to capture, with a few critical variables, some bifurcations that may matter a lot, not only for these two countries, but for the world’s future trajectory. We conclude with some speculations on how these two countries might manage an impending shift away from fossil fuels towards different socio-metabolic regimes.

Corporate Social Responsibility and firm financial performance: a industry sectors analysis
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The relationship between corporate social responsibility (CSR) and financial performance is a very discussed topic. A large number of empirical studies, in fact, tried to study it, but they have not reached yet a consensus. In our paper we analyze this relationship taking into consideration market and accounting based indicators, in nine different industry sectors. 988 US firms, taken by KLD STATS Dataset, covering the period between 2003 and 2015, compose our sample. CSR indicators are divided into seven macro areas:

• Environmental, that evaluates the existence of clean energy program, pollution prevention program and environmentally proactive activities;
• Community, that evaluates community engagement programs;
• Human rights, that evaluates if the company has undertaken exceptional human rights initiatives;
• Employee relations;
• Diversity, that identifies gender diversity inside the top management of the company;
• Product, that evaluates the existence of quality program and if the company invest more in R&D innovations;
• Governance, that analyzes the existence of transparency programs and policies to avoid corrupt business dealings. Each area is composed by positive and negative indicators. We make a sector analysis assuming that companies might have specific sector’s characteristics that influence their CSR features. Methodologically, we run a backwards-stepwise regression in a pooled dataset and we inserted in the regression the square and the lag of the independent variables; the first aimed to capture the non-linear effect, the second aimed to understand if there is a delayed response on financial indicators or, perhaps, if the effect is “smeared” in time. Finally we perform a linear combination of coefficient and test if there is an effect over time of each CSR indicator on each financial variable per each sector. Analyzes provided interesting results regarding the type of relationship between CSR and financial performances and suggested some sectorial specificities. The Oil & Gas sector is the sector in which firms invests more in each CSR area with an almost always positive return on financial performances and a reduction of financial risk. This can be explained by considering that Oil & Gas production imposes significant costs on society, such as air pollution, oil spills and injuries and thus, on line with stakeholder engagement optical, the Oil & Gas industry invests in CSR to better perform economically and financially. Also the “Financial” sector puts more attention in CSR, even if less compared to Oil & Gas sector. Firms in sectors such as “Basic Materials”, “Consumer Goods” and “Technology” invest less in CSR; In “Consumer Services”, “Health Care”, “Industrial” and “Utilities” firms focus their investment only in specific CSR areas. In general, several firms belonging to different sectors oversee three CSR areas (Governance, Community and Diversity), involving both internal and external stakeholders. In the other four areas emerge more clearly a sectorial specificities.

Organic farming in the past and today in a Central European case study
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This paper contributes to the vivid academic debate on potentially more sustainable models of food production, focusing especially on energy issues. Applying social metabolism and energy flow analysis, it compares the functioning of a current small-scale organic family farm in the village of Holubí Zhoř, Czech Republic with the historical performance of the village agroecosystem in c.1840. Historical data from the Franciscan stable cadastre and current data from direct field research are employed to quantify main productive assets (land, livestock, machinery and labour) and related energy flows into energy balance indicators. Their comparison shows that the present farm lies halfway between modern mechanized and traditional organic agriculture and thus constitutes an indicative case of the limits and potentialities of present-day more sustainable farm systems. Methodologically, the study is innovative by applying the social metabolism approach on the local (village and farm) level in the context of the global North, and by advancing the use of Energy Return On Investment (EROI) indicators for agroecosystems.

Integrated assessment of future scenarios of traditional extensive grazing in the Aralar Natural Park (Barque Country, Spain)
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The common grazing lands in high mountain areas provided for centuries essential resources for traditional pastoral systems, including fodder to feed the livestock, wood and food. However, industrialization and globalization, changes in rural lifestyles and new policies (e.g. CAP) are shaping
the rural landscape threatening traditional activities like sheep farming in mountain areas. Therefore, the social, environmental and economic importance of these lands decreased. Nowadays, despite the relevance of these unique ecosystems in terms of biodiversity, cultural heritage and multiple ecosystem services the sustainability of mountain grazing systems is at risk. We require a better understanding of the multiple socio-ecological factors that underpin its viability. Various attempts have been made to assess the impacts of mountain grazing abandonment in socio-ecological terms (e.g. loss of employment and traditional knowledge). There has been also progress in understanding the drivers of this decline (e.g. globalization and changes in lifestyles). In general terms, traditional extensive livestock grazing contributes to the cohesion of the territory and the maintenance of cultural heritage (Corbera 2006). This activity also contributes to landscape and biological diversity (i.e. heterogeneity of vegetation) (Adler et al., 2001) and favors higher biodiversity of birds compared to abandoned land (Laiolo et al. 2004, Verhulst et al. 2004). When combining extensive grazing in grass/clover sward with short duration/feed efficient system, the activity can contribute to climate change mitigation (Dawson et al., 2011). Also, the quality of milk and cheese produced from extensive grazing provides food of higher quality in nutritional terms (De Renobales et al., 2012). However, the sustainability of this activity is under risk due the processes of decoupling cattle raising and feed production areas (i.e. land use has shifted from grazing to production of feed crops) (Naylor et al., 2004) and the abandonement of extensive grazing and traditional practices due to intensification of the primary sector (Rounsevell et al., 2006).

In this context, it becomes critical to assess the contribution of these activities to rural development, the provision of high quality food, conservation of biodiversity and cultural heritage, in order to design and implement sound policies to support and improve this activity. Using as pilot case study Aralar (Basque Country), this work analyses the performance of three typologies of cattle raising: cheese-maker shepherds, milk producers shepherds and meat producers. Preliminary results show that the cheese makers rely on larger herds and on larger share of communal lands. On the socio-economic side, cheese makers obtain higher incomes and are less dependent in subsidies. After the evaluation of the farm/herd typologies, we carry out the comparison of different future scenarios using the MuSIASEM approach (Giampietro et al., 2009). The development of the scenarios takes in consideration the carrying capacity of the system, the spatial distribution of livestock and the historical trends. Four scenarios are developed and compared. The Business as Usual scenario considers the current use of the grazing land. The No-grazing scenario considers the elimination of this activity in the natural park. The Lowland scenario considers a sharp decrease in the number of shepherds producing cheese and the maintenance of shepherds producing milk for the industry and cattle ranger producing meat. Then, the Highland scenario considers the maintenance of most cheese producers and the sharp decrease of milk and meat producers. The evaluation of the scenarios show that the abandonment of traditional grazing may bring looses in terms of added value and jobs creation, and higher dependency on subsidies. As well, maintaining traditional extensive grazing in the lower and upper areas of the park would contribute to biodiversity, the quality of grass (for feeding) and the nutritional quality of cheese and milk produced.

Dynamic Simulation of Economic-Pollution Risk Network Transmission among Cities in Huaihe River Basin Based on Interregional Trade
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In the context of global integration, any rapid development of urbanization have led to serious impact on regional ecological environment as a result of the increasingly frequent economic trade between the country, and even the region. Nevertheless, there have been significant improvement in the economic level of cities and level of urbanization. The consequential feedback effect of this is that, the
damaged regional environment in turn restricts the absolute development of urban economy and
even, endanger the conditions of human health. The flows of inter-city economic factors, and the direct
and indirect transfer of pollutants have become a focus of the current academic research. In this paper,
we construct a non-directional economic correlation and pollution correlation matrix based on the
economic trade links and pollution transmission respectively between cities in the Huaihe River Basin,
and further develop a Directional Risk Network Transfer Model in the river basin using three scenarios
for simulation and prediction. To establish the matrixes of economic and pollution correlation, an
improved gravity model based on economic and pollution data (including GDP and population) is
developed, it enables us to quantify the economic and pollution relationships between the cities of the
Huaihe River Basin. Further to that, the network utility analysis method is used to study the
dimensionless economic linkages as well as those of pollutions, and a network model of the non-
directional networks is constructed by using the results from the economic and pollution correlations.
Base on the above quantitative results, economic risk and pollution risk transfer functions are a
necessity for the construction of directed economic flows and pollutions flows transmission network.
Finally, based on economic trade and pollution transfer between cities, this paper builds three
scenarios (terrain resistance, actual propagation distance resistance and indirect correlation
resistance) and uses Netlogo software—a powerful software to construct the directional model—with
combining the methods of network analysis and risk assessment, the economic and pollution transfer
process are simulated and forecasted in order to study the economic and trade risks and the risk of
pollution transmission between big cities and surrounding small and medium-sized cities in the Huaihe
River Basin, and to propose some rational recommendations for coordinated development of
economic development and environmental health in the Huaihe River Basin.

**Bhutan's transition to capitalism and prospect for post-growth**

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Bhutan is attracting a lot of attention as an alternative model of development seeking social and
ecological sustainability. Being a latecomer to macro-level processes of development, Bhutan offers a
fascinating case study for exploring the modus operandi and the effects of the transition to a market
economy. In addition, Bhutan is also well-known for trying – despite a tight dependency on the Indian
economy – to find ways of avoiding the negative consequences of capitalist development.

What can we say about the overall performances of the Bhutanese model of development from an
integrated socio-ecological economics perspective? This paper intends to suggest preliminary answers
to this question, based on the most extensive literature review to date (including grey literature only
available in Bhutan) as well as on one year of research and teaching, in Bhutan, on the Bhutanese
economy.

The paper starts by discussing the notion of “capitalism” and the debates on the “transition to
capitalism” as well as their relevance for ecological economics. From the 1960s up until today, Bhutan’s
development has been orchestrated by state planning through a series of five-year plans (Mehta,
2009). While a small – but powerful – capitalist class has been able to emerge, largely originating from
the aristocracy (Basu, 1996), I argue that many spheres of the country’s economy do not follow a
capitalist logic of production. In particular, the large majority of subsistence-oriented “middle”
peasants use the market as opportunity rather than as compulsion (Wood, 2002). Unlike what
happened in early modern Europe and elsewhere, neither enclosure movements nor any large-scale
indebtedness occurred in the country, two key mechanisms which would have pushed people into
wage-labor (Gerber, 2014). As a result, characteristically, the government is unable to find a Bhutanese
labor force willing to carry out unpleasant work like road construction. All the necessary workforce has
to be imported from India.
This situation raises fascinating questions about the evolution of the Bhutanese economy. The paper provocatively argues that the government’s declared objective to introduce a “modern market economy” is unrealistic in the absence of a class of commercial landlords, of large-scale agribusiness investments or of widespread credit facilities. Non-capitalist institutions are too strong (e.g. Wangchuk, 2001) and this can be Bhutan’s greatest chance, if only the situation is correctly understood and creatively used as a basis for innovative economic policies fostering possession rather than property (Gerber & Steppacher, 2016).

Chayanov (1925) famously argued that “middle” peasants do not seek accumulation and work until their subsistence needs are met. There is evidence that the same logic may apply to traditional artisans. Together, these two groups form a large portion of the Bhutanese economy and could represent the foundation of a truly post-growth economy.

The Bhutanese ideological context could potentially still be receptive to these views – even if it is under the pressure of a strong modernizing political sector. The Gross National Happiness (GNH) framework was born during the 1990s as a resistance against the negative impacts of neoliberalism. Following India’s neoliberalization at the beginning of the 1990s, Bhutan was in urgent need of an alternative discourse. And so the idea of a GNH was developed, as a series of guiding principles.

The paper shows how GNH is an ideological battle ground within Bhutan. GNH encompasses different tendencies, more or less radical. For some Bhutanese, GNH is green growth and/or a brand name to be used for every occasion. For others, GNH is a new indicator which should replace GDP in guiding development policies – a position I call “narrow GNH”. And still for others, GNH is not just a new indicator; it is a philosophy of social flourishing integrating exterior and interior needs and it seeks a steady-state once basic needs have been met by all – I call this last position “deep GNH” (see Ura, 2005; Ura et al., 2012; RGoB, 2012; 2013). Currently, it is the first group which has the majority in the government. But overall, Bhutan’s policies are the outcome of these different forces at play (Hayden, 2015).

From a socio-ecological economics perspective, the general policy framework remains highly interesting. Among the sustainability-oriented policies of Bhutan, one can cite: free education and healthcare; severe restrictions on foreign investments; no WTO membership; no outdoor advertising; heavy taxes on car imports; severe limits on mass tourism (and ban on alpinism); 50% of protected areas; constitutional 60% of forest cover; “carbon neutrality in perpetuity”; land distribution to landless farmers (no landlessness); willingness to shift to 100% organic agriculture. The paper briefly discusses each one of these policies and takes the Samdrup Jongkhar Initiative – led by a progressive lama, Dzongsar Jamyang Khyentse Rinpoche – as an example of “deep GNH in practice”.

Overall, much is to be learned from the Bhutanese experience, especially regarding the debates around the notion of decommodification which can be seen as a foundation for ecological economics (Gerber & Gerber, 2016). A pro-peasant and pro-artisan approach to economic policies seems a most promising way of achieving a post-growth economy following “deep GNH” principles.

References:
Killing three birds with one stone? Investigating the effects of a working-time reduction policy on well-being, gender and the environment

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Working-time reduction (WTR) is seen as a promising policy tool for a sustainable economy. By distributing working hours more equally, WTR could reduce unemployment and in turn mitigate growth pressures (Antal, 2014; Jackson and Victor, 2011). On the individual level, shorter working hours might enhance employees’ health and quality of life. WTR could also result into a more equal distribution of paid and unpaid work between men and women, thereby fostering gender equality (Coote et al., 2010). Moreover, WTR is increasingly discussed as a measure to decrease the environmental burden, first because of the reduction in overall economic output, and second, because employees might consume less or differently (Knight et al., 2013).

However, the actual effects of WTR are highly uncertain, depending on the respective policy design and institutional circumstances (Kallis et al., 2013). In order to realise both well-being and environmental advantages, Pullinger (2014) proposes options for voluntary, flexible working-time reductions accompanied with income cuts as a policy framework for WTR. Schor (2005) argues that people are rather willing to reduce future income than current income to obtain more leisure, as they adjust to present consumption levels. She thus suggests to channel future productivity gains into more leisure as a politically viable strategy for WTR.

A novel working-time policy in Austria unifies several of these features: The leisure option (“Freizeitoption”) enables employees to choose between a wage increase and additional leisure time. Employees are entitled to additional leisure every year as long as they are employed in the same company. The time credits can be consumed hourly or daily; they can also be accumulated to take some time off. The leisure option was first implemented in 2013 via the collective agreement for the electrics and electronics industry in Austria, and has since then spread among several other industries. In this paper, we take advantage of this innovative policy to examine (a) the way in which employees use the leisure option (i.e. to reduce daily, weekly or annual working time), and (b) the implications in terms of well-being, gender equality, and environmental effects. For this purpose, we conducted 18 problem-centred interviews (Witzel, 2000) with employees of a major company in the electrics and electronics industry in Austria. The investigated firm was amongst the first to adopt the leisure option. Therefore, we expect that employees already have a certain experience with this working-time policy.

For the selection of interviewees we applied a purposeful sampling strategy, which is based on the selection of subjects according to certain characteristics or categories (Coyne, 1997). In fact, we tried to balance the factors of age, gender, occupation (levels of qualification), and position (blue-collar and white-collar workers).

To evaluate the effects on gender equality and the environment, the interviewees were asked (a) whether they use the leisure option to reduce daily, weekly or yearly working hours, and (b) on which activities they spend the additional leisure time on. A recent study by King and van den Bergh (2017) shows that environmental effects vary for different work-reduction policies, suggesting a four-day
working week as preferable to other policy scenarios in terms of reducing carbon emissions. Regarding gender equality, we assume that a shorter working day is more favourable than an additional week of holidays, as the former offers the possibility to share household and care work more equally among partners. Therefore, besides the actual activities employees spend their additional time on, also the individual decision how to use the leisure option might hint at gender and environmental effects. In order to evaluate the implications on well-being, we mainly rely on respondents’ subjective assessments. More particularly, we are interested in the way the leisure option affected employees’ self-perceived work-life balance, health, and job satisfaction.

This research is expected to provide some valuable insights into the effects of a voluntary, flexible WTR policy that is associated with income cuts. Given the small sample size of the qualitative study and the specific nature of the policy analysed, the generalisability of these results might be limited. However, by considering an existing working-time policy, this research can be seen as a first attempt to explore the actual effects of WTR on an individual level.

References

Natura 2000 and regional development: an Austrian case study

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A wide range of studies have explored the question whether the establishment and management of the Natura 2000 network of protected areas is ‘efficient’ from an economic point of view. Since the land devoted to nature conservation according to the FFH (Flora-fauna-habitat Directive) and the Birds Directive is quite substantial, ranging from 9 up to 37% of a country’s total land area (Natura 2000, 2016), opportunity costs of conservation might marginally increase in the future. In addition, the costs of establishing and managing Natura 2000 sites (in terms of ‘out-of-pocket’ expenses) might be substantial. However, as several studies have proven, the benefits of conservation for Europe’s biodiversity may significantly exceed the costs of conservation (e.g. Gantioler et al. 2014).
This broad perspective leaves out the aspect of the distribution of costs and benefits on a regional scale. Usually, biodiversity hotspots are located in rather peripheral regions both in Europe as well as world-wide. The Convention on Biological Diversity (CBD) therefore builds the foundation of benefit and burden sharing, and considers the potentially uneven distribution of costs and/or negative regional economic impacts of conservation. Earlier studies have emphasized that the regional economic effects might be rather positive than negative (e.g. Getzner and Jungmeier, 2002).

In this context, the Austrian Association of Environmental Organizations (Umweltdachverband) commissioned a study (Getzner et al., 2016) to ascertain the effects of establishing and managing Natura 2000 sites in Austrian region with respect to
- Demographic development of Natura 2000 municipalities,
- labor market effects,
- effects on agriculture and forestry,
- tourism,
- general regional development of rural areas.

The methodological framework of the study first consisted of classifying all 2,600 Austrian municipalities according to their share in the Natura 2000 network by means of GIS analysis. Furthermore, for all dimensions mentioned above, long-term statistical data was analyzed, and the different developments were presented for, in all, six types of municipalities, in addition to their location in the main agricultural areas in Austria.

The paper to be presented at the ESEE conference shows that, while the Natura 2000 network of protected areas may lead to significant net benefits (welfare gains) from an overall economic perspective, the regional and local effects might also be negative in some cases. However, all in all, the connection between the establishment and management of Natura 2000 protected areas and regional development is very loose, and in most cases there cannot be detected any regional effect – which more often is positive than negative.

The central conclusion of this study is that, in general, the establishment of Natura 2000 protected areas (that are typically located in peripheral and rural regions) neither positively nor negatively affects the regional economy as well as the regional development. The existing structural problems of rural and peripheral Natura 2000 municipalities are neither substantially aggravated nor solved by the establishment of protected areas. In single cases, Natura 2000 sites might have negative impacts (e.g., agriculture, extension of industrial areas), but might also lead to positive effects (e.g., subsidies for rural development, tourism). The structure of the expected effects depends on the specifics of each region (e.g., general potentials for tourism development, demographic structure, availability of human capital in terms of education and qualifications). (Regional) Economic considerations thus do not seem to be important core arguments in the debate on the pros and cons of establishing protected areas.

Regarding policies and instruments for the implementation of the Natura 2000 frameworks, the authors of this study present a wide range of potential improvements for the process of establishment as well for the management of such sites, and for project development in close proximity to Natura 2000 areas.

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Valuing ecosystem services for urban planning
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Green and blue infrastructure is seen as a major instrument by the European Commission to address global challenges of climate change as well as supporting the quality of life in cities and their resilience. The benefits of investing in green and blue infrastructure in urban environments are twofold. In the first place citizens can benefit from multiple ecosystem services green infrastructure provides especially in terms of regulation services (air and water flow regulation, local climate regulation – temperature and humidity, air purification, carbon sequestration, water retention and flood protection, etc) provisioning services (urban agriculture, community gardening) and cultural services (recreation and community activities, scientific, spiritual and educational services, etc.). Secondly, green and blue infrastructure is being promoted as a cost-effective alternative or a complementary to ‘grey’ infrastructure and intensive land use changes in urban settings. Moreover it also helps to reach biodiversity goals. These benefits become even more relevant in regard to current threats posed by climate change and the need of sustaining and enhancing urban quality of life.

The aim of this paper is to demonstrate the value of green and blue infrastructure in the adaptation of urban areas to climate change. We argue that incorporating green and blue infrastructure design into the planning and policy spheres contributes to the functioning and resilience of the city and provides the adaptability to respond to locally contextualized challenges, such as overheating, flooding, air pollution, health and wellbeing as well as biodiversity loss.

The paper discusses various ways through which urban ecosystems services can enhance resilience and quality of life in cities and identifies socio-cultural impact that can derive from their loss. It focuses on the process how ecosystem services valuation can influence decision-making situation in urban planning context. Namely awareness raising (regarding non-economic values, including social, cultural and insurance values) and consequent design of economic instrument (e.g. entrance fees to parks, user fees to finance public utilities, etc.).

Loss of ecosystem services in cities may have negative impact on social and cultural values. These values are rarely addressed at the decision-making level and little has been said on how the ecosystem services and green infrastructure approach may contribute to better incorporate non-economic values in urban planning.

Developing a spatially explicit, global material flow model to trace environmental impacts embodied in international trade
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In the era of globalisation, supply chains of goods and products are increasingly international, thus disconnecting the location of production from final consumption (Liu et al., 2013). Consumption therefore has developed into a major, geographically distant driver of various local environmental and social impacts in countries producing raw materials such as copper, petroleum, soy beans or timber (Godar et al., 2015).

Today, the world economy uses more than 80 billion tonnes of renewable and non-renewable raw materials, compared to around 35 billion tonnes in 1980 (Giljum et al., 2014). This remarkable growth in material extraction strongly increases environmental pressures and causes impacts such as the degradation of natural habitats or increasing water scarcity. Also social conflicts have intensified with the expansion of agricultural and mining activities. The amount of materials embodied in international
Trade augmented even faster than overall material use. Today, more than a third of globally extracted materials serve as direct or indirect inputs for the production of internationally traded products (Wiedmann et al., 2015).

Methods to assess global supply chains from raw material extraction to final consumption have improved significantly over the past few years. The approach most widely applied for consumption-based (or footprint-type) assessments is multi-regional input-output (MRIO) analysis. Such environmentally extended models have already been applied to a large number of environmental pressures and impacts, such as GHG emissions, air pollution, water use, land use, material use, deforestation and biodiversity loss (see Wiedmann, 2016). Despite these improvements, existing MRIO databases have important limitations for the application to material flows and related footprints, as their spatial resolution is limited to the national level. Current MRIO models thus need to assume average environmental or social impacts per unit of product originating from a certain country and are unable to link specific supply chains to the actual geographical locations of production. This can lead to severely distorted footprint results, as the heterogeneity of environmental and social conditions within specific producing countries is not taken into account (Hubacek et al., 2014).

This paper presents a new footprint model that will overcome these existing shortcomings. The spatially explicit and highly detailed global material flow model covering extraction, transportation, processing and final consumption, will allow robust assessments of material footprints and related environmental and social impacts. For the first time it will be possible to trace products consumed in European countries back to the precise geographical location where environmental or social impacts related to raw material extraction take place.

The production (or territorial) part of the model will investigate the geographical distribution of around 60 different biotic and abiotic raw materials in countries worldwide on a detailed (10 km x 10 km) grid cell level, based on the national data set on material extraction developed by my research group over the past 10 years (WU, 2016). Further, this part will analyse the relation between trends and patterns of raw material extraction and a range of related environmental and social impacts.

The part of the model dealing with international supply chains and trade will in a first step trace the flow of raw materials from the location of extraction to specific transportation facilities such as ports. The second step involves tracing raw material flows from a certain export trade facility to the destination country, in which further processing of the raw materials takes place. For this analysis of physical trade flows, data from a range of available statistics will be combined, including national commodity flow surveys, port statistics, as well as information from global maritime transport databases. In order to obtain the spatially explicit global material flow model, the detailed physical flow accounts will then serve as highly detailed environmental extensions to an existing MRIO model, such as EXIOBASE, Eora or the OECD IO database.

The new model can then be applied to perform the first fine-scale assessments of Europe’s global material footprint. This will allow identifying global raw material extraction hot-spots related to the consumption of specific European countries and investigating the spatially explicit material footprint of key consumption products such as, for example, meat and dairy products or electronics. In order to tele-connect impacts occurring elsewhere with the various products finally consumed in Europe, the environmental and social impacts related to raw material extraction will be analysed in relation to the spatially explicit material footprint, applying multi-layer analyses using descriptive statistics (see Kanemoto et al., 2014; Lenzen et al., 2013).

Moving the impact analysis from the average national to the level of districts and municipalities will significantly improve the reliability and policy significance of footprint assessments. The spatially explicit material flow model can be applied to analyse all environmental issues related to raw material extraction with a spatial dimension, including natural habitat degradation, soil pollution, water scarcity, deforestation and biodiversity loss. Also social issues such as violent conflicts on mining projects or child labour in mining and agricultural production can for the first time be assessed in the context of material footprints.
The paper closely links to the topic of the special session on the role of trade in resource use across levels of scale. It presents a new concept to the biophysical dimension of world-wide trade and the assessment of embodied environmental and social impacts.

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A multi-scale approach to agroecosystem energy transitions: the case of Austria, 1830-2010
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In the course of the green revolution, agriculture shifted from a net-energy generating activity to an activity using more energy than it provides (Smil, 2008; Krausmann, 2016). The most important industrial energy inputs to agriculture include fossil fuels for machinery use, irrigation and fertilizer production. In addition, a dietary shift towards more livestock products has contributed to diminishing energetic efficiency of production, as livestock production requires much higher energetic inputs per unit of output than crop production (Pelletier et al., 2011). Despite significant yield increases, these processes have contributed to stable or declining energy returns on investment (EROI) in agricultural production (Hatirli et al., 2005; Hamilton et al., 2013). Recent research has demonstrated the usefulness of applying a “looped” socio-metabolic perspective on energy in agroecosystems (Galán et al., 2016). This approach divides energy inputs into “external energy inputs”, i.e. energy invested by the local community, either as labor or as inputs bought from the market, and “biomass reused”, i.e. energy inputs circulated within the local agroecosystem (Tello et al., 2016). The difference acknowledges the relative monetary costs of different types of inputs, as well as the different ecological implications of local energetic recycling as opposed to linear energy throughput. Regional case studies have shown that external inputs added to biomass reuse in the course of industrialization in many western case studies, rather than simply replacing it (Gingrich et al., forthcoming; Guzmán & González de Molina, 2015). Analyses of EROI, according to this methodology, are highly scale-dependent: biomass inputs into agroecosystems (in particular feed and seeds) are considered as external input or biomass reused
depending on where the system boundary is set. Unless operating in closed energetic cycles, a smaller unit of analysis (e.g. a village) will, ceteris paribus, be more dependent on external biomass inputs than a larger unit of analysis (e.g. a province or country), simply because in smaller scale levels, more biomass flows are defined as external inputs. Studies on energy returns of investment have so far focused mostly on local and regional case studies. Only for the case of Spain has a national-scale analysis been carried out (Guzman Casado et al., forthcoming). However, to our knowledge, no systematic analyses of energy returns on investment across scales have been conducted so far. This contribution consistently employs analyses of energy returns on investment to different scale-levels (regional and national) for the case of Austria in the period 1830 to 2010.

The empirical aim of the study is twofold:

(1) The national-scale analysis investigates the relative importance of different land-use practices which contribute in different ways to agroecosystem energetic efficiency. Austria is a country of a high forest share (above 40% throughout the time period) and an important livestock sector where grassland-based feed production still plays an important role. With forestry being the most energy efficient land-use practice and livestock rearing a highly energy-intensive way of agricultural production, we expect to find relevant results on the combined effects of both strategies. Understanding the Austrian case, a Central European, mountainous country, contributes to a better understanding of national and regional trajectories of agroecosystem energetic efficiency in Europe.

(2) The cross-scale analysis of regional and national trends is used to display in which way Austrian regions (e.g. mountains and plains) diverged in terms of their agroecosystem energy efficiency in different time periods, and to which extent national trends reflect regional processes. In addition, the regional-scale analyses demonstrate that the integration of fodder production and consumption is mostly connected to cattle-grazing, a regionally-limited phenomenon restricted by biogeographic suitability, or, more precisely, unsuitability for more intensive crop production.

The insights from the long-term analysis of agroecosystem energetic efficiency at different scale levels is used to identify potentials for increasing energy efficiency in the context of sustainable agriculture.

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Conceptualizing a Steady-State Energy System: Identifying Feedbacks, Causalities and Controversies
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Growing demand on energy prompted by an expanding economy is pushing biophysical source and sink limits. Discussion on the planet’s biophysical limits is not new (e.g. Boulding 1966, Meadows et al. 1972), but has increasingly gained attention during the last years leading, in particular, to the elaboration of alternative economic concepts (e.g. circular economy). In the current growth-oriented economic system, rising demand for energy is associated with an increase of social welfare. Alternative economy concepts, such as those focused on degrowth and steady state, try to challenge the existing economic model and design visions of a long-term sustainable (socio-)economic system. Since the energy system is a vital part of economy as well as it is directly and indirectly related to many of the sustainable development goals, it is necessary to develop a vision of a long term sustainable energy system, in order to avoid negative environmental and social implications.

Finding a model for a sustainable long term energy system that would provide sufficient level of wellbeing globally, at the same time, staying within biophysical limits becomes a very challenging task. Often energy is only regarded as one sector of the economy but not as a system that interacts with the socio-economic system in more ways (e.g. poverty reduction, health benefits) than as an input factor to the economy, which causes environmental degradation. In our opinion, having a clear vision of the energy system itself, its dynamics and its interaction with other areas of sustainable development will help modeling the energy system and building a more sustainable energy system. We seek to contribute to conceptualizing such a vision, which we call steady-state of energy. We will use Daly’s central element of the steady state economy (Daly 1974, Daly 1991), namely the steady state economy equation, which is based on the service-throughput-stock relationship theory and increasing efficiency to prevent environmental depletion and pollution, as the basis for conceptualizing a steady state of energy system and analyse what measures are necessary to achieve it. However, stabilizing the economic system to a constant level of resources used (at the input end) and limiting negative environmental impact (at the output end) is of course necessary, but as pointed out by others (e.g. O’Neill 2012, Kerschner 2010) is a concept especially relevant when addressing the global north. In some countries, particular in the global south, in which the basic infrastructure to provide the services for fulfilling basic needs is still missing, the energy system still needs to grow in order to be able to provide the resulting energy services to society at sufficient level. Hence, we want to, also, take up an idea brought up by Kerschner (2010) and others to achieve the steady state on the global level. By this we mean a global steady state of energy, in which the global north degrows its energy system, in particular its negative impacts (i.e. pollution) and the global south grows its energy system to provide the required services. This could be seen as a convergence of the two systems. Elaborating the definition of a steady state of energy system and a conceptual analysis on it will be carried out. Using a systems thinking approach, we study the relationship between the key elements of Daly’s equation in a more detailed and dynamic way and adapt the variables to the energy system. We also adopt feedback structures based on Daly’s equation to investigate the steady state of energy at the conceptual level. We believe that finding causalities and feedbacks in the steady state energy system helps to enhance the understanding of how the key elements contribute to a steady state socio-economic system, and will help identify main controversies and challenges for achieving it. We use Causal Loop Diagrams (Sterman 2000) as the main analytical, visualization and communication
instrument to elaborate this analysis on a global system level. Ultimately, this analysis leads to
determining leverage points, i.e. places for policy intervention. This is especially interesting in terms of
relating existing energy transition policies, such as measures to increase efficiency and shifting to
renewable energy sources, to the 12 leverage points by Donella Meadows (Meadows 1999) in order
to see whether the recognized energy system leverages could lead to a steady state energy system in
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Socioeconomic Effectiveness and Green Growth of Forest Sector in Russia
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One of the problems facing the Russian economy is its low environmental characteristics. Per unit of
economic result, our production chains spend an excessively large amount of natural resources or
there is an excessively high specific level of negative anthropogenic impact, such as pollutants
emissions per unit of gross domestic product (GDP). In [2], it is shown that, according to a number of
indicators, the eastern regions of Russia are substantially behind even the bordering Chinese
provinces.
The forest sector of the economy of Russia is passing through a profound crisis. Devaluation of Russian
ruble as a result of the 1998 crisis that caused a rapid growth of exports of raw timber, did not play
any substantial role in modernization of the forest industry. A number of regions (especially those
which have good infrastructural conditions for exports to China), on the contrary, experienced a clear
slowdown in the development of the sector because of a high attractiveness of exports of raw
materials in comparison with the creation of modern enterprises for timber processing. One of the
important causes for that was the low quality of Russian legal institutes responsible for a steady
increase in transaction costs in the processing sector, unlike the sector specializing in raw materials. In
addition, management of forest resources is, as before, based on the view that the forest resources of
Russia are inexhaustible and unlimited. In the opinion of many researchers, the unsuccessful reform
of forest-resource management after 2000 that has lasted for more than a decade led to the formation
of decision-making procedures (usually, at the federal level) which do almost not take into account the
diversity of the spatial and infrastructural characteristics of Russian regions. The consequences of such
decisions manifest themselves in a high degree of differentiation of economic results. For instance,
what is a stimulus for modernization of the forestry complex in some regions is an “anti-stimulus” in
others.

The model for analysis of ecologo-economic processes in terms of “green” economy used in the paper was elaborated on the basis of P. Victor’s conceptual scheme [3]. Detailed description of the model for spatial analysis is are presented in the article [1]. The suggested model can be used in temporal as well as spatial analysis.

Our calculations show a very high degree of differences in social and budgetary effectiveness of forest use in Russian regions. Since the concept of green economy encompasses important social aspects, we included in our analysis, as the economic results, important indicators in this context: FBPr – tax revenues to the consolidated federal budget from wood processing and manufacture of wood products per of 1 cubic meter of harvested timber; RBPr – tax revenues to the regional budget from wood processing and manufacture of wood products per of 1 m³ of harvested timber, and L – volume of wages of the workers of the all enterprises of regional forest sector per of 1 m³ of harvested timber.

The findings of this research indicate a significant differentiation of the budgetary (the FBPr and RBPr indicators) and socioeconomic (the L indicator) effectiveness of forest use in Russia's regions. The measures of state policy on forest use disregard the high degree of regional differences; given some positive results in a number of regions, largely in the European part of the country, they proved to be insufficiently effective for regions where the geographical and infrastructural conditions are favorable for the development of exports of raw timber and preprocessed sawn products.

The analysis showed that most of the regions with effective indicators of forest use hold also the best prospects in the content of “green” growth. This suggests that if the country’s forest policy is built upon the budgetary and socioeconomic indicators considered in this paper (rather than the volume of logging and the volume of export, and even rather than the volumes of processing), then the incentives thus created will contribute to the advance of Russian forest use toward the “green” economy. The view that to raise effectiveness of forest sector requires setting up large enterprises (carrying out large scale logging of millions of cubic meters in areas measuring hundreds of thousands of hectares and attracting large investors) cannot be considered as absolutely correct. Calculations indicate that the best results are attained by regional forest sectors with relatively small harvesting volumes. Many forest regions of Russia, and even Siberia and the Far East, are now experiencing an exhaustion of economically accessible forest resources. Therefore, any increase in logging is ecologically dangerous. Furthermore, there is an urgent problem regarding the establishment of natural reserves for conservation of biodiversity and ecosystem services. In the eastern regions of the country, the situation is complicated by a high demand for forest resources from China, where the felling operations were ceased in its northeastern provinces, within the framework of strategic rehabilitation of forest resources for the establishment of natural reserves. Our calculations demonstrate that an improvement in economic results from forest use is possible without any additional pressure on ecosystems by raising effectiveness of management and forest-resource utilization.

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Literature
Economic valuation and environmental justice: Are they compatible?

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Economic development bears unaccounted social and environmental costs (e.g. ecosystem service decline, health impacts, and biodiversity loss) that rarely appear in company balance sheets or macroeconomic accounts, unless they are claimed through courts or unless state regulations mandate their internalization. While attention to valuation of the ‘hidden costs’ of development has grown steadily in recent decades, the way in which these costs should be framed, valued and dealt with in environmental governance remains a source of controversy. While many economists see economic valuation and market-based instruments as the most powerful mechanisms to deal with the problem, critical scholars often take distance from economic valuation on the grounds that it privileges access to those with ability to pay. Are economic valuation and environmental justice mutually excluding? Using the example of ecosystem services, this paper addresses the question of whether economic valuation of socio-environmental costs is compatible with environmental justice goals. The paper is organized in three main parts, respectively addressing the problems of framing, valuation and governance of socio-environmental costs. Part one describes the ‘externality approach’ and the ‘cost-shifting approach’ as competing frameworks to conceptualize the problem of unaccounted costs. The first framework describes socio-environmental costs as externalities resulting from ‘market failures’, calling for their internalization in the price system through monetization and market-based instruments. This latter approach builds on the body of literature in institutional and ecological economics that (following William Kapp) describes socio-environmental costs as ‘cost-shifting successes’ through which powerful actors capitalize the benefits of their economic activity while imposing costs on others, including other species, future generations, and the poor. Part two draws examines how the two analytical frameworks describe above confront the question of how socioenvironmental costs are to be measured and valued. In doing so, the perspective that all of these costs can be effectively monetized is confronted with that on integrated valuation approaches that acknowledge incommensurability and value pluralism. Finally, part three addresses the problem of how socio-environmental costs elicited through valuation can be articulated through institutional and regulatory frameworks. The case that externalities are to be seen as market failures to be internalized through market-based instruments is contrasted with the case that capacity to degrade social and environmental conditions at zero cost, does not reflect a market failure as much as a power asymmetry that allow certain economic actors to impose costs on others, and the thesis that social struggle can be an effective driver of cost internalization.

We claim that ecosystem service valuation can inform liability claims for socio-environmental damage relying on justice-based institutions such as civil or criminal legislation on socio-environmental liabilities. We note that informing liability suits is a promising and yet underexploited application of ecosystem services valuation, and we point to concepts, frameworks and methods that allow shifting the spotlight of economic valuation efforts from ‘getting prices right’ to ‘getting justice right’.

On the emergy accounting of intangible goods

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Sustainability and equitable use of the resources require a proper evaluation of all their flows in the complex network of relationships ensuring systems functioning, resilience and dynamics. Monetary evaluations alone are framed within a user-side perspective that hardly captures the
complex role played by the natural capital and by the intangible goods. On the other hand, the donor-side perspective which the Emergy Accounting is based on provides a measure of values that accounts for all the investment done in generating services and resources at a more exhaustive scale than those addressed by economic analyses, opening the possibility of evaluating the contribution to the systemic operation of intangible aspects otherwise neglected by many "traditional" analysis methodologies. In this paper, the problem of accounting of intangible goods in emergy analysis is addressed. The systemic role of "stocks" of image and reputation is described for some case studies systems, pointing out how their quantitative determination is needed in the description of the systems operation for a comprehensive evaluation of their sustainability. In particular, we discuss the contribution given by the image of a system in the case of a productive sector and for an higher education system. As for the former case study, we address the sustainability of the renowned artistic glass sector of Murano island, in the Venice Lagoon (Italy), which has been challenged in recent years by the evolution of several socio-economic dynamics as well as by environmental constraints. A renewal of the systemic structure of the artistic glass production is linked to a proper management of the products image, an image which in turn depends on that of the entire city of Venice, underlining how the sustainability of the sector is part of that of Venice and its lagoon.

As concerns the second example, the image and reputation of a public University is addressed as a key factor affecting both the recruitment of qualified faculty and the enrollment of students, as well as the capability of attracting financial support from privates and through the participation in joint projects. Actually, the University -both as a physical system and as an Institution- pursues operational strategies that are ultimately based on market-related issues. For example, the competitive academic environment draws a particular attention to the prestige given by a sustainable University, making its reputation a key concept in maintaining its competitiveness. In this sense, from a systemic point of view, sustainability and image become strictly correlated concepts.

Sustainable Futures in Tropical Landscapes: An Integrated Agent-Based Modelling Approach
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Summary
Tropical landscapes lie at the nexus of three highly pressing concerns for a globally sustainable future: biodiversity conservation, climate change mitigation, and food production. This trade-off presented by tropical landscapes to society varies across countries; for instance, environmental management in the Wet Tropics Natural Resource Management (WET NRM) Region in Queensland, Australia, is progressing from single-purpose concerns –logging and land clearing for agriculture- towards multifunctional landscape governance approaches focused on addressing ecosystem services (ES) trade-offs (Stork et al., 2011). Furthermore, the number of protected (PA) areas in this region has increased in twenty percent since 1999 influenced by the inscription of the WET NRM Region on the World Heritage List (DSITI, 2016). This particular context has created a solid conservation-focused governance framework supported by different society sectors and agents at different scales. With this in mind, we develop an integrated and spatially explicit Agent-based model (ABM) to explore the extent three different future land-use scenarios (b.a.u., land-sparing, land-sharing) would affect landscape sustainability in the WET NRM region. In particular, our ABM incorporates Bayesian belief networks, GIS, empirical data and expert knowledge to study the impact of different landscape configurations on trade-offs and bundles regarding biodiversity, sugarcane production and carbon sequestration indicators. Model scenarios are computed under the land-sharing (LSH) vs. land-sparing
LSP) framework, promoted to address trade-off analyses; while one integrates agricultural production and habitat protection in an agro-ecological matrix (LSH), the other intensifies farming to allow the offset of natural reserves (LSP). Based on our results, b.a.u., followed by LSP and LSH shows more sustainable results in terms of enhancing bundles of biodiversity and the ES considered. Nevertheless, we argue that the use of this framework highly context dependent. Our simulation results can be used as spatially explicit tools to promote means for sustainable landscape management in the WET NRM region, by providing different policy making alternatives for targeting conservation priorities while supporting production management options. Furthermore, the proposed methodological framework is intended to be used to perform comparative landscape sustainability analyses between tropical and other socio-ecological systems (SES).

Method

ABM has become a standard technique for simulating and understanding complex dynamics in coupled SES as it provides a framework for combining micro-macro processes, use spatio-temporal data, represent human-environment interactions, and blend qualitative and quantitative approaches (Murray-Rust, 2011). The ABM developed here is built using an integrated methodological framework, which combines Bayesian Belief Networks (BBN), Geographic Information System (GIS), empirical data and expert knowledge. In particular, we use the WET NRM Region, Queensland, Australia, as a case study, where ‘patches’ represent different land-uses and ‘agents’ conceptually refer to forces driving land-use and cover change (LUCC) at the landscape level (i.e. laws, policies, norms). NetLogo (Wilensky, 1999) software is used to build the ABM, while ArcGIS (ESRI, 2015) and QGIS (QGIS, 2015) are used to both manage and analyze the baseline land-use map, and to provide with LUCC potentiality values. Published empirical data is used in those cases where GIS layers were not available. Finally, BBNs, which are built using GeNe (GeNe & SMILE, 1998) BBN builder tool, are probabilistic graphical diagrams used to state agents’ LUCC decision making through expert opinion. The BBN building process followed a logical framework adapted from the Australian Department of the Environment, Heritage and the Arts (DEWHA, 2010) and Marcot et al. (2006). An OFAT (One-factor-at-a-time) sensitivity analysis is performed, where different parameters are varied while the rest are kept fixed in order to explore the extent each of them affects model outcomes. Each combination of variables is repeated 20 times, making several hundreds of runs overall.

Results, Discussion and Further Research

This model is used to try to answer three specific questions, namely (1) which landscape management approach (b.a.u., LSP, or LSH) would increase landscape sustainability (i.e. enhance biodiversity and ES bundles) in the WET NRM Region; (2) whether our results can be extrapolated and used to analyze other tropical regions; and (3) the extent to which the power of different governance regimes affects the dynamics of LUCC, and therefore landscape sustainability, in this region.

Results show that b.a.u., followed by LSP and LSH, is the most suitable landscape management option in our model in terms of landscape sustainability under the framework considered. While the prior scenario shows positive increasing trends for both biodiversity and carbon sequestration capacity values –with a steady state sugarcane production trend-, LSP values shows increasing trends for sugarcane and slightly increasing or steady state for biodiversity. LSH scenario show positive trends for biodiversity –yet slightly lower than for LSP- and carbon sequestration, while sugarcane production indicator decreases over time. Thus we conclude that all scenarios show positive results for biodiversity, while each of them benefits the provisioning of either sugarcane or carbon sequestration. The high biodiversity values are due to the large number of conservation-oriented policies and increased environmental awareness in the WET NRM Region since the inscription on the World Heritage List in 1987, which has consolidated a complex, reliable and widely-accepted conservation-oriented governance framework.

Regarding question (2), we argue that our results from question (1) should not be, in principle, extrapolated to other tropical regions. The atypical pro-conservation governance and political context in the WET NRM Region is completely different to the governance in most tropical regions. For instance, a large amount of tropical landscapes are characterized for having pristine rainforests being cleared to expand intensive land uses, such as palm oil plantations in Indonesia (Palomo et al., 2014).
Moreover, the extent of land protected in these other regions does not usually reach the minimum 17% stated by the Aichi 2020 Targets (e.g. Indonesia 14.7% in 2014) (Vijay et al., 2016). In this regard, several studies critique the implementation of LSP landscape management frameworks in most tropical areas and thus support the LSH approaches (World Bank, 2014; Vandermeer et al., 2005; Rusch et al., 2016; Oke and Olatiilu, 2011). Far from disagreeing with these studies, we use our model to argue that the LSP vs. LSH framework is highly context-dependent. Thus, while in the WET NRM Region a LSP scenario may be suitable for biodiversity conservation given the atypical and particular governance context in this region, other tropical areas may be rather benefited from LSH approaches that increase food production while enhance climate change mitigation and biodiversity conservation. Finally, the model is also used to explore the extent changes in the power of governance regimes affects the dynamics of LUCC in the WET region (question 3). Following on the conceptual model built by Hill et al. (2015), agents in our model represent the formal and informal institutions, including laws and policies, which drive LUCC mainly at the regional-landscape scale. We expect a low number of protection agents needed to protected relatively high number of areas in short periods of time. Even in those simulations where the number of development agents triplicate protection agents, we expect biodiversity values to remain relatively steady over time. This “locked-up” situation that favors biodiversity conservation is based on the strong power of governance regimes that protect forest lands in the WET NRM Region.

To conclude, we argue that each geography and set of stakeholders will need to explore alternative conservation-smart SES, which will likely require a suite of strategies depending on the specific context. Indeed, a mixture of sharing, intensification and sparing may be needed to meet conservation goals in a world with a growing demand for forest products and other ES. Some authors have already pointed out the need to go over this dichotomy highlighting that LSH and LSP approaches are not mutually exclusive (Hill et al., 2015; Kremen, 2015; Chappell and LaValle, 2011; Fischer et al., 2008). Hence, there is an urgent need for analyses in tropical forestry landscapes to determine what balance of land-use intensity and best practices are conservation smart.

Integrating biophysical data into agricultural production function to elicit the value of green water ecosystem service

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A great majority of agricultural water use is provided by precipitation that is stored in soil moisture, defined as green water. This evaporates or transpires through plants playing a determinative role in crop growth particularly for rainfed agriculture. Whereas previous studies have focused on the contribution of blue water through irrigation, the present study aims to assess the economic value of green water supply, for cereal production in the Czech Republic. Market price methods rarely reflect the value of water provisioning service, as water is not priced at its marginal value. Moreover, in the profit maximization process, producers do not internalize green water use as this is provided by the agro-ecosystem at no cost. To overcome this failure, we employed the production function valuation method, specifying a Cobb-Douglas production function. First, green water was determined through CROPWAT model using precipitation and evapotranspiration data and was finally incorporated as a variable into the production function. The marginal value of green water was elicited by multiplying its marginal contribution with average market prices of the crop. Estimations were based on empirical time-series data at the regional scale. The findings complement the economic value of water, as revealed by previous valuation studies used in environmental accounts. The study further discusses various policy implications of green water valuation. Green water credits may be part of the payments for environmental services which will be addressed to farmers that enhance green water retention through good management practices. Finally, more reliable predictions can be made concerning the
impact of water shortages due to climate change, by incorporating green water contribution in anticipated scenarios.

Modeling degrowth for Germany: Results and implications for growth theories
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+++part of the special session proposal (Ecological economics modelling and degrowth)+++ In 2007 Peter Victor and Gideo Rosenbluth published their groundbreaking article on managing without growth (Victor und Rosenbluth 2007). The authors developed the system-dynamics model LOW GROW based on data of the Canadian economy and started exploring the connection between growth, no growth, degrowth and a prosperous societal development. The presented paper consists of two parts. The first part shows the results of the adaption of LOW GROW to the German data and contextualizes the work within the research field of ecological macroeconomics. The research shows that Victors and Rosenbluths results hold for the German context: it underlines the importance of working time reduction and redistribution for a degrowth society. Furthermore the introduction of the ecological footprint allows for a specification of the scale the economy must reach in order to develop within ecological limits and confirms the assumption of a degrowth-and-Steady-State-scenario (O’Neill 2012).

The second part of the paper focuses on the reflection of the possibilities of neoclassical and mainstream growth theories in coping with non-growing and degrowing economies. Therefore the results of the model are compared against the background of Steffen Langes groundbreaking work on Macroeconomics Without Growth (Lange 2016).

References:

On the tragedy of sharing
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“Undoubtedly, our age will be credited with having seen the end of the self-regulating market” Karl Polanyi (1944:148)

Nearly a century later, Polanyi’s outlook for the future leaves a lot to wish for. Today, in times overridden by multiple crises that encompass the world of finance, but also ecology, society, and politics, bringing Polanyi’s considerations stronger to the fore has become very attractive. The similarities between the socio-economic and political dynamics are impressive or even scary, especially once looking at the socio-political debates taking a dangerous (nationalistic) right-turn. Brexit and the US elections are big symptoms of an underlying sickness of society and the world: the liberal utopia has reached an unprecedented expression in hyperglobalization and has continuously been leading to an extreme polarization of society. Today, contrary to Polanyi’s hopes expressed in the opening quote, marketization and commodification have gained momentum, as visible in practices of e.g. carbon emission trading in international policy, the care sector, or financial derivatives.
Still, from time to time we see various concepts and new phenomena that bring an alternative utopia to the fore.

Collaborative (or sharing) economy – both terms quite in vogue in recent years – can be seen as an attempt of drawing such an alternative reality. Supporters build an idealistic vision of open, participatory, collaborative, cooperative and resource-considereate societies. In those visions, how we consume, produce, and interact is redefined. Access over ownership, sharing, co-creation, decentralization, peer-to-peer are some more key words, positioned as a vision that, if broadly implemented, will foster our search for answers to today’s reality overridden with multiple crises. Such visions are having problem with standing the test of time, particularly in the face of the so-called “Big Sharing” – or the commercial/economic framing of sharing and collaborative practices – with Uber, AirBnB, or TaskRabbit as most prominent examples. Many of these practices are seen as an abuse of the rhetoric of sharing. Regulatory issues bring both the consumer and worker rights into question, since instead of transforming the social fabric some of the platforms are exploratory and based on the mantra of self-interest. Cases of the collaborative economy reproducing class, gender and racial biases can also be found. Using sharing economy as another vehicle for tax and regulatory arbitrage is also of concern. The commonly quoted environmental benefits still lack comprehensive studies and often function as a truism among sharers that does not pass the test of system-scale impacts particularly once the ripple effects are taken into consideration. Importantly, many of these critical examples are significant not only for the co-optation of the sharing economy, but also for the role of progressing platform capitalism in maintaining or abandoning the “liberal utopian project”, to use Polanyi’s words. In this paper, I suggest a theoretical lens for exploring the dynamics of the sharing or collaborative economy in recent years, set in the context of socio-ecological transformation, the liberal utopia, and the role of ideas for institutional change. The suggested theoretical lens is used to understand the dynamics triggered by Uber - the flagship company in the sharing economy mobility sector, or at least presented as such in public discourse. Uber provides a much more diversified offer, yet services that stir controversy are specifically UberPOP (in Europe) or UberX (in the USA) – low-cost ride-sharing services provided by non-professionals who owe a car, to put it simply. UberPOP is presented by the company as a solution for urban traffic density, offering the users “everyday rides that are always smarter than a taxi” . UberPOP brings together users and private drivers at significantly lower prices than that of a “regular” taxi ride. While the company thrives on the narrative of sharing cities, being more resource-efficient, and redefining urban mobility, their activities are received with “mixed” feelings and less enthusiasm by those whose livelihood is threatened – the taxi drivers. Uber’s presence and development in France is perhaps a most accurate picture of the problematic dynamics triggered by the company in many areas of the world, where company-level decisions and technology enabled by it have led to incredible social unrest, notorious disrespecting of the law by Uber, as well as its practices of pushing its employees to function in a gray zone.

The theoretical lens I propose here is three-pronged and refers to the work of Karl Polanyi (1944 and 1977), Dani Rodrik (2012) , and Mark Blyth (2012) . It combines Rodrik’s political trilemma of the world economy (see fig.1) with Polanyi’s considerations on freedom, countermovement, and commodification, to finally be complemented with the question of ideas in institutional change processes, as captured by Mark Blyth. Emphasis on ideas brings Polanyi’s thoughts on the meaning of the economic and his substantive definition thereof to the fore.

Fig.1: The Trilemma of the World Economy (Rodrik)

This theoretical lens is used for mapping the actors involved in Uber-stirred dynamics, along with specific ideas brought by each actor, and their relation to the questions of commodification and countermovement.
Recent political liberation in Myanmar has set into motion a societal transformation process crossing all economic sectors. The changes experienced affect rural development, land use policy, foreign direct investment, and trade. This paper discusses the implications of these developments on socio-ecological systems in farming and the related impacts on energy regimes and poverty.

Myanmar is among the least developed countries in Asia (GDP less than $1,000/cap.yr-1) and 70% of Myanmar’s workforce is in agriculture. Energy consumption is the lowest in ASEAN and electrification rate is around 13%. More recently, however, industrial growth and international migration create new opportunities outside the agricultural sector.

The rural poor typically consist of the landless and farming households with access to small and marginal landholdings (less than 2 ha). Most of the poor live in the Central Dry Zone – where agriculture is at very low intensity levels. However, even in the agricultural rice basket of the country – the Ayeyarwady Delta – agriculture is mainly traditional, labour intensive and non-mechanised. Development schemes encourage intensified production, along the lines of the green revolution. Nevertheless, infrastructure development remains at low levels and production increases are limited due to
- lack of market accessibility and transportation
- lack of access to modern, adapted and suitable varieties
- lack of post-harvest technology reducing losses

In the process, smallholders tend to diversify on-farm (varieties, crops, agricultural activities) and selectively invest into mechanization of farms, although it is mostly larger farmers who can afford to mechanise. Meanwhile, the landless move into non-farm labour. Both of these processes – selective mechanisation and labour migration - lead to labour scarcity in agriculture, one depriving labourers of a stable income and the other as a matter of arising opportunities elsewhere. Both processes inhibit the possibility for sustainable intensification.

Land use systems in Myanmar are traditionally built on cooperation of landholders and landless. In a survey among agricultural communities in the Central Dry Zone and the Ayeyarwaddy Delta we found that up to 50% of agricultural households were landless (without formal title). Traditionally, landholders provide employment to landless labourers. More recently, however, these linkages seem to be unravelling, which accelerates socio-ecological change.

While landless labour is leaving and often succeed in improving their livelihoods, farmers remain attached to their farms, albeit with the need to make significant changes:
- switch to labour extensive crops or production systems
- increase energy input through mechanisation to replace lost labour
- drastically downsize and rely on family labour
- livelihood diversification

When farmers choose to switch to less intensive production systems they avoid hired labour while also avoiding investments into machinery. For example, the shift from transplanting rice to broadcasting cuts out the most labour-intensive steps in the production processes (around 12% of total labour input). The disadvantage to this method, however, is a yield cut of up to 30%. Thus, while energy input decreases, so does the output.

While we observe a selective acceptance of mechanisation, there are reasons for the reluctance of farmers to mechanise: (1) the high costs associated with investments into machinery and lack of cash liquidity; (2) the inflexibility of costs associated with operation and maintenance; (3) the lack of extension, support and services in rural areas; (4) the lack of multi-functionality of machines. Nevertheless, due to increasing labour scarcity, many farmers are forced to take on the risk of...
mechanising and thereby increasing their energy input. On the other end of the production, however, farmers may not be able to increase yields and, if they do, fail to add value due to lack of postharvest processing and inefficient markets. Thus, the energy input increases with uncertain gains in outputs. Downsizing the farm is yet another strategy taken by farmers – adapting the farm operation to the amount of available labour. This, however, is hampered by Myanmar’s land use policies. If farmland is unused, the land title returns to the state, and households lose valuable land assets. Even crop changes are difficult under the current law as areas are designated according to mandated land use. Therefore, farmers cannot easily switch to, e.g., less laborious perennials if the land is identified as paddy land. In addition, many households do not possess secure title – changing farming systems would run the risk of losing their land entirely. Downsizing implies cuts in energy inputs with uncertain levels of output ratios. Usually, however, downsizing occurs in conjunction with diversification.

Among small farmers, we observe a shift towards diverse livelihood portfolios, with an increasing proportion of non-farm income sources. For larger famers more is at stake and the flexibility for livelihood transition is limited. Therefore they are likely to mechanise, albeit reluctantly. Livelihood diversification relates to sourcing income from non-farm activities. Thus, we can expect farm energy inputs to decrease whereas energy consumption in the household would rise due to the gradual transition into a proto-industrial lifestyle.

The analysis confirms the dilemma of Myanmar’s development process: while agriculture is the economic backbone of the country and most people depend on it, agriculture is closely correlated with poverty and the source of a highly mobile labour force. Production gains are only achieved through increasing energy inputs from generally unsustainable sources, but they do not necessarily translate to economic gains for the rural population. Thus, the energy trap also becomes a poverty trap. This paper highlights the importance of political and social dynamics in agricultural development and argues for increased consideration of these concerns in the analysis of resource use systems.

**Discussing the common paths towards happiness and sustainable development**

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This article discusses the common paths that arise from empirical and conceptual happiness research and the study of environmental sustainability. We understand happiness as the experience of positive and negative emotions, as well as the cognitive evaluation of life, reported by people and not by an external agent.

Specifically, we discuss current evidence on the following questions:

1) What are the conceptions of happiness that better align with sustainability?

2) What are the issues that make people happy and at the same time contribute to sustainability?

3) Are there contradictions between the idea of happiness embedded on capitalist values and sustainability?

4) What are the role that economic agents can play in order to better contribute to achieve happiness and sustainability?

To do so, we build on the happiness literature and on the development and post-development literature. The paper is divided in six parts: and introductory section, one section for each of the four questions and a final conclusion and discussion section.

Concerning the first question, we explore the understanding of happiness embedded in capitalist societies, while comparing it with understandings derived from alternative approaches to capitalism such as degrowth and eastern philosophies such as Buddhism and buen vivir. Those alternatives are not only intellectual conceptions, but they are being experienced by people living in sustainable communities such as transition towns, eco-vilages and indigenous communities. We suggest that these alternatives are both better for sustainability, as well as for the happiness of people who live under
those realities. The empirical literature concerning the answer to this questions is, however, quite scarce. Therefore some more empirical evidence could help to fill this gap in the future.

Regarding question two, we deal with different personal goals -intrinsic vs extrinsic- and the relation with happiness, as well as the use of relational goods vs positional goods. Intrinsic goals refer to people’s concerns with the community, their relatives and friends and their own health and result in internal pleasure. Extrinsic goals are associated with money, status and the pursuit of social recognition. Materialist values are associated with extrinsic goals (Kasser 2002). Relational goods refer to goods that are immaterial, such as love and friendship, they cannot be accumulated its use brings more of those goods, and if they are priced they lose their value. On the other hand, positional goods refer to those goods that bring enjoyment to the owner only if other people cannot enjoy them. We argue that the lifestyles resulting from pursuing intrinsic goals are conducive to an intensive use of relational goods, while extrinsic goals are related to consumption of positional goods. Most importantly, empirical evidence suggests that a relative stress on intrinsic goals is related to greater happiness and sustainability (Brown and Kasser 2005; Kasser 2016).

The contradictions identified in the third question are based on evidence and paradoxes such as the Easterlin (1974) paradox and the Happy Peasants and Miserable Millionaires paradox (Graham and Pettinato 2002; Graham 2012). The Easterlin paradox concerns the fact that, within countries, rich people are always happier than their poorer counterparts, whilst across time rises in income do not seem to result in higher happiness levels (Easterlin 2013). The Happy Peasants and Miserable Millionaires paradox maintains that poor people can be happy while rich ones can be quite unhappy. Those results put in evidence the contradiction of several of the capitalist values (accumulation, competition, egoism, individualism) with the pursue of happiness, while the negative effect on sustainability of high economic growth and rich lifestyles remains evident.

Finally, question four addresses the necessary transformations for economic agents positively contribute both to happiness and to sustainability. At the individual level, it is necessary to reduce the production/consumption of positional goods and encourage the consumption of relational goods; a transformation that demands a change on the social imaginaries, as Castoriadis (1997) argue, and the socio-economic structures that support them. At the firm level, we argue that the transformation of production systems from profit maximizing to the ones characterizing social and solidarity enterprises do better guarantee happiness and sustainability. This involves reflecting on the basic questions of what to produce, how to produce and for whom to produce it in order to end the exploitation of humans and the natural environment. As for the State, we propose several sets of policies that would encourage the emergence of complementary paths that respect the environment while permitting people to enjoy life at the same time. The evidence for this last question complements the first one, as it provides some suggestions, without pretending to propose a fixed pathway, on how to transition from a capitalist paradigm to alternative ones that are healthier both for people and for the environment.

References
A multiscale analysis of the EKC for Energy and for CO2
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Building on a previous piece of research (Luzzati, Orsini 2009), this paper re-examines the environmental Kuznets’ curve hypothesis (EKC) both for total primary energy supply and CO2 emissions and for the period 1971-2014.

The following are the distinctive traits of this paper.
1) It investigates the EKC by (a) using both parametric and semi-parametric methods, and (b) analysing different levels, that is, the whole panel (142 countries), a sub-sample of it which excludes potential outliers, the world as a whole, and country patterns.
2) Differently from standard analysis, CO2 and energy are taken in absolute rather than in per capita terms. The reason for this choice is that sustainability is about absolute rather than per capita emissions. Moreover, this is consistent with the standard EKC narrative. Our findings confirm the importance of robustness exercises, supporting the idea that the evidence in favour of energy and/or CO2 EKC, if any, is a statistical artefact.

Keywords: Environmental Kuznets Curve, CO2, semi-parametric estimates, robustness

LONG ABSTRACT
The environmental Kuznets curve (EKC) debate started in the 1990s and is still very much alive. Its mixed results are due to the multifaceted nature of the issue and to the research strategies adopted. Indeed, criticism has often been levelled at the scant attention paid to robustness (e.g. Stern, 2004). Several facets of robustness have been investigated, for instance by applying non-parametric methods (e.g. Bertinelli and Strobl, 2005; Azomahou et al., 2006), by comparing alternative datasets and different parametric setups (Galeotti et al., 2006a), and by testing for series stationarity (Galeotti et al., 2006b).

Our robustness exercise involves both comparison between parametric and non-parametric methods, and the validation of cross-country findings by looking at other levels of analysis (i.e. the world as a single country and individual countries). This should mitigate the risk of statistical artefacts arising from pooling heterogeneous country patterns.

Another innovative element is that we take emissions in absolute rather than per capita terms. This is required for empirical analysis to be consistent with the EKC hypothesis according to which “higher levels of development [...] will result in levelling off and gradual decline of environmental degradation” (Panayotou, 1993, 1). While theoretical contributions take environmental degradation in absolute terms, the empirical EKC literature has focused on per capita terms. However, as far as ‘Nature’ is concerned, what matters is total human pressure and not per capita pressure.

Following the original narrative, we investigate a reduced form in which only per capita income is taken as ‘explanatory’ variable (Azomahou et al. 2006, 1348); in other words, we do not look for the anthropogenic drivers of environmental degradation, which would entail modelling the structural linkages explicitly. We apply our analysis strategy to total primary energy supply and to CO2 emissions. We take the annual observations for the period 1971-2014 for 142 countries, as published by the International Energy Agency, and freely available online as “CO2 Highlights”. After checking for the order of integration of the series, we followed a standard EKC regression model, Yit=αi+g(percapitaGDPit)+εit

where Y is either TPES or CO2 and αi are country-specific intercepts capturing differences that are independent of income.

As a first step we investigate the EKC hypothesis at the world level. This allows excluding effects from shifting “dirty” productions from rich to poor countries.
We move to panel data analysis. A semi-parametric approach, which allows the fit to be a non-linear function of the regressors (we use the MGCV package for R, Wood 2006), suggest to us a cubic specification for the parametric estimate. Following the Hausman test we specify ai as fixed effects. Autocorrelation and heteroskedasticity are checked respectively by the test discussed in Wooldridge (2002,282) and by a likelihood ratio test. We fit our model by using feasible generalized least squares (FGLS). Series stationarity was checked by running the tests developed by Levin, Lin and Chu (2002) and by Im, Pesaran, and Shin (2003). Finally, we check for group differences by pooling countries according to their income: low, middle, and high.

The lack of any evidence for an inverted-U relationship is so clear that there is no need for any econometrics. Nonetheless we perform some co integration analysis that confirms such intuition. Finally we look at country level, since this is viewed as appropriate by several scholars, such as De Bruyn and Heintz (1999,671-672) and Stern et al. (1996,1159). Visual inspection of the scatter plots of income vs. CO2 and vs energy show a strong (i) heterogeneity of patterns, (ii) few cases of inverted-U or decreasing curve. For those countries we perform a cointegration analysis. We hope that our exercise will contribute to the idea that a robustness check, at different levels of analysis and with different methods, helps reducing the perils of statistical artefacts implied in cross-country analysis.

References
From pledge to practical implementation: How to organise stakeholder integration in scenario development

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Problem statement
There is an increasing request to integrate practical knowledge of stakeholders into research activities with the realm of ecological economics. These claims are made by stakeholder groups (e.g. NGOs, practitioners), funding organisations as well as the scientific community itself. Major arguments in favor of stakeholder participation are i) to foster stakeholder driven research questions and thereby increase “value for money” to the society, ii) to increase mutual understanding and allow for knowledge exchange and multi-actor learning, and to iii) facilitate knowledge distribution by utilizing stakeholder communication networks. In ecosystem services and biodiversity research, Young et al. (2012) show that the involvement of stakeholders in developing and implementing management plans is positively related with increased understanding of biodiversity conservation initiatives. Especially for effectively addressing ecosystem services in policy making “interests of all stakeholder groups” have to be considered (Hauck et al. 2013: 20). Another positive effect of stakeholder involvement, especially for research projects, is that the scientific outcome gains legitimacy when “stakeholders' divergent values and beliefs” are recognized (Cash et al. 2003: 8086). On the other hand, stakeholder integration comes with challenges: especially public participation poses many obstacles. For example, increasing demands from research projects but also planning processes may overburden even professionals and can cause stakeholder fatigue (Durham et al. 2014). But also time and resource constraints limit the ability of designing such processes. Conflicts may emerge between stakeholder demands in a research project and those of scientists with respect to publication opportunities.

In this presentation, we tackle some of the challenges highlighted above by i) designing a process in ecosystem services and biodiversity research that tries to serve stakeholders knowledge demand while at the same time utilizes their practical experiences to improve research results and ii) critically reviewing the opportunities and challenges emerging from this cooperation. A stakeholder engagement process for defining land use scenarios serves as an example.

Concept and methodology
Our analysis is part of the BiodivERsA research project TALE (“Towards multifunctional agricultural landscapes in Europe: Assessing and governing synergies between food production, biodiversity, and ecosystem services”). In TALE five case study areas represent the diversity of Europe's landscapes and socio-economic conditions (Spain, Germany, Austria, The Netherlands and Switzerland). Land use scenarios in TALE shall describe contrasting development pathways under either land sharing or land sparing or in balancing both strategies (e.g. farm-level land sharing, local sharing and regional land sparing) to inform model building and policy recommendations. Land use scenarios in TALE describe case study specific alternative states of future land use and its corresponding framework conditions (i.e. land use drivers). Comparative local scenarios shall be developed based on global and European storylines. The scenario concept includes two major steps that both require stakeholder involvement: i) the development of storylines, and ii) the development of case study specific explorative land use scenarios along the common storylines.

Results and lessons learnt
The paper presents the design of the scenario process by explicitly outlining the stakeholder concept and critically reflecting it behind the background of the practical experiences made during the stakeholder integration process. As such, the paper contributes to the discussion on stakeholder integration and its results could be used as guideline for similar studies. Some of the lessons learnt and
recommendations from the application of the scenario concept are the following. First, there is a trade-off when the same procedures are applied in all case studies. The procedures are required to make case study scenarios comparable, but it reduces freedom of implementing stakeholder processes, and as such limits the options in the case studies to react to stakeholder requirements. Second, discussing ecosystem services outside the academic sphere is challenging and the question arises how to translate the concept of ecosystem services to be understood by all stakeholder and avoid being earmarked as too academic? Third, stakeholder fatigue seems to be widespread already. Hence the concept builds upon two smaller stakeholder groups, one to support the development of storylines and the other to define the scenarios. This approach limited the effort and time each stakeholder had to spend on the project. Furthermore it utilizes the different spatial scales (regional or national), the stakeholders are familiar with.

To conclude, a thorough planning of the stakeholder process, such as achieved in TALE, reduces biases during stakeholder selection and invitation. It allows to better communicate process objectives and finally to compare outcomes across different case studies. However, it is unclear so far whether stakeholders can better gain from participation and whether this can limit the emerging problem of stakeholder fatigue in empirical research on ecosystem services and biodiversity, which are typical to ecological economics.

References

What Types of Environmental Conflicts Emerge from the Impact of Land Use Changes on Cultural Agroecosystem Services— A Literature Review
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Agroecosystems are the result of the complex interaction between ecosystems and societies (Aretano et al., 2013; Robbins et al., 2014). Beside provisional, supporting and regulating ecosystem services (ES), they provide cultural ecosystem services (CES) (Nieto-Romero et al., 2014; Pretty, 2008; Swinton et al., 2007; Zhang et al., 2007). Today however, agroecosystems undergo changes due to socioeconomic and sociopolitical drivers (Pedroli et al., 2016). These drives are the outcome of a complex economic, policy, institutional and market forces (Munteanu et al., 2014; Zorrilla-Miras et al., 2014). Land use and land management towards the intensive agriculture that rely on chemical fertilisers and pesticides as a means of managing agroecosystems (Munteanu et al., 2014; Zorrilla-Miras et al., 2014). They represent one of the major causes of global environmental change and ecosystem service degradation that have immediate and strong effects on agriculture (Fondevilla et al., 2016; Metzger et al., 2006; Van Berkel and Verburg, 2014). Since environment and culture are closely connected, those changes in agricultural lands are noticeably affecting cultural systems (Ribeiro Palacios et al., 2013).
ES in agriculture have progressively captured researchers’ interest (Calvet-Mir et al., 2012; Milcu et al., 2013), particularly within the ecological economics community (Calvet-Mir et al., 2012; Kenter et al., 2015; Kirchner et al., 2015). Still, CES remain poorly investigated in comparison to other categories (Chan et al., 2012). They have consequently been invisible in agroecosystems planning and management (Barrena et al., 2014). It is argued that the existing studies based on economic valuations leave unnoticed one important fact, and that is the relationship people have with their environment (Ruoso et al., 2015; Zhang et al., 2015). Cultural values are difficult to express in monetary terms, and therefore they are often excluded from ES assessments (Van Den Belt and Blake, 2014). The relationship between agricultural revenues or cultural services is more complex than contingent valuations can indicate (Ruijs et al., 2013). In this respect, Carrasco et al., (2014) argue how CES of a community cannot be captured by economic analyses alone.

Here it comes the issue of power, environmental justice and environmental conflicts. Across the globe, competition for land is higher than ever (Cristina et al., 2012). Along with these trends, environmental conflicts emerge between stakeholders with different interests in land areas (Svampa, 2015). Environment is a primary source of livelihood for poor rural populations, whose values, interests and participation are often marginalized and neglected (Martinez-Alier, 2014). Equity is one of the most important element in the ES management (Pascual et al., 2010; Corbera et al., 2007). Therefore, close attention on conflicts regarding ES may clarify cultural narratives, issues in power distribution, and existing institutional barriers for sustainable management (Kull et al., 2015; Breslow, 2014).

With this in mind, this paper focuses on a systematic review of CES that agroecosystems provide, with the aim of categorizing and analyzing the conflicts related to CES delivered by agroecosystems, and triggered by land use-management changes.

After a careful selection, we included 159 peer-reviewed articles produced between 2003 and 2016, with empirical data from 81 countries. Through consistent coding, we identified 19 main land use and land management (LULM) categories taking place in agriculture. Urbanization and industrialization, agricultural intensification, water and land pollution and related overuse and degradation are the main ones, and they have tended to increase significantly since year 2011. Meanwhile, the increase of agricultural expansion and monocultures drew more the attention of researchers only after 2012. Land abandonment and, to a lesser degree, conservation, have also increased markedly since 2012.

Twenty main categories of CES and their subcategories delivered by agroecosystems were identified. Those results suggest the rich variety of CES involved in agroecosystems. Than we explored their interrelations through network analysis that confirmed the variegated interconnection of CES in agriculture, with heritage as a core element. We observed that traditional agricultural practices significantly relate to cultural identity, which are directly connected to the history of the place, being this human history or natural history. Those later are interested and transmitted across generations. Furthermore, food production plays an important role in celebrations, and agricultural and rural identity, manifested in traditional clothing and symbolic practices.

Through the review, we traced three different stages that, together, configure each conflict: the causes of the conflicts, their effects or outcomes and the ensuing responses. We identified 12 types of causes, 15 types of outcomes, and 10 types of responses of conflicts related to the transformations in land use and CES.

Each cause, or a combination of them, accompanies a land use change that eventually entails negative effects for some actors. The most frequent process the literature refers to is the undervaluation of CES through the dominance of metric-based valuations, in which non-commodity values remain invisible when land-use change decisions are made.

The three most frequent outcomes of the conflicts addressed are the exclusion of vulnerable groups from decision making; the cultural, economic, and environmental value loss; and the loss of previously existing forms of natural resource use (land, water, forests). The different forms of exclusion are related to either environmental management, policy making or participation in scientific research.

When those types of negative outcomes appear, people do not remain passive and the literature reports this as well. The results showed that responses can be manifested as mobilization and resistance, but also through enhanced participation or trough interdisciplinary research, government
support or relationship with NGO. Or by including socio-cultural significance in economic activities and multifunctionality promotion. In some cases tradition itself is mobilized in the resistance, through the defence of traditional cultivation, cultural and symbolic practices, or collective resource ownership, as well as resistance to state authority, including protests.

Finally, we analysed the interrelation between LUMC, CES and environmental conflicts. From the results obtained we showed how a particular LUMC type, for example agricultural intensification, has an impact on specific CES category, and the type of causes, outcomes, and responses of environmental conflicts emerge from that. A comprehensive map of what the literature has unveiled so far in relation to the effects of major LULM changes in agriculture on CES and related conflicts is presented.

The results are finally discussed in the context of former contributions on CES research. We highlighting the relevance of including conflicts into CES research, and the need to better understand existing power asymmetries among stakeholders. Such asymmetries generate, not only manifested, but also latent conflicts around CES that should be further recognised and explored (Plieninger et al., 2015).

Is there a golden mean for economic valuation of ecosystem services? An example of forest ecosystem services valuation

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The concept of ecosystem services (ESs) has become one of the main concepts driving biodiversity policies and related research in the last decade. According to EU’s biodiversity policy 2011-2020 member states need to assess the economic value of services provided by ecosystems in their territory and promote the integration of these values into accounting and reporting systems. While biodiversity policies ask for economic valuation of ESs, it has been a topic of constant debate not only between environmental and ecological economists but within the ecological economic circles as well (see e.g. Norgaard, 2010; Gómez-Baggethun and Ruiz-Pérez 2011; Kovács et al., 2011; Costanza et al., 2014).

In this paper we would like to join this debate through the example of forest management, by comparing the nature-oriented, continuous cover forest management (CCF) to the traditional rotation forest management (RFM). We use the categorisation applied in Millennium Ecosystem Assessment (MEA, 2003, 2005) for forest ESs, so provisioning, cultural, regulating and supporting services are distinguished. In this paper we provide a critical and reflective perspective on the ES approach itself as a decision making tool for nature conservation policy by highlighting some trade-offs and points of the debate in the field. By doing so, we show how the economic valuation of forest ESs poses a challenge from an ecological economics perspective.

This paper is based on the findings of our study carried out in 2015 within a LIFE project aiming to summarize the international and Hungarian economic and environmental economic literature and the background knowledge of the practitioner communities in the field related to the Natura 2000 forests. It served as a background study for the communication with and training of forest owners and users operating at Natura 2000 sites. Our main goal was to test the applicability of the ES concept as transformative science and advocacy of change in the forest management in order to integrate nature conservation goals. Besides the review of the international literature on the economic valuation of forest ESs, in our empirical work we followed an interdisciplinary and inclusive approach by engaging a wide range of professionals in the debate (involving forest managers, nature biologists, botanists, game managers) both from the academic and practitioner communities. We organized two workshops and six interviews to better understand the reflections of forest experts on the ES concept and their view on the relationships and trade-offs between forest ESs as a prerequisite for economic valuation.
As a critical reflection on the ES concept, the related economic valuation and its applicability in the forest management context, we present some open questions and dilemmas based on the findings of this study:

• complexity of forest ecosystems and complex relationships between ESs within an ecosystem (problem of double counting, bundling and trade-offs of ESs);
• complexity of social-economic systems, where forest ESs are enjoyed and evaluated;
• complex relationships between the ecological and social-economic systems;
• scale problems: different forest ESs are enjoyed at different scales;
• different visibility of different forest ESs (e.g. timber production as a provisioning service is usually straightforward and easy to value, however translating regulating services in monetary terms is very difficult in some cases);
• dynamic processes within forest ecosystems, while economics has a more static view;
• marginal value concept of economics, while changes in forest ecosystems are usually not marginal (e.g. threshold);
• uncertainties within the operation of forest ecosystems;
• methodological problems (discounting, summing up values of forest ESs for an ecosystem measured with different valuation methods, methodological problems of each method);
• lack of statistical data, (in the international scientific literature there are quite many examples for the economic valuation of some ESs – e.g. watershed services, carbon sequestration, recreation – while some services are not represented well – e.g. protection against noise or inspiration for art; those ESs that are exchanged in the market can be evaluated much easier than those which have no market value);
• ethical problems (citizens vs. customers, threat of the commodification of nature, distributive issues and justice).

In order to increase the benefits of the economic valuation of forest ecosystems, some of our recommendations are the followings:

• main goal of valuation, system boundaries (ecosystems, social and economic systems) and scale need to be well defined, relationships between forest ESs, especially trade-offs should be assessed economic valuation can be better grounded as a part of an integrated valuation (using e.g. the cascade model: ecosystem-ecosystem functions-ESs-well-being, combination of ecological, socio-cultural and economic valuation)
• discussions and cooperation with natural and other social scientists, different stakeholders, incl. policy makers (inter- and transdisciplinary approach) are needed in all steps
• results need to be critically reflected on (e.g. scope of usage, distributive issues, justice, limitations

Agreeing with the numerous conceptual and practical challenges of the economic valuation of forest ESs, it still can be argued that its careful and prudent application – based on an interdisciplinary, participative and empowering approach – can be beneficial for nature conservation and forest management policy making.

References:
Smartphone enabled social change: evidence from the Fairphone case?
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1
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Highlights
- Structural equation modeling is conducted
- This paper provides a theory of Lifestyle Movements
- Sustainable Consumption of Smartphones is possible

1. Introduction

From their introduction in the 1990s, smartphones are one of the fastest growing new technologies. It is estimated that their number will increase to more than 2.5 billion in 2018 – a third of the world’s population (Curtis, 2014). One of the most important features of smartphones is the Internet connection that enables users to have connectivity independently of time and place, used for a multitude of reasons, including communication, entertainment, searching for information, connecting to social networks, downloading data and much more (Anshari and Alas, 2015, p. 1). Consumers demand for a wide range of innovation for these services as smartphones have evolved to an extent where they are indispensable of daily life activities.

This rapid growth of smartphone market causes enormous challenges for sustainable development. For instance, the rising demands for innovation are leading to a product turnover, which is much higher compared to other electronic devices with an ever-shorter lifespan of approximately 12 months (Paiano et al., 2013). This causes a massive amount of e-waste and an ever increasing consumption of resources (Zhang et al., 2012) as well as rapidly intensifying social and environmental problems (Fishbein, 2002; Wernink and Strahl, 2015), which primarily occur outside the northern consumption centers (Mont et al., 2014).

To counteract these developments changes in consumption behavior in general and sustainable innovation in both process and product developments along with reforms of contemporary consumer culture are required (Petridis et al., 2015). These aspects are part of the degrowth movement, proposing an economy that is kept within ecological limits of the flow of materials and energy (Schneider et al., 2010). Apart from necessary shifts in technologies and policies, sustainable economies contradict mainstream economic thinking demanding social innovation and civil engagement (Lorek and Spangenberg, 2014).

What is surprising is that very little research on degrowth has explored the interaction of sustainable consumption, social movements, technology in general and smartphones in particular. Despite research that connects social movement research and consumer studies (e.g. Cherry, 2015; Dubuisson-Quellier, 2015; Haenfler et al., 2012; Wahlen and Laamanen, 2015) and social movement organization associated with the development of communication technologies in general (Rolf, 2005) and the evolution of communication and information technology (ICT) in particular (e.g. Borrero et al., 2014; Sandoval-Almazan and Gil-Garcia, 2014) the connecting to degrowth remains vague (Kerschner and Ehlers, 2016). This might be justified by the fact that in comparison to food industry, where label schemes such as Fair Trade, organic labels and many others are already common today, electronic industry remains within traditional production and distribution strategies, making it hard to refer to any empirical case. One of such rare examples is the Fairphone, a smartphone, co-developed by designers and consumers, considering the whole supply chain according to sustainability goals. This paper contributes to this new area of research by proposing and testing a theoretical conceptual model of the influence of alternative consumption, sustainable lifestyle and social commitment on the involvement with Fairphone. This approach allows conclusions on the different factors to predict...
sustainable consumption within the smartphone industry as a possible leverage point towards degrowth. Drawing on lifestyle movements, as consumption oriented and lifestyle centered phenomena targeting consumer culture, this study offers new theoretical perspectives. The case of Fairphone, as an example for technology of utmost importance for daily life, provides new empirical insights to the degrowth debate.

2. Background

2.1. What is Degrowth?

The origin of the degrowth concept can be dated back to the 1970s and describes a socio-economic path within environmental limits (Demaria et al., 2013). It assumes a crisis of the capitalist system given the increasing occurrence of environmental and social hazards. This follows an understanding of the hegemonic growth paradigm as foredoomed simply due to the limitation of natural resources needed for an ever-running production economy. Societal responses to these problems call for instance for modified consumption behavior (Laamanen et al., 2015, p. 460). As shown in table 1, degrowth is comprised of different ideas, approaches, and ideologies and can be regarded as a “concept in the making”, without any dominant definition (Petridis et al., 2015; Martínez-Alier et al., 2010; Ott, 2012) yet possible to summarize in seven different clusters.

Within the seven clusters at least two similarities are observed: First, degrowth is a transition process, primarily in regard to the downsizing of production and consumption in respect to ecological limits and an increase in human well-being (Schneider et al., 2010). Second, degrowth requires a shift of values and attitudes, as contemporary systems are characterized not only by a growth economy, but also by a growth society (Latouche, 2009). Both pillars highlight the urgent need to dissolve current consumption patterns by fundamental changes in behavior (Muraca, 2013).

What remains ambiguous in these considerations is the role of technology: it might (1) produce more environmental impact, while (2) render positive behaviors and new economic dynamics. The former connects technology strongly to the growth paradigm as improvements in eco-efficiency will lead to a redistribution of resources from less intensive technologies to more consumption of these. This rebound effect hinders any progress towards sustainability connected with technology (Fournier, 2008, p. 532). The latter in contrast, views technology as a promise to combat negative effects of mass-consumption as an enabler of greener alternatives (Bengtsson and Ågerfalk, 2011). New technological developments in this perception, especially ICT, maybe linked both to system transformations (e.g. form of sharing economy; Belk, 2014) and to new forms of political participation (Borrero et al., 2014; Sandoval-Almazan and Gil-Garcia, 2014) as well as reduced environmental impact (e.g. through energy savings; Pitt et al., 2011). Table 1 combines these arguments to the seven degrowth cluster.

Table 1

<table>
<thead>
<tr>
<th>Concerns Degrowth</th>
<th>Technology</th>
</tr>
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<tbody>
<tr>
<td>Anthropological Radical critique on Homo Oeconomicus</td>
<td>Visions of economic relations based on sharing, gifts and reciprocity;</td>
</tr>
<tr>
<td>Decoupling GDP from quality of life Technology as chance for new economic dynamics and as challenge in regard to a decoupling from growth paradigm</td>
<td></td>
</tr>
<tr>
<td>Participatory Democracy Concern over lack of democratic debate on economic development, growth, technology innovation and advancement;</td>
<td></td>
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<tr>
<td>Autonomy and self-limitation Technology offers new forms of political participation</td>
<td></td>
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<tr>
<td>Equity Environmental justice;</td>
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<tr>
<td>Critique of social inequality and, post-colonialism Critics on technological innovation in favor of wealthy west on account of southern nations</td>
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<tr>
<td>Ecology Questions of human hegemony over nature</td>
<td></td>
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<tr>
<td>Ecological economics based on internalization of ecological cost (ecosystem has value in itself)</td>
<td></td>
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<tr>
<td>Decoupling ecological impacts from economic growth;</td>
<td></td>
</tr>
<tr>
<td>Environment as commonly cared for and shared Technology offers sustainable alternatives but also produces environmental damage</td>
<td></td>
</tr>
<tr>
<td>Social Metabolism Keeping flow of materials and energy within ecological limits;</td>
<td></td>
</tr>
</tbody>
</table>
Steady state economy
Questioning technological innovation as solution

Biophysical limits to technology development

Culture
Decreasing meaning of “industrial civilization”;
Calls for a counter culture: de-commodification, new imageries of human, simplification of life
Social change as determined and/or independent of technological developments
Transformation
Replacing modes of production and distribution as current system is reason for bad development outcomes
Technology enables evolution of a new system comprised of social and environmental friendly values.

Compiled from (Demaria et al., 2013; Kallis, 2011; Kerschner and Ehlers, 2016; Muraca, 2013; Ott, 2012; Petridis et al., 2015; Schneider et al., 2010).
This study considers technology as an enabler of a downscaling of production and consumption in regard to ecological and social limits as it offers eco-efficient solutions. It further, considers social change as determined by technological development, hence new behaviors will occur due to the evolution of technology that will lead towards degrowth. Moreover, degrowth, will be considered as a movement that includes collective action to confront major parts of the society with citizen-based initiatives enhancing sustainability (Della Porta and Diani, 2006; Demaria et al., 2013; Petridis et al., 2015), which is enabled by technological innovation, especially the distribution of ICT.
New technologies have been adopted incessantly, to transport movement ideas and ideologies, to organize activities and to mobilize the public (Rolfe, 2005). In the context of degrowth ICT facilitate a dissemination of strategies at local, global and inter-levels, and between different groups, like scientists and citizens (see for example degrowth.de). Degrowth strategies are positioned between radical and moderate ideologies. They range from opposition activism towards the development of alternatives to institutions and practices defining the current system and reformist actions

Operationalising the concept of planetary boundaries

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The Planetary Boundaries framework (Rockström et al. 2009; Steffen et al. 2015) defines a set of biophysical boundaries, based on insights in Earth system science, that mark out a global ‘safe operating space’ for human activities and development. The concept has been influential in international policy discourse on global sustainability. For example, the United Nations 2030 Agenda for Sustainable Development and adapted Sustainable Development Goals recognize the importance of all the nine biophysical processes.

Decisions in natural resource management are usually not made at the global level but by decision makers at national or regional governments, businesses and other local actors. Therefore, the planetary boundaries need to be translated from their global viewpoint to these decision making levels.

In this contribution, based on Häyhä et al. (2016), a new framework for translating planetary boundaries to national or regional level limits is proposed. This includes a three-step approach based on 1) assessing the spatial characteristics of the biophysical planetary boundaries, 2) analysing their global socio-economic dynamics, and 3) addressing equity and fairness. These steps (or dimensions) correspond usefully to the three basic goals in Ecological Economics: sustainable scale of the economy, equitable distribution and efficient allocation (Daly, 1992).

The first step to translating the planetary boundaries to national implementation is to analyse the spatial patterns of these dynamic Earth system processes, using Earth system models and observational data. The second step includes analysis of the dynamics of social and economic drivers of environmental change. International trade is particularly important because it makes a geographic separation between the causes and the impacts of environmental degradation, allowing importing countries to externalize environmental impact of their consumption. The third step recognizes that
these complex interacting ecological and social dynamics also have an ethical dimension. Understanding connections of environmental and social systems cannot on its own resolve the dilemmas of fair implementation in decision making. Equitable sharing of the global safe operating space means recognizing that countries have different rights, abilities and responsibilities regarding development and global sustainability.

Possible approaches and tools for addressing each of the dimensions are discussed, as well as techniques that can help bridge across the three dimensions and scales.

References:

A Structural Analysis of the Direct and Indirect Rebound Effects in Residential Heating
Cécile Hediger

Overview
Promoting energy efficiency is the first pillar of the energy strategy 2050 in Switzerland, with buildings and heating systems being one major target. Yet the available empirical literature provide no conclusive result about the households’ responses to such improvements, i.e. “rebound effects”. There is a great discrepancy in the reported estimates of rebound effects. More importantly, most available studies are reduced-form analyses that do not account for endogeneity biases. Finally, there are few studies that have addressed the micro-level direct and indirect rebound responses together. Focusing on residential heating, we study how the households react to a gain in energy efficiency. They may adapt (increase) their demand because the relative price of the energy service has diminished thanks to the efficiency gains. An increased demand for the heating service is the direct rebound effect, while the indirect rebound effect is the impact on the energy requirement embodied in the consumption of all other goods and services. Both effects take back some of the global energy savings initially expected. As efficiency is seen as a key tool to decrease our energy consumption and in turn our CO2 emissions, a reliable estimation of rebound effects is crucial for energy policy.

The aim of this paper is to estimate the rebound effects with a cross-sectional data from Switzerland. The econometric model accounts for the simultaneity of the household decision in adopting the efficiency level and its demand for energy services. We also analyze the variation in rebound responses according to a selection of socio-economic characteristics, in order to explore deeper the mechanisms and motives underlying the rebound effects. The results will be also used to assess the validity of a preliminary estimation of rebound effects using a hypothetical choice experiment, reported in a previous study by these authors. The two complementary studies will provide important insights as to whether and how stated preferences methods could be used to elicit micro-level rebound responses in a reliable manner.
Methods

The dataset is a cross-section of about 3,500 Swiss households with various variables on energy consumption at the household level, including variables on the heating system and the heating bill. This survey had a follow-up survey with a variety of socio-economic variables as well as some psychological and sociological items.

An important challenge to identify correctly the rebound effects is the possible endogeneity of the adopted efficiency improvement. The selection of intensive users to higher efficiency levels could bias the estimates of the direct rebound effect. To the extent that the household’s efficiency investment and its consumption of all goods and services are a result of simultaneous decisions, any reduced regression model that includes the adopted efficiency level as an explanatory variable, is subject to endogeneity bias. This implies that an adequate modeling of indirect rebound effects should account for endogeneity as well. In other words, the efficiency of the technology depends in part on the preferred service level. The idea is that if someone values highly his heating comfort (with for example a high indoor temperature), he will probably choose a house with an efficient heating system to diminish the operating costs. In this case the OLS estimate of the direct rebound effect could be biased. To take into account this bias, we use a simultaneous equations model that is estimated by the 3SLS method:

\[
\ln(\text{heating efficiency}) = f (\text{heating costs and household characteristics})
\]

\[
\ln(\text{heating costs}) = g (\text{heating efficiency and household characteristics})
\]

\[
\ln(\text{embodied energy of a selection of consumption goods}) = h (\text{heating efficiency and household characteristics})
\]

The direct rebound effect is calculated through the elasticity of heating costs with respect to heating efficiency. The last equation captures the indirect rebound effect: with a more efficient heating system, you will save some money on your heating bill, and use this money to purchase goods or services. As any product and service requires energy to be created and used (embodied energy), the overall energy consumption will decrease by less than the amount predicted by the renovation of your heating system, even in the absence of any direct rebound effect.

Results

A first analysis using stated preferences gives on average a direct rebound effect of 12% and an indirect rebound effect of 25%. It means that about one third of the expected energy savings after an improvement of the efficiency of the heating system are lost. A strong heterogeneity exists among household, with about half of them showing no direct rebound effect. With the system of equations we will test if the results are consistent using revealed data.

Conclusions

Knowing the magnitude of rebound effects for residential heating is important to plan and forecast correctly the effects of energy transition policies in this sector. We show that about one third of the expected energy savings are lost after an efficiency gain. Fortunately a third is far from the backfire situation (a rebound effect of more than 100%), a counterproductive situation in which the households end up using more energy after the efficiency improvement than before.

References


Energy access and pathways in the developing world: Case study – Ghana
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Ensuring “access to affordable, reliable, sustainable, and modern energy for all” is an important issue of our time, the 7th of 17 sustainable development goals (United Nations, 2015). On the one hand, there is a desire for economic and human development, which can be driven by increased consumption of inexpensive fossil fuels. On the other, the climate mitigation imperative requires reducing the consumption of those same fossil fuels. A starting point for reconciling this potential conflict is to gain a deeper understanding of societal energy pathways and options for future access to energy services. One emerging method for gaining such understanding is societal exergy analysis. Exergy is the thermodynamic maximum amount of physical work that can be extracted from any form of energy (e.g. mechanical work extracted from a barrel of oil). Exergy can be estimated at different stages of a societal energy pathway (primary, final, or useful), and it provides a thermodynamic basis for quantifying efficiency.

Several societal exergy studies have been performed in the last 15 years, starting with industrialized countries (US, UK, Japan, and Austria), and more recently extending to Portugal and China. Promising insights from this literature include deeper understanding of how and why energy drives economic growth and societal development (Ayres and Warr, 2010), nuanced projections of future energy demand (Brockway et al. 2015), and links between energy and economic growth (Santos et al., 2016). A result that motivates the present work is that China’s societal exergy time series (Brockway et al., 2015) is very different from those of industrialised nations, suggesting that (a) developing nations may have different exergy consumption patterns compared to developed nations and (b) there is a need to create exergy time series for additional developing nations. However, to date the developing world has been largely overlooked by societal exergy analysis.

In response, we construct a societal exergy time series (1971–2013) for Ghana. The first step is to collate primary energy data (e.g., coal, oil, and natural gas) and final energy data (e.g., refined gas, electricity, petrol, and food). Sources include the International Energy Agency (IEA), the UN’s Food and Agriculture Organization (FAO), and national surveys and censuses. Second, final energy is allocated to four key categories of end-use applications: heat (low, medium, and high temperature), mechanical drive (stationary motors and transport), electrical (appliances and other devices), and muscle work (human and animal). The third step is to estimate time series of device-level exergy efficiencies for machines (e.g., automobile engines, cook stoves, and light fixtures) that convert final energy into useful energy, which is then exchanged for energy services (e.g., motion, sustenance, illumination, thermal comfort). Last, the energy and efficiency datasets (from steps 1 to 3) are used to estimate time series exergy use at primary, final and useful stages, and an overall time series of country-level primary-to-useful exergy efficiency.

Input-Output (IO) analysis techniques from economics are applied to societal exergy accounting for the first time in this case study. The IO approach has several advantages over previous methods, including (1) the provision of a more consistent nomenclature and analytical framework, (2) reducing computational burden and chances for computational error (via efficient and elegant matrix mathematics), and (3) paving the way for future multi-region societal exergy analysis, including trade flows of energy and exergy.
From our analysis, we highlight three key results. First, Ghana’s overall useful exergy consumption rose 4-fold in this 42 year period. This gain in useful exergy was delivered by 3-fold rise in primary exergy inputs and a 1.33-fold gain in primary-to-useful exergetic efficiency. In contrast, China in the same period had a 10-fold useful exergy increase provided by a 4-fold primary exergy increase and a 2.5-fold exergy efficiency gain (Brockway et al., 2015).

Second, Ghana’s primary-to-useful exergetic efficiency is low (~5%) compared to other nations (typically 10–15%) (Brockway et al., 2014 & 2015). However, Ghana’s efficiency is aligned with China’s in the 1970’s, prior to its industrialization. This result may indicate that exergetic efficiency correlates with economic development. The relatively small increase in Ghana’s primary-to-useful efficiency was due to declining primary-to-final efficiency (as high-efficiency hydroelectricity occupied a decreasing proportion of electricity supply) that largely cancelled gains in device-level final-to-useful efficiency. These opposing trends may continue, because (a) the proportion of electricity from hydropower will decline further as Ghana’s economy grows and (b) the transition to high-efficiency fuels for cooking and water heating brings increased health and safety.

Third, a precipitous decline in industrial activity during years of military coups and political upheaval (1981–1984) caused a noticeable decline in overall exergetic efficiency, because low-efficiency fuels for cooking and water heating comprised a larger proportion of total energy consumption during those years.

These results have key implications for future societal energy needs. If Ayres and Warr (2010) are correct that useful exergy is the driver of economic growth, policies that increase overall exergetic efficiency may be an important strategy for attaining important economic and human development goals without compromising CO2 emissions targets in the face of energy constraints. This is because such a strategy would enable more energy to be delivered to the useful stage (thereby increasing access to energy services), whilst stabilising (or reducing) energy requirements at primary and final stages. In that context, Ghana’s opposing trends of decreasing primary-to-final exergetic efficiency and increasing final-to-useful exergetic efficiency are striking. If human and economic development are correlated with overall exergetic efficiency, declining primary-to-final efficiency becomes an impediment to achieving human development targets. And if rising electricity demand is satisfied by low-efficiency, carbon-intensive primary energy sources, the barriers to improved overall exergetic efficiency and human development will remain strong, despite increasing machine efficiencies and the cooking fuel transition. Ghana’s energy pathway is at a crossroads.

References

Governmentality in evidence: epistemic forest governance in biodiversity-era in Finland and Peru
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The 1992 Earth Summit in Rio de Janeiro marked the beginning for a new era of global biodiversity concern. Since then, the needs to address effectiveness, sustainability and fairness of environmental and resource policies have become increasingly intertwined in governance reforms. This has challenged not only the policy planners and implementers but also the scientific and expert communities expected to justify the policy relevance of particular forms of scientific knowledge and the operational applicability of scientific evidence.

Public policy goals and the means to achieve these goals are shaped and shared by the habits of those in position of planning policies and making decisions (Hiedanpää & Bromley 2016). Soundness of scientific advise rests on the given governance structures and their evidence requirements, i.e. ideological orientations and paradigms. In relation to this, Haas (1992) has introduced the concept of epistemic community to communicate the interconnectedness of social and scientific habits and paradigms. An epistemic community is a network of scientists and other experts with recognized knowledge and skill in a particular issue-area. Such community shares a set of core beliefs about knowledge and its uses in policy planning (Haas 1992). Hence, epistemic communities are constitutive in policy formulation and implementation. This is an integral part of governmentality, i.e. the art of governing through an assemblage of principles and rationalities employed by a particular government (Dean 2010).

Our main attention is on the dynamics of biodiversity-era forest “ecostructures” in two countries, Finland and Peru. We explore how societal ideologies have become entangled with epistemic communities and how these entanglements have contributed to forest-related institutional adjustments. Forest institutions provide a complex context for forest policy and the concrete forest governance and management activities produce their effects in a particular ecostructure. By ecostructure we refer not only to the formal institutional components or informal modes of life conditioning people’s economic opportunity space, as Colander and Kupers (2014) define the concept, but also the particular ecosystem components and ecosystem services (Hiedanpää & Salo, manuscript). The forest ecostructure therefore is a constellation of interwoven human–human (governance-related) and human–nature (management-related) transactions (Hiedanpää et al. 2015; Salo et al. 2014, 30–32).

Our general task is to make sense of the epistemology of the forest ecostructure. We present three research questions concerning both countries: 1) What are the general features of the forest ecostructure? 2) What governance features preordain what knowledge and information are useful and sufficient to be evidence? 3) What has led to changes in these governance features and knowledge practices related to the ecostructure?

We build our analysis on a series of interviews, documents and literature review, and a long experience of forest-related research in both case countries. In Peru, we analyse a total of 30 interviews (19 from the year 2005 and 11 from the year 2016). In Finland, we have some 20 thematic interviews on forest biodiversity policy and management dating from 1995 to 2016. Analysis is still ongoing at the time of the submission date for the ESEE abstracts.

In Finland the forest ecostructure has become under multiple pressures during the studied time-period. Initially, the concern for declining forest biodiversity in intensively managed forests implied important needs for conservation biological evidence. With new economic mechanisms for the protection of biodiversity, this development, however, largely conformed to the traditional protection-use divide – managed forests were predominantly understood as a source of wood whose output was to be maximised. Substantial changes in forest management for improved biodiversity conservation were addressed only later, as exemplified by the new forest law of 2014 that re-allowed continuous cover forest management after almost a hundred years of prohibition. However, the habits of administrative mind change slowly towards the more diverse forest management practices and the recent debates on bioeconomy, particularly the intensive use of forests and the global climate change,
have made the evidence concerning the effectiveness, sustainability and fairness of forest governance and management planning more mixed and contested.

The Peruvian forest ecostructure has been under constant reform during the whole period of analysis. One driving force has been a societal modernization process that has two aims: to conquer the part of the Peruvian territory considered particularly underutilized (Amazonia) and to take into control the social space reigned by informality. By the entering of the biodiversity era, the legacy of state supported “scientific forestry”, as envisioned by important Peruvian forest scientists in and from the 1970s (Dourojeanni 2009), gradually gave way to neoliberal ethos of international sustainable forest management standards, export-led timber industry, strong private property rights, and associated formalization of the sector (Salo et al. 2013). Embedded in the neoliberal project, a political-administrative decentralization has further transferred decision-making to lower levels of governance.

However, this process has suffered from a series of flaws with roots in the insufficient incorporation of the existing forestry praxis in the formal governance structure.

In both countries, the increasing legislative investments in stability of forest ecostructure, the diverse and conflicting set of scientific policy advise and evidence, the introduction of quasi-participatory policy planning processes and the prevalence of underlying biodiversity-threatening administrative-ecological functionings and mechanisms characterize the situation.

The post-Rio forest sector reforms in our case countries have drawn on the sustainable development discourse and biodiversity ethos in one hand and the ideological premises of institutional inertia in the other. Trade-offs in effectiveness, sustainability and fairness goals are in the heart of the studied reform processes. Institutional adjustments support multiple alternative truth-claims characteristic not so much to constructionism and post-modernism but more so to the era of complexity, post-normal science, and so badly misunderstood habits. For some observers this vagueness means value pluralism and pluralism of scientific vantage points and for others it is the evidence of our “post-truth” condition. We see the prevalent ambiguity as a precondition for reconstruction of the science and the philosophy of science the forest governance is based on. In our full paper, we will have an explicit treatment of governmentality of evidence, i.e. why forest administration and science cannot offer clear advise of what needs to be known in order for us to act for society or for nature.

Valuation from a scratch? – Attribute generation for economic and non-economic valuation of ecosystem services

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Introduction

Ecosystem services (ESSs) are fundamental, but not often visible to the public or to the decision makers. Economic valuation methods are commonly used to support decision making by determining the monetary value of ESSs for which market prices do not exist and cannot be indirectly estimated through market data (see e.g. de Groot et al. 2002; Hein et al. 2006). Lately, there have been calls for non-monetary valuation methods, including multi-criteria decision analysis (MCDA).

We compared choice experiment (CE) and multicriteria decision analysis (MCDA) in parallel to valuate peatland ESSs in Finland, with an aim to study the ability of economic and non-economic valuation methods to account for ESSs. We assessed potential effects of different peatland management scenarios, including different levels of conservation or peat production, in the context of the national Supplementary Peatland Conservation Program (SPCP) in Finland.

In valuation studies attribute generation is often poorly reported and lacks rigor and details regarding sampling, data collection and analysis (Armatas et al. 2014). In this paper, we study the challenges of the attribute generation for the CE and MCDA processes. We discuss the similarities and differences, and lessons learnt in attribute generation for the two valuation methods.
Material and methods
The study was framed to the open or sparsely wooded peatlands in Southern Finland. The material included undrained peatlands suitable for peat mining with criteria of being at least 10 hectares. Four policy scenarios until 2050 were formed. The scenarios vary according to the level of protection and on the intensity of the peat production.
One aim of the project was to compare the needs of CE and MCDA for attribute generation, and thus, attribute generation was carried out separately in these. For the CE, the attributes were initially formed on the basis of existing literature on peatlands and the ecosystem services they provide. They were later specified so that they could be presented in the CE questionnaire in a concise yet informative way. The final attributes were, surface water quality, biodiversity, carbon storage, fuel peat production and recreation. In the MDCA process, which was started after the CE study, the attributes were identified with stakeholders involved in the process, resulting in a much longer list of attributes. The list was narrowed down in the second meeting, and in addition to the attributes in the CE study, included, groundwater quantity, other peat products (such as horticultural peat), and yields of cloudberry and cranberry.
Results of attribute generation
The effects of peat extraction and drainage to the total water budget are usually small. Foremost changes in the hydrology of peatland after drainage are altered flowing paths of the water (e.g. Burt 1995, Dunn & Mackay 1996). The changes in runoff were estimated to be between 0 and 0.7% in different scenarios. This lead to the conclusion, that the effect of peat land management scenarios to the flood control is not significant in the study area. Therefore, the flood control was excluded from the final list of attributes in the CE and MCDA analyses.
The effects of scenarios on water quality were estimated based on changes in phosphorus loading in sub catchment scale. The analysis was based on specific loading figures per area for different management options (Kortelainen et al. 2006; Pöyry 2013) and the use of VEMALA loading model (Huttunen et al. 2016). If the phosphorus loading of a sub catchment would increase more than 5 % as a result of peat extraction, then the status of headwater lakes were estimated to be in a risk to worsen. The number of lakes being in a risk of deteriorating status varies between 9 and 105 between the scenarios. For the MCDA qualitative descriptions of natural water purification function of peatlands and effects to downstream fish and shellfish habitats was added.
Groundwater effects were estimated to be small, as only 0.1 % of the area of the peatlands overlap with groundwater areas. Therefore groundwater was excluded from the final list of attributes in the CE. However marginal effects of draining peatlands next to groundwater areas were taken into consideration in MCDA.
The effect of different scenarios to biodiversity was evaluated based on the changes in peatland use in different scenarios and on the inventory data of peatland habitats and species related to SPCP. The attribute levels were descriptive. For the CE short descriptions were used, e.g. the diversity of peatland species will somewhat decrease, decrease significantly or remain in current level. For the MCDA more detailed descriptions were used.
For the climate effects, we analysed the changes of carbon storage under different scenarios. In natural state the peatlands function as carbon sinks, but drainage and peat production changes the carbon flux in the surface of the peatland. In addition use of extracted peat for energy production releases the carbon stored in the peatlands (e.g. Kirkinen et al. 2007). The decrease in the carbon storage varies from 6 to 12 % between the scenarios.
For the peat production the selected attribute was related to the self-sufficiency of Finland in energy production. The share of peat production in the domestic energy production varies from 7 to 13 % between the scenarios.
For recreational effects accessibility analysis to nearest peatland in a natural state was used in CE (see e.g. Ala-Hulkko et al. 2016). The average travel time to nearest peatland in a natural state varied from 16 to 19 minutes between the scenarios. For MCDA more descriptive attribute was formed, describing the possibilities of recreation and nature experiences in natural state peatlands.
Discussion

The prerequisites for attributes in CE and MCDA are similar, as they should be nonredundant, policy
and demand relevant, measurable and limited to a minimal number (e.g. Keeney and Raiffa 1976;
Jeanloz et al. 2016). There are also differences, for example, in MCDA the number of criteria is not as
strictly limited as in the CE survey. In addition, in MCDA the attributes can be more descriptive than in
a CE survey, where attributes can ideally be translated from scientific indicators or parameter values.
The attributes for CE should also be economically relevant, following the microeconomic theory
(Jeanloz et al. 2016). In MCDA the criteria and attribute generation is an iterative process, where key
stakeholders are involved, and thus, additional attributes may be introduced in later phases of the
process.

We learned a few valuable lessons during the scenario formation and attribute generation process. In
CE respondents value a public good from their own perspective, whereas in MCDA the participants are
making decisions from a perspective of public interest. This has implications on the attribute
generation. In our case, most of the attributes (e.g. biodiversity, recreation, water quality) were more
descriptive and contained more information in the MCDA process compared to the CE. For example
for CE, the travel time to nearest peatland seemed as a functional attribute for recreation, whereas for
MCDA more descriptive attribute was formed. However, the focus group of CE revealed that in terms
of recreation the accessibility was irrelevant for participants, after all. Therefore the attribute for
recreation was changed to the area of peatlands in each scenario. After piloting the CE questionnaire
no changes to attributes were needed.

In the first MCDA workshop with stakeholders it turned out that even though the scenarios were
intended to cover the different views in the debate, some stakeholders were not happy with them and
wanted to include a scenario in which peat production is closed down by 2030 for climate reasons. This
experience showed that it is advisable to carry out a participatory process first before designing and
administering a CE survey.

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Households at risk of energy poverty are not able to keep their dwelling adequately warm. Consequences are among others health problems. For the most part cold dwellings means moisture damage and mold causing susceptibility to infection, respiratory diseases, asthma, rheumatism, arthrosis, arthritis, migraine or headache, other chronically disease, and depression and anxiety state of inhabitants as well. Besides the precarious situation and the harm of the affected people, these means costs for the public social and health system.

On the other hand, today the development of energy efficiency in buildings, whether in respect to research, politics, or in practice, in Austria is more or less state of the art. The technology for passive houses is highly developed, ecological and energy efficient building materials are on the market, while implementation is supported for example by the ecologization of Austrian housing promotion. However, these standards are not affordable for households at risk of energy poverty, which mostly live in highly energy inefficient buildings. The thermic renovation of these buildings would on the one hand improve the quality of life of the residents, including the reduction of social and health costs, and on the other hand could be an important contribution for increasing the energy efficiency of residential buildings.

Quantifying Energy Poverty
In Austria 268,000 people are not able to keep their dwellings sufficiently warm, and obviously are unable to benefit from this technology development. According to EU-SILC statistics most of the people who suffer from energy poverty live in energy inefficient buildings. To be able to search for evidence based approaches regarding this issue, our understanding of energy poverty in Austria has to be developed through much more in detail research. To date, the quantifying of energy poverty in Austria has been undertaken by EU-SILC using subjective appraisal of the individual affected. Therefore this paper shows the current debate of quantifying energy poverty in Austria according to objective criteria. Furthermore the paper aims to enable a significant advance in knowledge regarding gender and migration issues and their inter-linkages to energy poverty. In doing so, it will fulfill equity objectives concerning sustainability.

Sustainable Housing
Amongst other requirements, sustainable housing means that windows and doors do not let in draught, a dwelling is free from mould and dampness, a building is well insulated, there is an efficient heating system, and people can keep their home adequately warm during colder periods. In Austria a significant proportion of dwellings fail to fulfil these criteria, therefore the requirement for building renovation is immense.

Under these circumstances, households at risk of energy poverty live mostly in buildings which are not sustainable. In our research project we investigated the living and housing conditions of affected households. The lifestyle of these households can be generally described as very modest - for instance, turning the heating temperature below 21°C or heating only one room. Consequences are often dampness, mould and health troubles.

While tenants may favour building and dwelling renovation, they are concerned that such improvements will lead to increased rents. Thus, households at risk of energy poverty are often not interested in building renovation, and landlords keep dwelling in unsustainable state of repair, even without a heating system, with the intention to being able to offer cheap dwellings to tenants who cannot afford a higher rent.

Case Study RedEn!
In this context, the results of the research project RedEn!, which focuses upon the living and housing conditions of households at risk of energy poverty in some regions or cities of Austria, will be presented. The approach of the project is interdisciplinary as well as transdisciplinary. The researchers
have technical, sociological and economic backgrounds, and municipalities as well as social services are involved intensively. There are some efforts in supporting energy poor households in saving energy costs by more efficient fridges or energy saving lamps. But it is evident that such measures cannot solve the affected households’ central issue, that is to say the poor condition and energy inefficiency of the buildings. It is often not possible to implement thermic refurbishment of buildings with households in danger of energy poverty, because induced energy savings are not sufficient to refinance the investments. As a consequence, the full energy and climate change policy potential of thermic refurbishment cannot be tapped. In cases where considerable refurbishments are implemented, the strained financial situation of households, at risk of energy poverty, can be aggravated.

The research projekt „RedEn!“, financed by the Austrian Climate and Energy Fund, investigates the financial feasibility of the implementation of considerable refurbishments under the aggravated conditions of the strained financial situation of households at risk of energy poverty. Cost efficient refurbishment packages for individual objects are developed and a realistic estimate of cost-benefit impact for specific households will be carried out. These will build on detailed socio-economic evaluation regarding specific living and the life circumstances of households at risk of energy poverty. Results are integrated in the information and community work on site involving not only the residents but also the owners of the buildings.

On the basis of an analysis of the living conditions of households at risk of energy poverty and a detailed socio-economic evaluation in different research areas in Vienna and Lower Austria, cost efficient refurbishment packages for selected pilot buildings are developed and a realistic estimate of cost-benefit impact for specific households is carried out. Existing and feasible alternative financial models and funding instruments, as well as the regulatory framework are analysed. On this basis financial concepts, including present supply-side as well as demand-side public subsidies, are provided. The project shows, that the problems of households at risk of energy poverty regarding the necessary building refurbishments cannot be solved without public engagement.

Identification of collaboration success and its influencing factors of sustainability experiments

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Experimenting is acknowledged to be crucial within a transformation process as it can contribute to the transformation by deepening, broadening and scaling-up. Deepening is defined as a learning process through which actors learn about new ways of performing societal functions within a specific context, broadening is repeating an experiment in a different context and linking it to other functions or domains, and scaling-up is embedding an experiment in dominant ways of thinking, doing and organising at the level of the societal system. Furthermore, based on a literature review and rephrased for our case, we define transformative sustainability experiments as innovative initiatives focussing on sustainability challenges within the agri-food system as starting points for learning and collaboration aimed at contributing to a transition towards a more resilient system. At present, many sustainability experiments emerge, such as short chain initiatives, food hubs and transition towns. However, a lot of experiments cease and come to an end due to failures of very diverse origin. Hence, the identification of collaboration success and its influencing factors in relation to its potential contribution to a more sustainable system is essential. We focus on the agri-food system as the agri-food system is urged to transform towards sustainability due to various demographic, socio-economic and ecological pressures such as scarcity of natural resources, urbanisation and volatile price formation. Moreover, the agri-food system has specific sustainability challenges due to the perishability of products, seasonality in production and food safety policy. Empirical insights and guidelines how to design and manage sustainability experiments within the agri-food are specific and limited so far. Therefore, we analysed
and evaluated four in-depth sustainability experiments of the Flemish agri-food system, i.e. (i) a short chain initiative to set up direct home delivery of fresh and processed farm products, (ii) sustainable social catering in a hospital, (iii) the valorisation of biological surpluses into a new marketable product, and (iv) production, processing and consumption of local soybeans for animal feed and human consumption. All sustainability experiments are local and small scale, innovative, focus on action and learning-by-doing, and have a high risk of failure. To analyse and compare the four case studies, we developed an analytical framework based on literature from institutional economics, ecological economics, evaluation methodology and transition studies. The resulting framework determines performance based on three dimensions, namely governance (i.e. organisational and relational governance), process and societal outcomes or collaboration. We define collaboration success as the social gains, the learning effects and the transformative power of the experiment. Moreover, the overall performance of an experiment is the sum of collaboration success and effective changes into practice. In this study, we determined the collaboration success perceived by the actors of the experiments. We performed 21 semi-structured interviews with actors of the experiments, organised four learning workshops and one overarching eye opener workshop. Our preliminary results provide useful empirical insights into the governance, processes and collaboration success of sustainability experiments linked to their overall performance. Moreover, we identified the influencing factors of their collaboration success. These identified factors are network structure, personal relationships (e.g. trust and relevance of identity), choice of partners and transaction characteristics (e.g. task decomposability and risk sharing). The results are useful for researchers, decision makers and practitioners who design or organise future sustainability experiments to accelerate a transformation process. Future research could extend the number of case studies and assess more broadly the influence of the affecting factors on the collaboration success.

Science-policy interaction in sustainable development as Shakespearean theatre

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In this paper I borrow theorizations from theatre studies and distributed cognition to explain the temporal dynamics science-policy interaction in the contested field of sustainable development policy. Understanding the overall process of science-policy interaction as it evolves over time is particularly important in sustainable development where the long-term knowledge claims of ecological economists often clash with the short-term pragmatic imperatives of decision makers. My research questions are: How does science-policy interaction in a socially contested field such as sustainable development evolve over time? What are the implications of an improved understanding of the temporal dynamics of science-policy interaction for evidence based interventions in sustainable development policy?

Earlier research on the interaction of science and policy has focused on the nature of scientific evidence, the politics of policymaking, the operation of power in the policy process (Juntti et al, 2009), and the supply of knowledge produced by science and its demand within policy (Sarewitz and Pielke, 2007). Those who have focused specifically on the role of knowledge in science-policy interaction have developed techniques (Meyer, 2010; Sheate and Partidário, 2010) and typologies (Michaels, 2009; Turnhout et al, 2013; Ward et al, 2009) for such interaction, and matched different types of interaction with different policy issues and settings (Michaels, 2009). Hukkinen (2016) has developed a conceptual model of the temporal dynamics of science policy interaction. What is lacking, however, is a characterization of the overall process of science-policy interaction, including the actors, types of interaction, policy settings, and temporal dynamics.

The empirical material comes from action research that I conducted in two case studies of sustainable development policy, one as a member of the European Commission’s 7th Framework Programme Environment and Climate Scientific Advisory Group (2008-2012), the other as a member of an informal professors’ group on Finnish energy policy (since 2014). As contrasting cases, they provide broad
Co-governance arrangements for nature conservation: insights from the Portuguese case

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In line with the large body of literature that explores the governance turn, empirical studies on policy instruments for nature conservation, show that hierarchical and mandatory approaches, based on top-down protected areas designation or land acquisition by state actors, have been complemented with more collaborative partnerships with local public actors (Apostolopoulou et al., 2014), environmental NGOs, as well as with landowners through voluntary agreements (e.g. payments for environmental services) (Santos et al., 2015). Thus, we are witnessing a move from regulatory and hierarchical approaches to more flexible and hybrid solutions (Wurzel et al., 2013); a tendency that make actors

qualitative, albeit tentative, empirical material for understanding the process of science-policy interaction in sustainable development: the EC Advisory Group was a formal group of 18 researchers from around Europe providing evidence-based input to the formulation of EC’s environmental and climate research agenda, while the Finnish professor’s group was an informal group of 10 Finnish researchers providing evidence-based input to the formulation of Finland’s energy policy agenda prior to the Parliamentary elections of 2015. In both cases of science-policy interaction, there were successes and failures in how effectively the advisory groups were able to frame the policy discussion. The process description of science-policy interaction that I develop with recourse to theatre studies and distributed cognition provides a tentative explanation for the observed successes and failures.

The theoretical framework for explaining the process of science-policy interaction in sustainable development builds on the similarities of the distributed cognition processes observed in Shakespeare’s theatre of Elizabethan time and in contemporary science-policy interaction (Table 1). Tribble (2005) has explained the cognitively demanding performance of Shakespeare’s theatre in Elizabethan time as a process of distributed cognition. According to the theory of distributed cognition, cognitively demanding collective activities cannot be explained with individual cognitive capacities alone. Instead, an individual’s performance is based on the possibility to offload individual cognitive functions to the social and material surroundings. Analogously, I argue that the complex socio-cognitive process of science-policy interaction in sustainable development is based on a theatre of sorts: the adoption of stripped-down parts, a simplified plot of policy evolution, and an understanding of the correct timing of evidence-based intervention.

In Shakespeare’s theatre, stripped-down parts refer to easy-to-remember chunks of verse for each role. The overall plot is presented as a sheet of paper on the stage wall with a scene-by-scene account of movements, properties, casting and sound. The timing of movement on stage is indicated as a combination of the plot plus the physical lay-out of the stage, which together provide cues for entry and exit of actors (Tribble 2005). Analogously, the stripped-down parts of science-policy interaction can be categorized in an order of increasing intensity as supplying (provision of knowledge from producers to users), bridging (exchange and translation of knowledge between producers and users), and facilitating (co-production of knowledge in cooperation between producers and users) (Turnhout et al. 2013). The overall plot of policy evolution can be characterized as a cyclical process of policy consolidation (when the values and attitudes attached to policy converge and policy takes place in only a few institutional venues) and policy destruction (when values and attitudes diverge and policy venues are many) (Baumgartner and Jones 1991). The parts and the plot inform each other and determine the most effective timing of science-policy intervention in sustainable development (Hukkinen 2016).

Applying the framework to the two cases will enable me to provide a theoretically grounded explanation of the successes and failures of influencing policy framing. The analysis proper is still underway.
interplay at different scales more multifaceted and institutional frameworks more complex (Paavola et al., 2009). On one hand this shift seems to enhance the participation of local communities, stakeholders and landowners in the decision making process regarding among others, the reduction of land use changes, the sustainable use of natural resources and the implementation of active measures to restore damaged ecosystems and protect endangered species. This is expected to reduce local oppositions and conflicts and favour the success of measures aiming to tackle nature degradation and biodiversity loss, thus responding to both normative and pragmatic reasons. It is also expected to leverage non-state actors resources and capacities. On the other hand, scholars have warned that hybrid co-governance arrangements blurred the traditional distinction between public and private actors responsibilities and may undermine state capacity to ensure public interest. In other words, when governance models entail the shrinking of state authority and the devolution of responsibilities to non-state actors legitimacy and accountability issues may arise. For this reason, there is a need to explore new governance models for nature conservation with the aim of deepening our understanding on their potentialities and pitfalls.

This paper focuses on co-governance arrangements between state actors and environmental NGOs for the management of classified areas (e.g. Natura 2000 network) and protected areas in Portugal. Data have been collected through bibliography review, a study of legal and regulatory frameworks and policy documents as well as newspaper articles. Our fieldwork involves semi-structured interviews with government officials, protected areas managers, environmentalist and other relevant stakeholders.

A multilevel governance perspective allows to study co-governance settings and resulting public-private actors interactions for nature conservation within a context characterized by i) the existence of multilateral environmental agreements, ii) the Europeanisation of decision making process (e.g EU directives creating the Natura 2000 ecological network) along with the existence of EU funds for nature conservation purposes and iii) the decentralization process in nature conservation.

A diachronic approach has been applied to gain insights on the evolution of governance models. Questions which are relevant for the research agenda of “new environmental policy instrument” studies (see Jordan et al., 2013) have been addressed: are governance settings that entail a partnership with private actors for nature conservation “new” models in the Portuguese jurisdiction? Are they coexisting with or replacing the “traditional” ones? Moreover, the diachronic perspective allows to investigate the role of environmental NGOs during the evolution of national protected areas designation and management.

Our preliminary findings show a “messy” practice of distinct governance arrangements implemented against the backdrop of the restructuring of state role in nature conservation policies starting from 90s and now accelerated due to austerity, budget cutbacks and economic crises. Despite the 2008 policy and legal framework that enable for profit and non-profit private actors to apply for the recognition of private protected area (PPA) and its integration in the national network of protected areas, to date just one PPA has been created/recognized. However, within the national network of classified areas other experiences of privately protected areas and co-governance and co-management arrangements between state actors (public national authority for nature conservation or local actors) and environmental NGOs exist. Distinct models have emerged due to successive strands of legislati ons, interactions of policy instruments (not always synergistic) and different institutional contexts. Moreover, local actors and environmental NGO motivations also played a relevant role, usually driven by the existence of EU funds for nature conservation.

This timid emergence of non-state actors as agents for nature conservation has been analysed in parallel with the shift from government downward to municipalities that since 1993 can designate local protected areas. We argue that these changes and in particular the recruitment of non-state actors for public policy, may be helpful for compliance goals (e.g. the management of Natura 2000 network). Nevertheless, considering our findings they should be carefully implemented since they risk to undermine the value of natural resources, biodiversity and landscape as commons, and divert from the desired direction of the redesigning of conservation strategies based on the recognition of socio-ecological systems (and
their management) driven by local communities. Considering that the national authority for nature conservation (ICNF- Institute for nature conservation and forests) is facing a reduction and lacking of human and financial resources its role as a steering actor (and enabler of the accountability mechanisms) for co-governance arrangements would be more and more difficult to comply with. Also, mismatches between natural and social scales may arise or worsen. Additionally, national and local environmental NGOs are highly dependent on EU funding with limited capacity of leveraging national private funding. This undermines financial sustainability crucial for nature conservation purpose which is a long term task, and favours NGOs with international networks.

To conclude, there is also a need of additional research to explore the articulation/integration of nature conservation policies and protected areas creation with the national strategy for tourism that aims at reconciling nature conservation with sustainable development in Portuguese rural areas that are facing depopulation. It would be interesting to investigate to what extent it is concurring to the diffusion of co-management arrangements between local governments and NGOs.

References

The incentives for corporations to engage in voluntary environmental disclosure
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Corporations have started to manage environmental issues voluntarily since 1990s. Some corporations even appeal that they are environmentally conscious to consumers. These voluntary actions are categorised in “voluntary approach” (henceforth VA). VA is considered to be a supplemental instrument to the traditional policy instruments such as tax, subsidy and emission trading. However, it seems to be more flexible, effective and less costly than those traditional approaches in some particular cases (Alberini and Segerson, 2002; Arimura et al., 2008). Therefore, nowadays, VA is considered to be one of the most important policy instruments to reach environmental targets (Arimura et al., 2008; Vogel, 2005) and in particular when dealing with climate change issue. To enhance VAs and to reach environmental targets, it is important to scrutinise what are the incentives for corporations to involve in VAs. Many previous studies used qualitative methods based on the interviews of several executive managers of corporations to examine the incentives of VAs and showed interesting findings, but in most cases, it is difficult to generalise those findings to other corporations’ cases. By using the experimental approach, this study may overcome this limitation of qualitative methods and reveal the relationship between those factors and VAs.

This study focuses on two factors which are suggested as the incentives to be environmentally friendly by previous studies and examine the impact of those factors. First one to focus on is the “regulatory threats.” Among the incentives of implementing VAs which are pointed out by previous studies, the “regulatory threats” are one of the powerful factors for corporations to be green. The future pressure
of being controlled by regulations is a huge impact and corporations may try to react proactively before being regulated. To examine this factor, we set a punishment, i.e. future regulatory threats to a corporation if an accident happens due to the corporation’s investment activity.

Second one is the bandwagon effect which may also stimulate corporate actions. To analyse this factor, we disclose information regarding corporate VAs that reveals how much each corporation brings the negative impact on environment. In some cases, disclosure may work positively to enhance environmentally friendly actions, but sometimes, disclosure may work negatively to escalate their selfishness by knowing other corporations’ selfish actions to the environment. Each experiment is a repeated game with no clear information when the game will finish. Groups of three players will be made each time and the member will change each time because we think the condition of perfect stranger is important in this study. In the control treatment (treatment 1), each player, i.e. corporation is given 100 points at first and the player will invest those points to produce the products that gives negative impacts toward environment which is a common goods for all players. By investing some of the points to production, players will be able to get profits. The player can also spend some points for environmental management to lower the probability of future accidents. Each player can spend up to 40 points towards this environmental expenditure but it is impossible to prevent all future accidents. Uncertainty of the accident occurrence will still exist even though the players spend all 40 points. When a player caused an accident, the negative impact will influence two other players who share the group’s environment, i.e. common goods.

In the treatment 2, the players who caused the accidents are given punishments by authority and they have to pay fines. In the treatment 3, the players’ actions are disclosed by authority to show which player brings negative impacts towards environment. In the treatment 4, both punishments and disclosure factors are included in the model.

Based on the experiments, it became clear that as supported by previous studies, punishments has worked strongly for corporations to act environmental friendly. Disclosure’s impact is interesting because in treatment 3, some of the players that were spending considerable amount of environmental expenditures in previous stage changed their actions to be selfish after they noticed other players’ actions were selfish. In this case, disclosure gave negative actions towards environment. However, when disclosure were implemented along with punishments, disclosure has worked positively to prevent accidents and protect environment. Based on this finding, the policy implication that a set of punishments and disclosure may work well to prevent future accidents and environment destructions.

Reference:

Degrowth and tourism conflict in Barcelona – applying a decolonial perspective
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The approach of applying a decolonial perspective to a critical analysis of tourism is explored to analyze the socio-environmental conflict around tourism in Barcelona (Spain). Barcelona, a city that is a trademark in itself and which is increasingly confronted with the phenomena of mass tourism, can be seen as the embodiment of a paradox. A former colonial power, Spain, is now being colonized by tourism. In fact modernist architecture, one of the main tourist attractions, was
funded by profit realized with colonialism itself, from slave trade to sugar plantations, just to draw one line to the visible colonialism.

Looking at the more recent historical background regarding big events which took place in Barcelona over the last decades, such as the 1982 FIFA World Cup, the 1992 Summer Olympic Games, the 2004 Universal Forum of Cultures, and the increasing flows of mass tourism, in 2015 there were around 8 million tourists visiting the city (Ajuntament Barcelona 2015), it could be argued that Barcelona is now a victim of its own success.

Interlinking a critical view on tourism and discovering tendencies of coloniality thereby, this study explores the extent to which mass tourism could be seen as a colonial act. This refers to the persistence of power structures, the exploitation of the workforce, the damage of the environment and the unequal distribution of multiple benefits and burdens. In brief, a conflict with several facets, visible and invisible dimensions and multiple actors.

There are groups opposing the so called mainstream discourse implying that tourism functions as a vehicle for economic growth which also brings benefits in forms of employment and poverty reduction (Jafari et al. 2016).

One of these groups, contesting the alleged coloniality of mass tourism, is the “Assemblea de Barris per un Turisme Sostemible” (Catalan for Assembly of Neighborhoods for a Sustainable Tourism; hereafter ABTS), which unites multiple citizens and organizes educational events and public actions to challenge various forms of mass touristic developments.

This study focuses on three main points: first, the question of whether mass tourism can be seen as a form of coloniality is analyzed. Following this, the appearance, actions and claim for degrowth, or rather ‘degrowth’, of ABTS is explored, to assess to which extent they can be framed as an act of decoloniality. Both questions are tackled through qualitative research methods, including semi-structured interviews and focus groups, combined with grounded analysis, whereas key insights were extracted from the individuals and the entity ABTS who are engaged in mass-tourism contestations. ABTS, which advocates for “decreixement turístic” (Catalan for touristic degrowth), takes action to reduce Barcelona’s intake of tourists. The entity does not represent a homogeneous group, as it does not have one single uniform approach. While outwardly degrowth is meant in a quantitative sense, i.e. less tourists, other more qualitative aspects are also targeted by the group, such as conviviality, sustainability and a respectful togetherness.

This more qualitative perspective is in accordance with the general understanding of ‘degrowth’ within the ‘degrowth’ community. This includes a wide range of concepts and perspectives, which despite their multiplicity share an understanding of slowing down and thinking and acting in alternative ways (D’Alisa et al., 2015).

In the third part, the results of the qualitative research are used as the basis for further considerations regarding the concept of a “liveable city”. This includes indicators to questions regarding the availability of public space, environmental conditions for a liveable city, the availability of affordable housing, the quality of social relations, the space for non-commercial exchanges as well as indicators related to narratives and imaginaries concerning the liveability.

By applying a perspective which originally comes from the so called Global South, the decolonial perspective, and converting it to a context in the Global North, Barcelona, this study interlinked ‘degrowth’ and tourism.

Bibliography:
Structural coupling: can ecological economics offer value?

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A new ecological economics of water requires a combination of framing and boundary choice before it can become relevant. This claim is exemplified through action research within the USAID-funded RESILIM-O (Resilience of the Limpopo-Oliphants) project managed by a local NGO, AWARD in South Africa. Despite its project structure (and institutional form) RESILIM-O can be conceptualised as a systemic co-inquiry into how to do systemic governing of the Olifants Catchment understood as a structurally-coupled, coevolving social and biophysical system.

Invited to undertake a mid-term, formative, meta-evaluation certain framing choices underpinned my design. These choices drew on co-evolutionary systemic dynamics in the sense of Norgaard (1994) along with structural coupling (Maturana and Verden-Zoller 2008) and systems thinking in practice concepts developed in Ison (2010). Recent developments in systemic evaluation also informed my choices, viz: “diverse agents learn, self-organize, and co-evolve with their environment. Order and progress can emerge naturally from social interactions, and they need not be imposed centrally or from outside. Reconstructing a programme theory of change needs then to rely on local cultural attitudes to understand how the intervention can work around them and modify those attitudes over time” (p.664 in Reynolds et al 2016).

In its enactment RESILIM-O is required to show evidence of specific changes in the biophysical system and in the social system viz (a) ha under improved management (for biodiversity conservation) and (b) individuals with improved climate change capacity. However, in a 'complex system' the relationship between action and outcome is rarely linear and unicausal. This requires a set of sophisticated, systemic framings of RESILIM-O and its constituent practices understood in terms of an unfolding, emergent, co-evolutionary dynamic between the social and biophysical systems each with varying temporal dimensions and time lags.

As an extension of my formative review framework this paper explores whether an ecological economics of relationship quality and trajectory could be developed and add utility to evaluation of situations framed as structurally coupled social-biophysical systems.

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Transformative ecological economics

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The main challenges of our time; food security, clean water, poverty, environmental crisis, violence, terrorism, and loss of meaning, could not be solved within our partial, fragmented and limited visions and assumptions. Disciplinary knowledge has reached its own limitations. According to Nicolescu a unified theory of different levels of reality is “crucial in building sustainable development and sustainable futures” (Nicolescu 2010, p.33). It is not enough to make modifications within the existing system; we need a deeper systemic change. I maintain, in accordance with Nicolescu, that to solve the
complex challenges we are facing today, “transdisciplinarity is not only possible but also vitally necessary” (Nicolescu 2010, p.32).

In this article I elaborate on these challenges enlightened by ecological economics as a transdisciplinary field of science. Transdisciplinarity concerns what is at the same time between the disciplines, across the different disciplines, and beyond all disciplines. One consequence of accepting ecological economics as a transdisciplinary science is that we also accept that ecological economics is more than a mixture of ecology and economy, ecological economics connects to something beyond the traditional scientific disciplines.

To illuminate some of the consequences of defining ecological economics as a transdisciplinary science I find it relevant to reflect on how different levels of reality and various perspectives on reality could be unified through Nicolescu’s concept, the Hidden Third. I maintain that it is significant and illuminating to link the Hidden Third to Whitehead’s organic cosmology. Whitehead’s Philosophy of organism is mentioned by many distinguished contributors in ecological economics as a source of inspiration, amongst others Daly and Cobb Jr. (1989) and Costanca (1991). Whitehead’s motivation to develop an organic cosmology was to frame a system of general ideas in terms of which every element of our experience could be interpreted. “Here interpretation means that each element shall have the character of a particular instance of the general scheme” (Whitehead 1933/67, p.222). Whitehead’s way of putting things in perspective is both pertinent and informative as an interpretation of the Hidden Third.

The Hidden Third, signifies the interaction by creating a field that encompass different levels. As an example I discuss the connection between economic system (macro), business practice (meso) and economic actor (micro) by referring to Nicolescu’s interpretation of transdisciplinarity (fig. 1).

I discuss in some detail what ecological economic practice would look like, based on a transdisciplinary understanding of the interplay between the three levels in a frame of interpretation based on the Philosophy of organism as the Hidden Third.

One characteristic is that there will always be a dynamic unbalance stimulating energetic change processes. Everything will be in continuous process of change. Another characteristic is that nothing exists as an isolated atom, everything is interdependent both temporally and spatially. In other words becoming is more important than being, and relations are more important than objects. In Whitehead’s words “All things change, the activities and their interrelations” (Whitehead 1934/77, p. 15).

Another way of illustrating transdisciplinarity, is to describe how different scientific perspectives are united by the Hidden Third. This means that our ability to connect different sources of inspiration; e.g. philosophy, science, practise, art, and spirituality depends on the space of interconnection. Maybe organic cosmology (Philosophy of organism) as the Hidden Third embodies this space. This means amongst other things that natural science has to be connected to philosophy and spirituality. As examples I refer to thermodynamics (e.g. Daly 1996, “Steady-state-economy”), Darwinism (e.g. Boulding 1981, “Decentralized networks”), Anthroposophy (e.g. Steiner 1977, “Collaborative economy”), and Buddhism (e.g. Schumacher 1993, “Frugality) (fig.2). To find an opening that cuts across them and transcends them we need to go beyond the dissimilarities. Nicolescu argue that the third level of reality is of the greatest importance.

Concluding discussion

Transformative ecological economics ask new questions more than searching for new answers to the established questions. According to Max-Neef (2005) transdisciplinarity is more than a new discipline or super-discipline. It is “a different manner of seeing the world, more systemic and more holistic” (Max-Neef 2005, p. 15). He points at the fact that the attentions made until now in these matters are based upon reductionist thinking. If we do not succeed in establishing a meaningful context for transdisciplinary understanding “we will continue generating ever greater harms to Society and to Nature” (Max-Neef 2005, p. 15).

One plausible conclusion related to practice is that the solution to the big challenges of our time depends on our ability to implement interconnected changes on three interconnected levels; system, practice and actor in accordance with the Hidden Third, articulated through the Philosophy of
Another conclusion is that the interconnectedness is based upon steady-state-economy, decentralized networks, cooperation, and frugality.

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Rethinking Agreement? Reflections on the implications of nudging experiments in an ongoing regime transformation within Finnish silviculture
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The Finnish forestry regime is currently undergoing a shift towards more open and diversified forestry management practices, as enabled especially by the new forestry legislation of 2014. In contrast to previous times, the legislation now, among other new liberties for forestry owners, allows for the application of the so-called Continuous Cover Forestry way of practicing silviculture. (CCF). As a set of forestry management practices designed avoid the currently paradigmatic clear-cutting, CCF can be viewed as long-suppressed niche technology that is trying to pave its way in Finnish forestry in explicit contrast to the calculations (in a broad sense) of natural scientists, forest economists and other regime-bound actors alike. As a result of CCF being banned in Finland for 60 years, however, there is little knowledge of either the natural scientific, economic or socio-cultural ramifications of the newly liberated forestry management technology.

As part of an attempt to clarify these issues, environmental social scientists have undertaken to conducts experiments based on nudging or the design of choice architecture. Although the explicit aim of these nudging experiments is pragmatic (to inquire into the most effective ways of framing policy instruments and management practices to different forestry stakeholder groups to facilitate quick adoption in the context of Finland’s fragmented land ownership), conducting them raises interesting questions about the potentially conflict-amplifying effects of nudging, especially in its explicitly linguistic forms. In this paper, we report and discuss such an ongoing nudging experiment, performed as a collaborative endeavor between the University of Helsinki and the University of Jyväskylä, Finland involving the explicit attempt at bringing about so-called cognitive dissonance of participants via a deliberate juxtaposition of the two classic behavioral approaches of “promoting awareness and concern” and “nudging” (Reddy et al. 2015). Our starting point is the assumption, inspired by existing research in especially social psychology (e.g. Dickerson et al. 1992), that doing so will be more effective in bringing about behavioral change than either awareness-promoting or nudging as stand-alone
interventions.
More specifically, our hypothesis in the experiment reported in this paper is that an experimental procedure of a) first creating such a cognitive dissonance between the concurrent aims of economic and ecological value creation of Finnish forest owners and managers, and b) then presenting experiment participants with text material that is heavily nudged towards the niche technology of CCF, will 1) reduce cognitive dissonance among participants already harboring a degree of ecological goals, thereby gently pushing towards adoption of CCF, but 2) induce cognitive dissonance among participants more firmly grounded in economic value creation, thereby opening up cognitive space for them to reconsider their existing commitments. The net result, we also hypothesize, is an increase in the cognitive distance between as well as in affective loading of the positions taken towards CCF among the participants in the experiment, the latter constituting indicators of the conflict-amplifying effects of such linguistic nudging.

Theoretically, we situate our experiment at the interface between environmental policy, practice theory and cognitive linguistics (e.g. Hukkinen 2016; Shove et al. 2012; Lakoff and Johson 1999; Fauconnier and Turner 2001). In our view, successful linguistic nudging for policy requires that the metaphorical maneuvers performed in the experiments are firmly grounded in the actual practices – meanings, materials, images – of forestry owners and other stakeholders as well as in existing frontline research on metaphors and other linguistic phenomena. Methodologically, we ground our linguistic operations in the Metaphor Identification Procedure, or MIP, as developed by Steen et al. (2010) in conjunction with the thinking of embodied primary metaphors as developed by cognitive linguists Lakoff and colleagues.

The actual experiment, crafted in line with these premises, consists in presenting forest owners and forestry managers in Central Finland, via an internet survey platform, with four different versions of a comparison between the traditional clear-cutting forestry management practice and CCF. The first version conforms to the ways in which the alternatives are currently presented in Finnish forestry guidelines; the second adds currently omitted information on CCF; the third involves a linguistic nudging of the notion of “economic wealth” as presented in the guidelines; and the fourth involves such a nudging of both the notion of economic and ecological wealth. Each respondent, randomly selected from the database upheld by the Finnish Forestry Centre, is presented with one comparison only (the questionnaire specifically designed to measure the cognitive and affective appeal of the text naturally being the same for all respondents).

The results of the experiment as described above are relevant not only for the communities of forestry and forest policy researchers interested in the current regime transformation in Finnish silviculture, but also for all those researchers interested in perception of ecosystem services, and especially in the issue of how such perceptions can be influenced in a deliberate manner. There already exists a significant body of literature on the perception, acquisition and use of ecosystem services (see e.g. Asah et al. 2014; Andersson et al. 2014); however, there does as of yet seem to exist a linkage between research on nudging and perception of ecosystem services. Our research aims, among other things, to address this research gap.

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Co-Creation of Socio-Economic Scenarios as Building Block of a Local Risk Management Tool to Climate Change - The Case Study City Lienz in the East-Tyrol, Austria
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The large uncertainties over future developments and structures of societies and economies make the assessment of climate change impacts, adaptation options and vulnerabilities a challenging and complex task (Hallegatte et al., 2011). One way of dealing with these uncertainties and this complexity is by using scenario analysis that takes into account different socio-economic pathways and identifies the dimensions and main drivers along which societies and economies evolve over time (Moss et al., 2010). These dimensions should cover different vulnerability patterns. Some of these factors are obviously environmental such as the response of the climate system to additional greenhouse gas forcing. But vulnerabilities will also depend on a variety of socio-economic determinants such as the demographic development, labor market participation, income generation and wealth, or the effectiveness of governance structures in risk management, health and education, to name just a few. Future economic, technological, social, cultural and demographic developments are at the same time drivers of climate change. Different pathways of future socio-economic developments must therefore be analyzed to be aware of different drivers and their uncertainties.

As climate change impacts, vulnerabilities and adaptation options are context-specific and thus characterized by a particular regional or local environment, the issue of vulnerability assessment and the derivation of adequate adaptation measures and risk management tools requires small-scale evaluation. Therefore, global scenarios such as the Shared Socio-economic Pathways (SSPs, O’Neil, 2015) need to be backed up by local scenarios. In the present paper, which is based on the ARISE project (Adaptation and Decision Support via Risk Management through Local Burning Embers), bridging the gap between global research frameworks and sub-national or local climate change assessments and management tools is a paramount issue. ARISE develops, as one building block, local socio-economic scenarios for the City of Lienz. These scenarios are designed in a way to be consistent with particular narratives of the Shared Socio-economic reference Pathways (SSPs) and still represent local characteristics and circumstances.

To develop local socio-economic scenarios for Lienz, a participatory approach was chosen. A scenario workshop was held that facilitated a broad stakeholder engagement and an application of local knowledge to the design of two diverging socio-economic scenarios, a “booming” economic future and a “stagnating” economic future until 2050. Given the fact that for socio-economic data the most disaggregated level available is generally the NUTS3 level, the involvement of local decision-makers
and the compilation of local knowledge was crucial to develop informed scenarios. Informing stakeholders and strengthening the science-society communication, the scenario workshop also served to communicating scientific insights on regional climate change and the present and recent socio-economic situation (related data will be shown in the presentation, i.e. on demographic development, sectoral local employment data and value added). The scenario workshop hence assisted a two-way knowledge transfer, a transdisciplinary dialogue and exchange of ideas. Participatory approaches are increasingly being recognized as an important element in planning, decision-making and management. Approaches such as participatory planning and participatory integrated assessment have been developed and practiced by many private and public sector organizations (Jäger et al., o.J.; Stoll-Kleemann – Welp, 2008). In recent years there has also been a growing acknowledgement within the sustainability science community of the relevance and usefulness of engaging social actors in addressing complex and long-term societal issues (Haas et al., 2013).

One main result from the stakeholder scenario workshop held in Lienz was that the “boom” scenario was in fact described as a sustainable economic future based on a local economy that would not decline and not grow but remain stable in terms of GDP growth but show a significant structural change, e.g. towards renewable energies, decentralized production clusters etc. “Boom” was thus not considered as economic growth in the classical sense. “Stagnation”, in contrast, was understood as a future development that followed the present path with different challenges and obstacles and thus could be titled as “business-as-usual” development. These outcomes were particularly apparent when matching the stakeholder views of “boom” and “stagnation” with the narratives of the global Shared Socio-economic pathways Pathways (SSP’s; O’Neill et al., 2015). We find that the local “boom” scenario best matches with the SSP1 “Sustainability pathway of development” while the local “stagnation” scenario best complies with the SSP3 “Regional Rivalry pathway”. The main characteristics of the SSP1 and SSP3 global narratives chosen as best frame of the two stakeholder-derived socio-economic futures of Lienz will be briefly summarized in the presentation.

To give an example: Demography is one decisive factor in the future economic development. In the Sustainability Scenario the population of Lienz and the surrounding area is assumed to stabilize, in particular the workforce becomes constant. However, the current aging of society is going to proceed. This suggests broadly that major utilities and infrastructure facilities (water supply, sewage disposal, electricity supply, waste management) as well as administration and finance (public spending, taxes) can be maintained. At the same time, the service sector (health sector, tourism and other services) is adapted to cater to an elderly age structure of society.

In the Rocky Road scenario, developments follow a bumpy path, a change in demographic structure and population decline. This is due to the outmigration of particularly young, well-educated, dynamic and innovative people (ÖROK, 2010; FAO, 2006). This development can lead to a negative loop, as the lower the proportion of the economically active population, the less there is the chance of reversing the economic decline. Depopulation leads to a neglect and ultimately a loss of infrastructure such as educational institutions, health facilities, water treatment facilities, energy utilities, etc. This in turn accelerates the outmigration from rural areas further (FAO, 2006).

Both scenarios have been developed with respect to main sectors of the economy: tourism, agriculture, forestry, industry and manufacturing, education, health and other services, infrastructure and natural hazards, policy and administration. Major findings and final results will be presented in the talk.

For the local risk assessment and derivation of adaptation options in Lienz, the “Rocky Road” scenario was applied as it suggests more difficulties and requires a higher preparedness for future development and adaptation. The co-creation of the “Sustainability”/“Green Road” scenario was nevertheless important as it showed insights into a sustainable development of the region, achieving both from outset, a resilient socio-economic development and a low-carbon development.

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Passenger transport and cities in India: Variations in energy use with patterns of urbanization
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Mobility is essential for high quality of life in modern times because it enables people to access labor markets, goods and services. However, transport is a major contributor to local and global environmental pollution. Sustainable and inclusive mobility is therefore essential to reach the Sustainable Development Goals, especially regarding the goal for resilient and sustainable cities (SDG 11) and healthy livelihoods (SDG 3). Developing countries face two major issues in relation to passenger transport one refers to strong urbanization dynamics which challenge governments in providing adequate infrastructure, the second relates to the dynamics of rising private motorized transport with increasing income. Although previous studies provide some insights on the relationship between urban form indicators such as population size and mobility demand, the relationship between urban form, passenger transport and energy demand is not yet well understood in emerging economies such as India.

This analysis aims to address: What is the effect of urbanization on transport energy demand in India? Does transport energy consumption vary with patterns of urbanization? This paper investigates variations of passenger transport across different urban areas in India with the aim to assess the effect
of urbanization stage, population size and public transport infrastructure. To test our hypothesis on agglomeration effects and public infrastructure, we classify urban areas into metropolitan areas (Mumbai, Delhi, Kolkata, Chennai, Bangalore, Hyderabad), cities above one million (cities), small urban and rural areas. Moreover, this study relies on the Indian National Household Survey 2011 – 2012. This approach allows an analysis of energy footprints for whole India and with respect to urban archetypes by a novel angle. The bottom-up analysis of household transport behavior allows differentiating between household-specific drivers of transport demand and structural drivers. Based on multivariate analyses and propensity score matching we assess the effect of population size and availability of public transport infrastructure on mobility patterns for different urban areas. This study highlights that population size of a city changes transport behavior because agglomeration effects and the availability of public transport. Even when income is controlled for, transport energy demand varies significantly between metropolitan areas, cities and small urban areas. The share for private motorized transport is significantly lower in metropolitan areas than in other urban areas and significantly higher for bus and rail services. In addition, the share of transport on total direct energy consumption (electricity, heat, cooking fuels, transport) is significantly higher for metropolitan households.

Main findings of this paper clarify that persons in metropolitan areas have higher mean energy footprints for transport compared to inhabitants of cities above one million and other urban areas. This is true although households in metropolitan areas have a higher share of public transport in their modal split which is more energy efficient than private motorized transport. The results imply first that insights from developed countries cannot easily be transferred to emerging economies. Second the insights reveal that a focus only on public transport does not extenuate rising energy demand with increasing urbanization.

Moreover, considerable differences could be found between metropolitan cities. For instance, Bangalore has a five times higher mean energy footprint for private transport than Kolkata which draws attention to the dynamics of urbanization and historic development of public transport. Finally, in a scenario analysis we show that adopting the transport mode of metropolitan areas, cities above one million inhabitants could realize considerable energy savings. Cities above one million inhabitants are in the center of this comparative static scenario analysis because these urban areas are expected to grow significantly and struggle to cope with rising transport demand. In this context, public transport has three major advantages, first it is less energy intensive, second it avoids more effectively congestion and local environmental pollution and thirdly it provides better access to mobility for lower-income households and foster their inclusion into the labor market.

Effective urban planning strategies that fit into the Indian context will be crucial to cope with rapid urbanization and increasing mobility needs of the urban population. For a low carbon mobility future, both more energy-efficient public transport modes as well as efficient urban planning are essential to decrease transport demand in urban areas and make them more livable.

Strategies for tying degrowth to the assessment and regulation of technologies
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This paper is a contribution to building an alternative for technological assessment, regulation and innovation, guided by and aimed at a degrowth approach embodying an ethic of responsibility which can become established in the daily life of individuals and communities. Today’s scientific and technological research institutions tend to commit to and sustain a certain style of choices and technological designs guided largely by financial and production criteria. The emergence of risks, and increasing inequalities and uncertainties, are some of the serious consequences of those choices (e.g.
Beck, 1992 [1986]; Krimsky, 2004; Nowotny et al., 2005). Changes need to be put in place which deal effectively with not only the risks, but also with the intensification of the problems brought about by the new industrial world being built by informatization, digitalization, biotechnologies and other high technology systems. It is argued that technologies should be submitted to assessment, whether at the point of design or in relation to their later consequences, in the light of a diverse set of ends and values, with the aim of regulating, inhibiting or reorganizing them.

The proposal put forward here is justified because various basic standards and contents of contemporary society, examples of which are those associated with sociability, communication, production, health and leisure, are largely involved in and configured for technological networks and systems, but the technological factor needs to be questioned further. Two views have come to dominate: an inflation of expectations in relation to technology, allied with the ubiquitous idea of its neutrality; and a lack of understanding of how technological progress encourages operational complexity in processes linked to human life, causing serious problems and risks of social diversity, political differentiation and economic inequality (Rescher, 1999). It needs to be acknowledged that certain technological choices and innovations may be ethically inappropriate, or that there is a need to understand their risks and implications. Hence the need for them to be assessed and regulated, in opposition to the hitherto predominant commercial orientation which opposes any kind of ethical, judicial or political control (Garcia, 2012). A critical examination of technology is lacking in many domains, with some exceptions such as those relating to human health and the environment. But even when there is that assessment, it tends to be undertaken within the limits of the utilitarian principle, generally taking the practical form of cost-benefit calculations. It is acknowledged that mankind has made truly important scientific and technological advances and that there are some effective practical and experimental regulatory positions; however, in relation to the latter, a step further is needed, conceiving the degrowth project as “an invitation to think and act outside the box” (Sekulova et al., 2013: 5). This paper thus reformulates an idea first put forward by Langdon Winner (1978), called methodological Luddism, which would assess and guide technologies, their design, use and alternatives, in directions which correspond to the urgency of the imperative of responsibility and the values of social justice and ecological conservation.

The paper is divided into four parts. Part 1 outlines how technology has become a key issue for philosophy and the social sciences. The modernist Promethean promise, which saw technology as the engine of economic and social progress, was questioned by a group of mid-twentieth century thinkers who focused on the negative effects of trust in technology and questioned the theory of its neutrality. Authors like Hannah Arendt, Lewis Mumford, Jacques Ellul, Ivan Illich, and Hans Jonas, amongst others, recognized its social, cultural, economic, ecological and political implications. After them came a constellation of thinkers who combine a critical view of technological dominion over nature and technocratic control of society with approaches leading to a new, inventive relationship with technology which disengages it from industrial productivism and mass consumption. In the second part, starting out from the idea that the degrowth movement has come to acknowledge the importance of the technological factor for its aspirations, this paper argues for a deeper incorporation of the views of thinkers for whom technological options are political issues and who provide principles and concepts which simultaneously open up the possibility of that assessment and creativity required to disembed technology from economic growth. Thus Arendt (1958) offers the concept of praxis as the political ability to discuss and activate the values and ends of technology, with a view to building a durable common world. From Jonas (1984 [1979]) comes his principle of responsibility as a response to the destructive potential of modern technologies which amplify its unexpected effects and also demand that the range of human responsibility be extended in the face of an uncertain future. While these two thinkers call clearly for a normative assessment of technologies which will go hand in hand with effective regulatory experiments to protect populations against certain undesirable effects, Illich (1973) and Borgmann (1984) both argue for a reform of current social relations through technology itself. Their approach comprises a value-laden appreciation of current technologies and how they lead us to a good life. The third part of the paper shows that while optimistic attitudes to technological progress still prevail, other attitudes, of ambivalence and scepticism, have emerged which may
encourage both the politicization of technology and an axiology of technology. Drawing on the earlier sections and the approaches and concepts outlined in them, the final part offers a frame of principles, objectives and actions to achieve normative assessment and regulation of technologies, to welcome contextually and locally rooted projects, and to promote the practice of voluntary technological contraction.

That frame is formed by three principles, objectives and actions to implement methodological Luddism: (a) extending and deepening normative processes of technology regulation; (b) to support grassroots systems for technological innovation; (c) to promote focal things and practices. Behind this frame lies how technologies connect with ways of life and hence build worlds, an issue of major significance when new industries are arising such as those based on rapidly escalating commercial computerization and biotechnologies. If every technology contributes to social and environmental changes, it is also true that the restructuring and contraction of technologies may also bring about creative social transformation. Technologies are also social constructs and interact with symbolic creativity and the cultural variations among social groups. There is, of course, potential technological flexibility which contrasts strongly with the current rigidity of larger-scale technological systems. It is not a question of doing away with technological innovation, but of stressing that there is a proper domain in which it is possible to promote or discourage technologies, providing concrete opportunities for scientists, engineers, designers, activists and communities to become involved.

References

Increasing the accuracy of marine footprint calculations
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The amount of evidence and indications of humanity’s overuse of natural resources are mounting, both within the scientific community as well as in observable changes to the natural world. One reaction to this has been the creation and use of a wide variety of ways to quantify and highlight these issues. As a result multiple indicators have been created for the purpose. One such indicator is the Ecological Footprint (EF). In spite of considerably controversy and some hard-hitting criticism (van der Bergh & Verbruggen, 1999; Giempietro & Saltelli, 2014) the Ecological Footprint has, since its conception in the early nineties, become the most widely used and recognized sustainability indicator.
in the world (Talberth et al, 2008; van der Bergh & Grazi, 2015). Its metaphorical style and imagery has found favour with practitioners, policy makers and the public alike. This high profile of the indicator brings about a certain responsibility for the scientific community to make the EF as accurate and robust as it can be, within its recognized limitations (Wiedmann & Barrett, 2010). Practitioners working with the EF are well aware that of the six land types used by the methodology, the fishing grounds are the land type involving the largest standard errors and highest amount of uncertainty (Lazarus et al, 2014). The basic equation the fishing grounds calculations are based on (PPR = CC * DR * (1/TE)(TL -1)) from Pauly and Christensen (1995) is mired in uncertainty and estimations on each variable, as acknowledged by the authors. Discount rate, trophic level and transfer efficiency can thus hardly be considered more than rough, general estimates. In spite of this the literature is surprisingly thin when it comes to this issue. Of the great number of studies being devoted to methodological improvement suggestions for EF calculations very few deal specifically with the marine component and its inherent inaccuracies. At the same time, the EF is being widely utilized to estimate the ecological burden our societies are causing and to guide decision-making.

This study aims at increasing the accuracy of the marine footprint calculations. To do this Iceland will be used as a case study. Iceland is a particularly good case to use for studies of fisheries since the marine sector is by far the most important sector of the Icelandic economy. This importance is reflected in the size of the fishing sector in relation to the economy as a whole – this in turn means that any inaccuracies in the calculations are highlighted and made visible as shown by Jóhannesson et al (forthcoming). This importance has further led to a good infrastructure around the sector such as robust data collection, a willingness to learn from past mistakes among stakeholders and a certain respect for the resource. Because of all this the marine footprint can be calculated from actual consumption figures and the results then compared to results from the standard EF methodology based on finding the footprint of consumption by subtracting exports from imports and production (P+I-E=EFC). This study will utilize all these factors by asking if it is possible to get the results from the standard methodology to match the results from such a simple calculation of the EF from the known consumption figures, by adjusting the standard methodology calculations (PPR = CC * DR * (1/TE)(TL -1)) in several ways as suggested in the literature:

- By using actual data, sourced from as close to the source as possible wherever possible, as opposed to using international databanks. Comparison of the two will then provide sensitivity analysis - as called for by Kitzes et al, 2009 - for the international databank data commonly used in EF studies. Data on production, export and yields (extraction rates) will be requested from Fisheries Iceland (an umbrella association for companies operating within the fishing industry) with only import data coming from Statistic Iceland
- Through using local figures for area sizes, discount rates, yields and extraction rates. Where two secondary or derived products are produced from one and the same primary input the ratio between the primary and secondary products will be used to determine the yield without the use of a footprint allocation factor or monetary data. Availability and robustness of local data should make this possible
- Through using a localized food web to estimate PPR, which may absolve the study from a dependency on estimated trophic levels and transfer rates.
- By implementing a correction factor into the calculations as suggested by Bastianoni et al, 2012
- By incorporating the ideas from Talberth et al (2006) on ecological sustained yield threshold and modified biocapacity calculations to include marine protected areas

The model used will be the 2015 edition of the GFN Learning Licence. In light of how widely used the EF is and how easily errors can be overlooked within the calculations, increasing the accuracy of the indicator has significant scientific value. The fishing grounds play an important role here being acknowledged as the most sensitive element of the calculations.

Reference:
Climate smart governance?
Alfred Kaiser

Nowadays, more and more people live in urban areas. This transition brings along a lot of challenges, providing the necessary utilities to large amounts of people living in the same area. Thanks to the revolution of the information technology and big data sets, the concept of the “smart city” has emerged, and nowadays a lot more information is available about different types of utilities. According to Caragliu et al. (2011), the increasing urbanization is creating a need for the city planners to deal with reinforced complexity regarding urban factors, such as food and water supply, traffic management and waste disposal and climate change. Against this background, the concept of “smart cities” has been introduced, described as a device for dealing with these service problems in a common framework. We can see that the growing number of concepts of “smart cities” bring variety of definitions and smart governance being one of the main pillars of smart city. Academic research in field of smart governance is relatively young and researchers are not united in definition what is “smart governance”. Major concern of smart governance concentrates on the role of ITC (information Communication Technologies). Although vast research was carried out on the role of human capital, social capital and environmental capital as important drivers of growth of the cities (Caragliu et al. 2011). Usually they vary in minor differences or scale of the focus but the main idea behind the theory is same (Mooij 2003; Willke 2007; Johnston & Hansen 2011). Mooij (2003) and Willke (2007) and Johnston & Hansen (2011) agree that the information technologies play significant role in implementation of smart governance concept. Some researchers pay more attention towards participants and involving of people rather than to the technical background of concept and believe that they can positively contribute to the system of local government. We were looking for more
focused concepts, local scale is visible in work of Janssen & Estevez (2013) where they proposed new term “I-Government” with focus on close up local scale. Concept of I-Government is very interesting due to its innovation and more concentrated focus. This concept concentrates on smaller groups in small scale environment and thanks to ICT (Information and Communication Technology) better address problems and solutions between groups, communities, places and so on. This is what they call “Doing more with less” and it is accurate name for the concept.

In our work we use the concept of smart governance to manage semi public areas. We argue that these areas can be defined as common pool resources because they are shared with local communities where every individual is an actor (Maco 2015). Common pool resource includes natural and anthropogenic resources which are in our case semi public areas (inner blocks). As we are about to encounter multiple actors the managing of these semi public areas is complex. Ostrom (1999) already identified that the vast number of actors creates difficulties in system, organization and agreeing on rules and enforcement of those rules. We agree that especially in local scale individuals play a very important role. Usually in this kind of environment where individuals are facing choices, all others will be affected by “one-man choice” because they are interdependent. If the individual prefers short-term self interest choice that means for the others that this one individual leaves them worse (McGinnis 2000). This is where smart governance should step in and use of new technologies can improve processes of common agreement on rules and enforcement. With smart governance, we create better, more accurate and responsive system of local governance. Thus governance becomes more transparent and more beneficial.

So smart governance should provide individuals enough information to not take selfish decisions and focus on long term benefit. From a past we already know about many cases such as case from Nepal, where irrigation systems are the example of well managed common pool resources which rely on rules and norms created and developed by local participants who are in this case local farmers (Ostrom et al. 1999). In case where authorities created the system of irrigation it was less efficient than one created by farmers themselves. It was caused mainly because of strict focus of authorities on modern engineering and ignoring of rules and norms that farmers had before (Ostrom et al. 1999). It seems logic that the communication of participants is vital for livable system or concept. Only if local stakeholders and individuals are involved in creation of norms and rules, system have the chance to work with highest efficiency. It was proven by many studies and in case of Nepal irrigation systems it is nicely described. Use of new information and communication technologies can improve the process of developing rules and norms, especially if it is in the interest of local residents. Inclusion of new technologies in local government does not immediately means that the city can promote itself as smart city, but it is a step towards it because smart governance is one of the pillars of smart city concept.

We focus on lower levels of governance such as local governance of urban areas and discuss the possibilities that semi-public places offer opportunity for mitigation of the negative effects of global climate change in cities. In particular, we are addressing two research questions “What are the key factors of effective smart governance?” and “How to stimulate creation of effective smart governance?”. The condition to functional system of smart governance we need to have smart community. So people should be aware of using of new technologies and they have to be concerned about environment. Smart community can be seen as a group of connected individuals that interact between each other on the network and deliver smart services or solutions. These individuals can be anyone or anything, dog or tree can also interact by playing a significant role in the decision making process (Xia & Ma 2011). Key attributes of smart community are following: Smart communities are socially and physically aware systems, the scale of community varies with each case, smart community and its size are flexible, smart community can be functional without the Internet and life cycle of smart community can vary from one to the other.

It is necessary to create the system where people from semi-public spaces can delegate their needs to local authorities. In current situation the communication is not efficient enough. So the community should be aware of their environment and take action to improve it, just then they are becoming smart community. Once they realize that the cooperation among them can be profitable for everyone then they realize that they are working together under natural common regime. Our focus concentrates on
management of semi-public spaces represented by inner blocks. WAUA (2009) a blog about architecture, urbanism and art differentiates semi-private and semi-public spaces. We have to keep in our minds that both share the characteristics of private space. Here are usually many actors and stakeholders to who tend to use and manage one specific semi-public space. The theory of the commons is concentrated on common-pool resources (CPRs), products which are coming from these resources and on the question, how these resources should be managed. For our research is relevant, especially urban commons because we will focus on developing collective regimes for semi-public spaces inside the inner blocks. Goods from CPR are suppose to benefit certain group of stakeholders who are related to clearly specified common-pool resource.

How long term trends of energy and economic growth interaction can inform modelling excercises

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Economic environmental history can inform us about relations between factors of production that need to be taken into account in any realistic modelling of economic growth. Long time series of ratios between capital and energy, output and energy, capital and labour can all serve as inputs to our understanding of how the macroeconomy behaves with respect to decoupling and sustainable development. I have worked together with several scholars to produce a long run energy –growth database for Europe and we have written a book: Power to the People – energy in Europe over the last five centuries (Kander et al 2013). It shows that energy was strongly complementary to economic growth, up to the 1970s, when ICT expansion weakened the relationship, and information was a stronger driver behind growth. This is supported by multiple ratios: useful energy to GDP goes down after 1970, primary energy decouples in a relative sense to GDP (energy intensity goes down fast) at the same time as energy consumption stabilizes, the energy-capital ratio declines faster than before (Kander and Schön 2007).

Structural decomposition shows that the transition to the service economy is a far weaker explanation for the decline in energy intensity after 1970 than commonly perceived. That transition is merely a price illusion, but has some fact to it (Kander 2005, Henriques and Kander 2010). The increasing quality of energy over time (with electricity, natural gas and oil replacing wood and coal) played some role for the declining E/Y ratios in the 20th century, but is not the sole or even main reason for the decline (Gentvilaite et al 2015).

Equipping workers with more machinery that consumed energy is a salient feature of long run growth in Europe. The capital to labour (time) ratio went up. But at the same time workers got higher salaries, so Solow’s assumption of constant cost shares for labour (0.7) and capital (0.3) holds relatively well in the long run. This means that conventional growth theory can do well to assume high substitution possibilities between labour and capital (constant elasticity of substitution = 1).

However, my research also demonstrated that the cost of energy compared to GDP in Sweden went down from some 50% of GDP in the 19th century to the present day low 10% (Kander 2002). This is at clear odds with a model with unlimited substitution options. Consequently, David Stern and I modelled growth in an alternative way, where energy is not fully substitutable (Stern and Kander 2012, Kander and Stern 2014). The expansion in the supply of energy services over the last couple of centuries has reduced the apparent importance of energy in economic growth despite energy being an essential production input. We find that the elasticity of substitution between a capital-labor aggregate and energy is less than unity, which implies that when energy services are scarce they strongly constrain output growth resulting in a low income steady-state. The expansion of energy services is found to be a major factor in explaining economic growth in Sweden, especially before the second half of the 20th century. After 1950, labor-augmenting technological change becomes the dominant factor driving growth though energy still plays a role.
A participatory modelling approach to assess trade-offs between land use, ecosystem services and biodiversity conservation in an Austrian case study region
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Multiple competing demands on land have increased the pressure on natural resources and caused demand-driven land use changes. Agricultural expansion and intensification increased global food production substantially. Historically, such land use changes have caused large changes in ecosystem service (ESS) supply. The decline of non-provisioning ESS, such as clean water availability or soil fertility, caused an increase of the vulnerability of ecosystems (Schröter et al. 2005; Power 2010). Ecosystem functioning and services also depend on biodiversity, which is negatively affected by agricultural intensification and land expansion in general (Isbell et al. 2015). Typically, these problems in agricultural land use are framed as trade-offs between provisioning ESS (i.e. food, fibre, biomass for energy), regulating and supporting services (i.e. water purification, soil retention or climate regulation), cultural services (i.e. pleasant landscapes) and biodiversity (Millenium Ecosystem Assessment 2005).

Two contrasting concepts have been developed and widely debated in the nexus of provisioning ESS and biodiversity: land sharing versus land sparing. Land sharing is wildlife-friendly farming which ensures the coexistence of agricultural land use and environmental protection and nature conservation. In land sparing, land for nature conservation is strictly separated from agricultural land (Phalan et al. 2011; Green et al. 2005). Therefore, agricultural land with high yield potentials shall be used intensively in order to reduce conversion pressures on natural land or to release agricultural land for nature conservation (e.g. rewilding). Both concepts have been studied theoretically (i.e. Phalan et al. (2011)) and empirically (i.e. Tscharntke et al. (2012) or Navarro and Pereira (2012)). However, only a few studies have combined this concept of biodiversity protection with the provision of multiple ESS (i.e. Wade et al. (2010)).

However, there is an explicit need to consider non-provisioning ESS, socio-economic conditions, preferences and values of local populations and land use history when assessing trade-offs from ESS and biodiversity and developing desirable future pathways (Grau et al. 2013; Fischer et al. 2014). Also

References
global and EU level trends and policies, which influence regional land use, biodiversity conservation or ESS supply, have to be considered. Since such external factors for regional land use are difficult to estimate, stakeholder participation is required in order to consider different preferences under current and potential future conditions. Stakeholder participation is also crucial to guide research towards societal knowledge demand and a successful dissemination of research results from biodiversity and ESS studies. So far, stakeholder integration in the analysis of land sharing/land sparing is very limited. Integrated approaches are increasingly implemented to assess a range of ESS over contrasting scenarios by a rich set of indicators considering both, biophysical (such as climatic changes) and socio-economic (i.e. agricultural and environmental policies) land use drivers.

The main aim of the TALE project (biodiversa/FACCE-JPI, www.ufz.de/tale) is to disentangle multifaceted links between agricultural production, biodiversity and other ESS and to optimize societal choices between different ESS and the conservation of biodiversity in different European countries. In our Austrian case study (funded by Wissenschaftsfonds Austria), we use an integrated modelling framework with stakeholder participation in different phases in the research process. Here, we present the conceptual approach in modelling synergies and trade-offs of ESS and biodiversity and how we integrate biophysical and socio-economic drivers as well as stakeholder demands and perceptions.

First, an analysis of current policy frameworks, which are impacting land use decisions regarding agricultural use, biodiversity conservation and ESS supply, was conducted. Stakeholders gave valuable information about relevant regional, national and EU policies from their perspective. Second, a set of common indicators was developed for all case studies. A common set of indicators and tools ensures comparability and transferability across case studies. The selected indicators cover all classes of ESS (provisioning, regulating, supporting and cultural) and several biodiversity metrics (ranging from landscape elements important for biodiversity (i.e. landscape heterogeneity) to species richness measures). Third, storylines as well as scenarios are developed. Scenarios describe case study specific alternative states of future land use and its corresponding socio-economic and biophysical drivers. The scenarios are related to one common global storyline and three common EU storylines. With respect to the global storyline, we have chosen the shared socio-economic pathway SSP2 (Middle of the Road; see O’Neil et al. (2015)) to allow linkages to the global modelling efforts on climate change mitigation and adaptation. It includes for instance socio-economic developments, such as income growth, technological development and resource and energy use. The EU storylines show contrasting socio-economic development pathways for land sharing, land sparing or balanced policy strategies. They include for instance agricultural input and output prices, structural changes, direct payment funding, environmental and agricultural legislation. In a next step, case study specific scenarios are co-produced by stakeholders and the research team by interpreting the different EU storylines in terms of how these would influence regional land use (i.e. share of cropland, built-up area, areas for nature protection or high value farmland) and land use intensities (i.e. fertilizer use or irrigation). Stakeholders will reveal likely future regional to national land use, biodiversity conservation and ESS objectives which are then integrated in the description of the case study scenarios. They should also select feasible policy measures, supporting either land sharing or land sparing, which are used in the model analysis. Forth, the scenarios are input to the integrated modelling framework to assess the status quo of ESS, biodiversity, their synergies and trade-offs. Furthermore, optimal strategies for future land use are identified, which alleviate trade-offs between different ESS and biodiversity and promote synergies (i.e. sharing, sparing or balanced). The results of the earlier steps (i.e. policy analysis, scenarios and stakeholder preferences) are integrated in the model. The last step involves stakeholder participation again, where model results are used for validation and co-learning and where stakeholders shall disseminate the co-produced results.

To conclude, our contribution will show how stakeholders and their preferences can be integrated in land use modelling. The link between the natural environment and socio-economic drivers in an integrated modelling framework serves as worthwhile example of ecological economics. Moreover, it reveals the importance of an integrated approach to study trade-offs arising from agricultural production, biodiversity conservation and other ESS.
References

Stakeholder participation in responsible research and innovation: the politics of knowledge creation
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The concept of “responsible research and innovation” (RRI) has gained significant scientific and political attention recently. RRI aspires to be an umbrella term of concepts and practices that may further the transition into a different research and innovation system (Schomberg 2013), one that may contribute to the transition towards sustainability. However it is still a question to what extent the current conceptualisation of RRI and its practical implementation is meant to address the (systemic) root causes of unsustainability, to actually consider planetary limits and to create knowledge in a way that challenges current hierarchies, hegemonies and knowledge cultures. It seems that the principles of RRI (anticipation, reflexivity, inclusion and responsiveness) leave room for various (even contradicting) interpretations and are actually translated into genuinely different practices. It is also telling that RRI-discussions often take place in contested fields of research and innovation, such as synthetic biology, geo-engineering or nanotechnology. As Stilgoe et al. (2013) warn: „the ease with which responsible (research and) innovation can be inserted into policy documents should remind us
of the risks of instrumentalising the phrase” in other words “RRI [may be] narrowly, and instrumentally, motivated to support the delivery of a pre-committed policy, with economic growth as its main priority” (Owen et al 2012).

The present paper focuses on the process aspect of RRI: the way knowledge is created and decisions are made in the context of RRI processes. The participation of various actors in this process is something ecological economics has long been arguing for. These arguments have been underpinned by (1) the appreciation of the diversity of values and the acknowledgement of the different forms of knowing (e.g. Inglis 1993; O’Hara 1995); (2) the limitations and the inherent political content of the expert knowledge with regard to sustainability (e.g. Funtowitz–Ravetz 1993 Latour 2004); and (3) the intrinsic value of participation (Sen 1999). However, participation may refer to genuinely different practices depending on the extent of power gained by participants (Arnstein 1969) or the ability to shape the spaces and rules of participation (Gaventa 2006).

Our paper asks: in what way is RRI the collective effort of researchers and stakeholders? What does the call for inclusion actually mean with regard to RRI? We argue that it is vital for this aspect to be better understood, since it provides information on the transformative potential of the RRI concept and practices. The analysis of the RRI process may draw attention to the hidden politics (hierarchies and hegemonies) of RRI; an aspect that may hinder RRI’s capacity to increase environmental and social sustainability.

The arguments of the paper are based on the findings of the H2020 project FoTRRIS (Fostering a Transition towards Responsible Research and Innovation Systems, http://fotrris-h2020.eu/). As part of the project we carried out a literature review and conducted expert interviews with knowledge actors in 5 countries. We reviewed 59 papers appearing in scholarly journals with the term ‘responsible (research and) innovation’ in their title and 9 ongoing or accomplished RRI related projects funded by FP7 or H2020. We put special emphasis on the secondary analysis of case studies appearing in the academic literature and the reviewed projects. Moreover we conducted 62 interviews with knowledge actors in Austria, Belgium, Hungary, Italy and Spain in 2016.

We found that the RRI literature hardly reflects on the inherent political content of the research and innovation process. The RRI-literature does not provide guidance on how to deal with sensitive issues, such as power conflicts, value conflicts, minority opinions or the unwillingness to participate. RRI is rather oriented towards researchers and policy-makers, and it is not necessarily the discourse of the stakeholders or citizens. In most of the cases inclusion is translated to practices where a closed group of actors (mainly researchers and policy makers) invite selected actors into a pre-defined space of participation (‘invited participation’) to discuss values and contribute with their knowledge (as far as it does not challenge their basic underlying assumptions). Largely, participants are invited to discuss, but not to actually make decisions. Expert interviewees confirmed this: while most of them appreciate the participation of societal actors beyond the formal R&I system in the context of RRI, there was some reluctance in regard to highly inclusive approaches as well as for processes, which allocate (more) decision power to non-formal experts. Reservations referred to worries in regard to the legitimacy of non-formal experts having a strong say in steering R&I, either due to doubts concerning engaged actors’ expertise, or because this might introduce societal conflicts into R&I. The R&I community argues that such e.g. conflicts of interests between different stakeholder groups should be primarily tackled within policy arenas, but not in the context of R&I activities, because this might put the autonomy of R&I at risk. Thus forms of ‘invited participation’, where the power of process control and decision making is with the experts, are preferred.

These results suggest that in its present form RRI has limited capacity to transform the status-quo of knowledge production. In order to keep control over these A process can easily be called ‘RRI’ without actually being organized in a way that challenges the reigning hierarchies and hegemonies. Therefore, we argue that the co-creation of the RRI processes and outputs and the reflection on the inherent political content of the process should be indispensable elements of the RRI concept.

In response to this the FoTRRIS project proposes a conceptual framework for RRI that draws collaboration with societal actors to the centre of the RRI-process. In response to this the FoTRRIS project proposes a conceptual framework for RRI that draws on collaboration with societal actors to
the centre of the RRI-process. There are several reasons for this: (1) transition to a more sustainable socio-economic system will require not only technical but also social and economic change, so stakeholders should be co-creators of the whole process; (2) For R&I to be responsible it should itself avoid inequality and exclusion in the production of knowledge; (3) The biggest resilience today does not appear at the level of R&I institutions or public bodies, but at the level of local communities and cities; for RRI to lead to timely solutions for pressing societal challenges it should integrate this resilience as a primary source of expertise (Snick 2017).

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Informing the climate sensitive land and forest management policies in Central Asia – Towards a combination of economic experiments and qualitative case study

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Introduction
There is a growing interest to analyze and evaluate policies employing economic experiments in combination with other complementary methods (Colen et al. 2015). In an economic experiment, an environment is designed where a number of human subjects make decisions in a controlled setting. “Their main advantage”, according to Beckmann and Padmanabhan, “is that many influencing factors are under strict control of the researcher and stylized theories about human behavior could be tested in a straightforward way” (2009: 345). Therefore, framed economic experiments can be helpful to inform for instance policy makers about the drivers of farmers’ behavior regarding their responses to implemented policies (Baerlein et al. 2015). For example, an ex post policy evaluation can help to access whether introduced policies reached it’s stated goals and objectives. Policies or its instruments can be also evaluated ex ante to design more effective policy interventions in future (Colen et al. 2015).

In this project we propose to evaluate the dynamics of institutional change in forest use and the effects of the Joint Forest Management policies implemented in Tajikistan. For the institutional analysis we develop a research methodology where we combine an economic experiment with a qualitative case
study. The project findings will inform policies on climate sensitive land and forest management in Tajikistan and Kyrgyzstan. Furthermore, the research findings will offer broader insights regarding the priorities for the climate change adaptation policies in Central Asia.

Guiding research questions
In studying institutional change, both the type of research questions (Alston 1996) and the aspect of time in understanding institutional change (Bromley 2006) are important dimensions that may guide methodological decisions.

Alston distinguishes between research questions investigating the effects of institutions and questions concerned with “the dynamics of a system that leads to change” (Alston 1996: 26). The first type of research question investigates the effects or consequences of institutions. In this case, the analysis of institutional change is rather static. A researcher can, for example, study the outcomes of an institution by comparing one situation where the institution is already in place with another situation where a different institution exists. The second type of question identified by Alston explores the complex dynamics of institutional change. It may, for example, analyze the driving forces of “demand and supply” in a political process, which may subsequently lead to change of formal institutions (Alston 1996: 27).

Bromley (2006) suggests that incorporating a time dimension in our understanding of human actions has important methodological implications for studying institutional change, calling this “human will in action” (2006: 113) and arguing that humans tend to consider possible future outcomes of their actions and act accordingly. This is related to humans’ ability to “Reasoning backward [which] is precisely the act of understanding the present in terms of the future, and deciding how we wish the future to unfold for us. Final cause – reason – is concerned precisely with this idea” (Bromley 2006: 114). Therefore, Bromley argues that in order to understand human actions, several plausible reasons (or final causes) may require investigation. In his view, understanding of reasons “for a purposeful action is to be found in some outcome in the future... [they] consider present in terms of future” (2006: 113-114). On the other hand, “mechanical causes are those that precede the action to be explained...[they] consider future in terms of present” (2006: 113-114).

In this research an attempt will be made not only to take a snapshot but also to develop a moving picture by investigating both the effects and dynamics of institutional change, as noted by Alston, by incorporating Bromley’s time dimension into the analysis. The research objectives and questions formulated for the present research include:
1. exploring the dynamics of institutional change (to understand its reasons): Why do informal institutions in forest use and management change? and
2. investigating the effects of formal institutions (to explain causes): How do the new formal forest institutions affect behavior of the forest users and what outcome it has for the resource use?

References
Fears and hopes of children: Drawing future ecosystem services of Kiskunság, Central Hungary

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Socio-cultural valuation methods – e.g. preference assessment and photo-elicitation surveys, narrative techniques, discourse-based methods such as focus groups or deliberative workshops, and techniques of ethnography and political geography, among others (see IPBES, 2015 for a broad disciplinary categorization) – recently gain an increasing attention in ecosystem services (ES) assessments. While they are extremely diverse in their epistemological foundations (e.g. collecting qualitative or quantitative data either in individual or in group setting, by using maps or other visual stimuli etc.), a key commonality of such methods is the aim to discover a full range of values people attach to ES, from the perspective of the people themselves (Kelemen et al. 2014).

Depending on the exact aim of a socio-cultural valuation study, participants involved might range from holders of specific (e.g. local and/or traditional) knowledge forms, to local resource users (e.g. farmers or foresters) and representatives of various stakeholder groups (e.g. ES beneficiaries, policy makers or official bodies responsible for the implementation of land use rules). Although socio-cultural valuation studies are rarely linked to actual decision making processes directly, participants are usually addressed as stakeholders during the research process. This reflects that researchers accept and support the fact that their research partners do have a stake in ecosystem services management and valuation. Going further along this line opens up the question: who else do have a stake in ES management and valuation beyond the usual suspects, who are not yet engaged in ES research?

One of those major silent stakeholder groups is children. According to the UN Convention on Children’s Rights, a child who is able to form his or her own views, has the right “to express those views freely in all matters affecting the child” (Article 12). Children can be considered the future generation whose well-being, both on the short and the long term, is strongly influenced by present day decisions on ecosystem services. Nevertheless, children’s needs, preferences or values are hardly addressed by ES studies, the few existing exceptions refer merely to future risks of malnutrition or health problems of children as a consequence of ES loss (e.g. Butler and Olouch-Kosura, 2006).

Howsoever morally desired it is to engage children in research as participants, it requires alternative methodological approaches and their careful application to assure validity and avoid any harm caused to participants (Ben-Arie, 2005; Mayaba and Wood, 2015). Drawing analysis is one of the frequently applied approaches in childhood sociology and related fields (Punch, 2002), which has already been used to assess the environmental perceptions of children (e.g. Barazza, 1999; Pellier et al. 2014), although not in the ES discourse. This presentation sheds light on how drawing analysis can be used to engage children in the socio-cultural valuation of ES, and how their value perceptions can be fed into an ongoing stakeholder dialogue.

In 2015 we organized a drawing competition for local children living in the central settlements of Kiskunság, Central Hungary, where we run a research project aiming to solve real life problems through the operationalization of the ES concept (OpenNESS, EU FP7 project). The research project had a strong stakeholder engagement element, which was realized through regular meetings with the project’s stakeholder advisory board, as well as interviews, questionnaires and several workshops with local residents. The focal issue of the project – aridification and the resulting changes of ES supply – was defined together with stakeholders, and natural and social scientific research methods were combined with participatory techniques to develop acceptable future land use scenarios. Realizing the diversity of knowledge, experience and value commitments of the local adult population led us to broaden our scope, and to invite pupils from local primary schools to draw their expectations about human-nature relationship in 2065. Major aims were to combine adult perceptions with children’s visual expression of opinion and feelings, and to give voice to the next generation in present day discussions. Altogether 46 children between the ages 6-14 drew a picture from 4 local schools, which were a priori
contacted by the researchers to discuss the topic and the instructions of drawing. Drawings were prepared in the classroom at one of the regular drawing classes, and instructions to children were given by the teacher. It was also the teacher who collected the drawings and sent them to the researchers for analysis (so researchers were not in direct contact with children). To increase the motivation of children, the drawing exercise was framed as a competition. Drawings were evaluated by the project’s stakeholder advisory board (considering relevance) and a painter (considering the artistic expression), and four drawings in two age categories were awarded publicly. Drawings were exhibited in a museum and a primary school, both located in the research area, they were also displayed at the scenario planning workshops organized during the research process, and they were available online at the social media platform of the research project.

Drawings were analysed by an art therapist, and in parallel by two researchers, who coded and analysed the content of the drawings along a predefined protocol. Key aspects of the analysis included the percentage of natural and human influenced elements, the number and status of animal and plant species as well as humans, the characteristics of the abiotic environment (e.g. wet or dry climate), the list of recognizable ecosystem services, and the level of technology development. The protocol contained some qualitative questions as well that tried to record the researchers’ impression and subjective feelings. All pictures were analysed by two researchers and the art therapist, and results were triangulated. An SPSS database was created including the quantitative data extracted from the protocol, which was analysed by simple statistical methods (frequency and cross-table analysis) and hierarchic cluster analysis.

Children’s drawings displayed characteristic perceptions of how human-nature interactions might change in the future, such as technological modernisation (robotics) and the loss of natural environment, using modern technology that enables more effective but balanced land management, living in harmony with nature by reinventing old land use practices, creating nature reserves with very few human influence, or the complete depopulation of the area together with serious environmental degradation. The relatively high proportion of pessimists were remarkable: almost one fifth of the pictures showed negative expectations or fear. The presence of human beings and technology/artefacts were limited or completely missing in many drawings, holding again a strong message about how human-nature interactions might evolve.

Despite the interesting results and the positive feedback received from local stakeholders, we faced many challenges during this drawing exercise. The presentation will discuss in detail the most crucial questions, such as (the lack of) transparency towards the participating children, the reliability of the results, and the uptake of the values articulated by children within the wider society. Recommendations on how children’s drawings can be applied for the socio-cultural valuation of ecosystem services will also be shared.

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Energy and carbon taxes: Evidence from EU member states
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In the EU CO2 emissions from industry and energy supply are regulated under the EU Emission Trading Scheme (EU ETS). To control emissions from private households, transport and other small sources, in contrast, no comprehensive EU policy strategy is in place. In 2011, the European Commission came up with a proposal for a new energy taxation directive (COM (2011) 169) that would put more emphasis on the carbon content of fuels. This proposal has, however, not been adopted due to resistance of some Member States and the requirement of unanimity for EU taxation issues. Although some climate change aspects have been taken up in the Member States’ energy taxation following the EU’s Energy Taxation Directive in 2003, the existing energy or carbon taxes serve mainly a revenue raising purpose and only in some cases an explicit reduction of emissions is intended.

In this paper a cross-country comparison of energy and carbon taxes in EU Member States is performed. Based on the European Commission’s taxation reports, taxes for the most important fuel types and end-use categories are assessed. In addition, countries which have introduced a carbon tax are identified. A systematic assessment of carbon taxes is performed, i.e. the development of the taxes is analysed i.a. in terms of the tax rates applied (and their development over time), tax benefits and tax exemptions, and the development of tax revenues and their usage. In addition, the outcomes of the introduction of the tax are investigated in a meta-analysis of studies available for countries that have introduced a carbon tax. In this meta-analysis, the effectiveness of the taxes is assessed in more detail, as well as the observed impacts on economic growth and employment, but also the related innovation and distribution effects.

Energy tax rates applied in EU Member States must exceed the minimum excise duty levels as defined in the Energy Taxation Directive in 2003 (Directive 2003/96/EC). The minimum rates defined in this directive differ both with respect to energy source and application area (i.e. different rates for transport, heating and electricity apply). Effective tax rates in Member States show a pronounced variation even within the different use categories and energy carriers. With respect to transport, diesel tax rates in EU Member States in 2016 ranged between the minimum excise duty of EUR 330 per 1,000 litres (EUR 9.2 per GJ) in Greece and Bulgaria and EUR 674 per 1,000 litres (EUR 18.8 per GJ) in the United Kingdom, while petrol tax rates were in the range of EUR 363 per 1,000 litres (EUR 11.1 per GJ) in Bulgaria and EUR 770 per 1,000 litres (EUR 23.5 per GJ) in the Netherlands. In 27 Member States petrol tax rates exceed diesel rates by up to 100 per cent (Greece), only in the UK the tax rate per litre is identical for petrol and diesel (ultimately implying again a higher petrol tax rate per unit of energy due to lower energy content compared to diesel). In the majority of the Member States, excise duties on diesel have, however, increased more strongly than those on petrol in recent years.

So far, only nine EU Member States have introduced CO2 taxes (Slovenia, France, Denmark, Finland, Portugal, Ireland, Sweden, Estonia, Latvia, Poland. In the UK other carbon pricing mechanisms, e.g. the price floor established to complement the price signal from the EU ETS, are in place). In most cases, the CO2 tax, however, is well below EUR 10 per tonne and hence significantly lower than energy tax rates. Notable exceptions in this respect are Sweden where the CO2 tax has reached EUR 118 per tonne CO2 and Finland with a CO2 tax of EUR 60 per tonne in the transport sector and EUR 55 for heating in 2016.

Evidence on the effects of the introduction of CO2 taxes is mixed as shows e.g. research on Denmark
(see Withana et al., 2013, and the literature cited therein): Generally a positive effect of the Danish CO2 tax on emissions is found. With respect to GDP generally neutral to positive effects were found, along with positive effects on employment. Regarding the distributional effects studies suggested that the Danish CO2 tax was regressive.

References

Exploring substantial transformation paths to reduce global footprints: How can structural change of input-output relations contribute?
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Affluence and consumption has been the key driver of growing global footprints. This has been demonstrated with structural decomposition analyses of historical global input-output structures for GHG emissions and materials (see, e.g. Arto and Dietzenbacher, 2014; Pothen and Schymura, 2015). Changes in input coefficients and energy and material intensities could not compensate for this growth, but underlying technological change remains the ‘silver bullet’ in the related decoupling debate.
Analyses of global footprints using input-output analysis have so far mainly focused on historical changes. It would be important to know, whether future structural changes in input coefficients, but also in the composition of consumption, could deliver reductions in global footprints, including GHG emissions. More generally, changes and drivers of changes in the input-output structure have to be identified. For the input-output structure of WIOD, sector-specific nested CES production functions have been estimated in order to capture the effects from price changes on substitution effects between capital, labor, energy, and intermediate material inputs (Koesler and Schymura, 2015). Reductions in the costs of renewable energy technologies and their global diffusion and adoption are at the core of a recent contribution that links an energy-economy-environment model with a multi-regional input-output framework to predict future coefficients (Wiebe, 2016). In this case, costs and prices are the intermediate drivers of structural change, while the learning curves from R&D and resulting technological change cause changes in the cost structure. Indirectly, also institutions, including norms and legislation, but also regulations concerning utilities and infrastructure decisions, may change input-output structures. More broadly, also the sector composition of an economy affects input-output structures between sectors and on the aggregate level (Peneder, 2003). Changes of infrastructure and related price changes the coefficients of other sectors as well. For example, the adoption of policies for a post-carbon transformation could potentially lead to a significant change in several of the input-output relations between multiple sectors. Some relations will likely decline or intensify, while many others may remain stable. A move towards electricity-based transport, for example, requires suitable infrastructure policies, and would then reduce the direct link to refined fossil fuels. The presence of railways or a strong electricity distribution grid for refueling electric cars will certainly influence the technical coefficients in the mobility and transport sectors. Therefore, infrastructure policies and utilities regulation may indirectly determine technical
coefficients. Another example concerns the built environment. A move towards larger shares of wood inputs in construction may reduce the link to cement, and vice versa. Whether houses are constructed from wood or cement may not only be a question of climate and building purpose, but also building regulations and available resources. Such structural changes have been at the core of input-output model development and analyses (Duchin, 1998; Hubacek and Sun, 2001).

Obviously, a global adoption of renewable energies as an intermediate input in the production process is key to a transformation to reduce global footprints. From agriculture to services, all sectors are to various degrees dependent on energy sources. How do these links change with the adoption of renewable energies? Which input-output links change when mobility and transport move from fossil fuels towards renewable fuels, such as biofuels, syngas, electricity or hydrogen? This move certainly depends on technology and associated shifts in relative prices, but may more fundamentally be influenced by the transport and electricity infrastructure available. And the resulting structural change will almost certainly have very different social, economic and environmental impacts.

Direct and indirect energy flows may also depend on a sector’s availability and use of primary inputs, including labor, capital stock and land. This dependence on what Georgescu-Roegen called funds is a key concern in ecological economics and has created heated debates in the past, for example between Solow/Stiglitz and Georgescu-Roegen/Daly (Mayumi et al., 1998), concerning biophysical constraints, feasible substitutions, and related production functions. A move towards photovoltaic and wind power might fundamentally change the relations between capital stock and intermediate inputs (flow-fund relations). There may be a move from intermediate fuel inputs towards the use of renewable energy capital stocks in the electricity sector. While the use of fossil fuels is reduced, the capital stocks to harvest sun and wind have to be built up. A large renewable energy capital stock has to be built, which will likely require increases in intermediate flows from mining and quarrying, steel, and cements to build renewable power generation plants. Also the development of suitable capital stock in manufacturing sectors has a causal effect on the use of energy type and intensity, which needs to be captured by a suitable model specification. Capital stock accumulation, for example, has been found to have a long-run effect on reducing energy intensity in some industries, but not in others (Kratena, 2007). The choice of functional forms of related production functions is crucial to capture such changes.

In this paper, we show fundamental differences in the production structures of sectors between countries related to footprints, and identify past changes in input coefficients. For example, agricultural production in arid and semi-arid climates may depend on irrigation and related electricity or diesel input, which leads to a production structure that is very different from other climates (Kimmich, 2013). The key question is then, whether such input-output relations have changed in the past, and why? In a second step, we identify causal mechanisms that may explain fundamental differences, but also changes in input coefficients. We specify and empirically test relations between intermediate input flows, their related sector capital stocks and labor, and the value added created through these. We take into account country-level predictors, including both stable and variable characteristics, including infrastructure and environmental regulations. Our empirical tests and parameterizations are based on WIOD, which covers trade flows and intermediate inputs between 40 countries and 34 sectors, including a link to the Rest of the World, for the years from 1995 to 2011 (Dietzenbacher et al., 2013), which has just recently been updated to 2014. The database also contains detailed Social Economic Accounts and detailed energy use, GHG emission, and material extraction satellite accounts.

Concerning the link between transport and electricity, we find significant differences between the countries and changes over time. While the input-output link from electricity to transport has strongly increased in Austria, for example, almost no link and no change is visible for the period from 1995 to 2011 in the United States. On a global scale, we do not find any substitution of fossil fuels with electricity in transport. When looking at the construction sector, we find a significant relative increase in the input of wood for construction in some countries, and a reduction in others. The relative share of wood for construction decreased in the United States, but increased in Austria, for example. We account for country-level characteristics and variables to explain these diverging paths. These variables
include environmental controls, as well as infrastructure indicators, and diverging policies and institutions.

References

What are the best strategies against pharmaceuticals in the environment? End-of-pipe vs. source-oriented measures
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Medical substances are an essential pillar of the modern health system and they are widely applied in animal farming. In Germany 8,120 t of human pharmaceuticals with ca. 2,300 different active substances were used in 2012 in human medicine (Ebert et al. 2014). About 800 t of antibiotics have been used for animal farming in 2015. The total amount of veterinarian pharmaceutical sales is not documented and hence unknown. The general trend in pharmaceutical consumption is upward (BVL 2016).

Only a small fraction of the amount of the used pharmacological substances remains in the human or animal body, most of it is excreted unchanged or metabolised. These substances end up in the environment, mostly in ground and surface waters, via different pathways. Veterinary drugs are excreted by farm-animals with the manure. If the animals are kept on meadows the manure ends up either in the groundwater after it percolated through the soil or it is washed (subsurface or lateral) into the surface waters. If the animals are kept in stables the manure is mostly used as a fertilizer on farm land and, thus, also reaches groundwater or surface waters. Concerning human pharmaceuticals, the pathway is different. As human excrements end up as sewage, the sewage system can be seen as a huge funnel. The load of pharmaceutical substances is channeled to the sewage treatment plant, where substance concentrations are still pretty high, certainly much higher than in the environment which the sewage plant outflow is then discharged into.

Currently, sewage treatment plants are generally not equipped to eliminate pharmaceutical substances in Germany. Accordingly, pharmaceuticals have already been found in surface waters in
effective concentrations, particularly in the lower course of sewage plants (for an overview: Petrie et al. 2014). In the environment these substances can cause “side effects”. Empirical evidences for adverse effects of pharmaceuticals for the aquatic ecology have been found (e.g. Kümmerer 2008; Roig 2010). And under certain circumstances, they find their way back over the nutrient cycle or drinking water into human bodies where they may potentially cause harm to human health. Today, however, no concrete harm for humans by pharmaceuticals in the drinking water could be proven, yet (Ebert et al. 2014).

Against this background, questions arise concerning what needs to be done. The first question is whether to wait or to act now: Is it sufficient just to stay alert and to observe and monitor the environment for known and novel harm? Or should concrete measures for reducing the emissions of pharmaceutical substances into the environment already be developed, agreed upon and implemented? In the paper, we will argue that the precautionary principle indicates that incomplete scientific evidence of the threat to human health does not justify refraining or postponing preventive measures. It is a central element of this argument that irreversibility may occur when certain pharmaceutical substances are widely spread across environmental compartments such as the ground and surface waters. If these substances are potentially harmful, the precautionary principle, which is anchored in pharmaceutical, environmental, and chemical law and other judicial areas in Germany and Europe (Kern 2010), justifies that action should be taken now.

The next question is how to act, i.e. what would be an appropriate strategy to diminish the risk from pharmaceuticals to the environment, particularly to the ground and surface waters, and to human health. In the paper we will argue, that such a strategy has to differentiate between human and animal pharmaceuticals and that two aspects are of particular importance to find an appropriate strategy: (i) the different societal goal conflicts of different types of medicaments and (ii) the different emission pathways for human and animal pharmaceuticals sketched above.

Different societal goal conflicts
For animal and human pharmaceuticals the structure of the trade-off between conflicting goals is different. In the case of farming, pharmaceuticals have been used to to reduce the costs of “meat production” in industrial farming systems (UBA 2016). If the external costs for society are high enough, it is desirable to regulate the use of pharmaceutical in agriculture more restrictively. That this is an effective way to ease the problem can be seen at the example of regulatory measures for antibiotics in agriculture that were taken in Germany in 2011 and 2013. This regulation led to a 50 % reduction in consumption of antibiotics for farming by 2015 without seriously affecting animal production (BVL 2016).

The situation is quite different for human drugs. Human health is an individual and societal goal of utmost importance. It is typically weighted higher than economic interests and environmental protection (even though at the bottom line pharmaceuticals in the environment may have adverse effects on humans). For this reason it is often not desirable to reduce the use of human drugs (at least if there are no adequate substitutes).

Different emission pathways
Effective and cost-effective measures for eliminating substances are typically most promising if they focus at the point where the concentration of the pollutant is as high as possible. As sketched above, for human pharmaceuticals this point generally is the sewage treatment plant. Accordingly, public discussion on human pharmaceuticals in the environment is typically connected with one specific measure – a quaternary sewage treatment. A quaternary treatment supplements the regular primary, secondary and tertiary treatment of sewage by an active-carbon filter or an ozonization facility that are effective means for removing large fractions of micro-pollutants from waste water. Because the quaternary sewage treatment interferes at a point in the pathway of human drugs where the several sources can be addressed at once and where the dilution of the pollutants is not too high, and because effective and affordable techniques for a quaternary treatment are available (Hillenbrand et al. 2015, Gawel et al. 2015), we will argue in the paper, that this measure is a central element of a more comprehensive strategy against pharmaceuticals and other micro-pollutants in the environment.
However, quaternary treatment is a classical end-of-pipe strategy. Generally end-of-pipe measures are seen inferior to source-oriented measures for several reasons: For instance, the polluter-pays-principle is more compatible with source-oriented measures compared to end-of-pipe measures; source-oriented measures are often cheaper and more effective because starts closer to the causes. So, it can be seen as an exemption to the rule that, due to the emission pathways and due to the specific structure of the goal conflict, in the case of human pharmaceuticals, the end-of-pipe approach of introducing the quaternary treatment is still effective.

This is, however, different in the case of animal pharmaceuticals. Here pathways differ significantly from the human case and the sketched societal dilemma between the highly valued positive effects of pharmaceuticals and adverse second order effects via environmental pollution is not present. Instead, we have to deal with a well-known problem of economic activity with negative external effects to society as a whole. In this case, we argue in the paper, the well-known regulative tools of environmental economic reasoning can play an important role to solve the problem.

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Why do we pay more for organic food than for ‘ordinary’ food? In theory, providing food should incur the same costs under the same climatic and soil conditions; the difference lies mainly in technology. Organic food bears more of its costs, and ‘ordinary’ food less. All the rest of the latter’s costs occur somewhere else, often far in time or in space, or appear in the less humane treatment of animals. Thus the higher price of organic food can be described by economic law because it has higher cost content. In general, usually we have lots of technological options (see e.g. choices on the egg market). Information is often available about the technologies behind those products, and we, either as consumers or producers, have the option to choose between those technologies. But low-cost technologies, which are usually also regarded as more advanced, powerful and efficient, spread more of their costs elsewhere. Choosing between them reveals a preference towards the others who must bear those costs – especially when the above-described background has been made clear to the decision maker. We deal with those preferences through collecting data from consumers and potential producers – first among university students with an economics major. Who are those individuals whose willingness to spread their costs is definitively lower than others? And who are those who are ready to spread costs to others, even marginally low costs, to gain advantage for themselves? These are the main questions in this research which is also embedded into the related scientific knowledge of external cost analysis, subjective risk perception, and the valuation of natural resources used by economists.

The notion of external costs is central to environmental economics which is the starting point of our analysis. Three characteristics appear to be common to all definitions of external effects: (1) they change the welfare function of a person not involved into the transaction; (2) the effects are not intended by the producer of the product/service; and (3) the effects is not compensated for (Turner et al., 1994). Though the notion is also applied to positive, advantageous effects, we solely deal with negative external effects such as environmental load or pollution. The above type of definition has lots of advantages for the analysis, and the most important, inherent condition seems to be the 3rd one: as effects are compensated, the problem changes its character and stops being external. Then, all costs appear internal for the user of the technology. This is the classic solution to the externality problem: internalization of external costs.

There seems nothing more natural for economists to accept than that external effects are unintended. The smoking chimney or exhaust pipe is not our purpose, of course. The purpose is to produce electricity or move from point A to point B in space, and the environmental load and the pollution is only an unintended by-product of the process. However, by broadening our view and studying all of the possible technological options for achieving our goals, it is possible that we will come to realize that this process is not so natural and unintended. Using a specific technological solution clearly reflects our values and preferences because we also accept the distribution of the costs created by the chosen technology. This choice ultimately informs us not only about the fate of ‘third persons’ who unintendedly suffer, but also tells a lot about the ‘first persons’ (producers), and second ones too (consumers). These individuals say yes to the technological solution by which a specific product or service is ‘manufactured’ and they all accept the pattern of cost distribution in their act of production and consumption by opting for a specific technology.

When analyzing ‘intention’ we never should forget the logic of our market-based economic system where profit maximization lies at the core of working principles. Of course, profit has two basic elements: revenue and cost. Our focus is the latter: cutting costs means increasing profit, all else being equal. We usually describe technologies that operate at lower costs as better, more powerful, and efficient. But we seldom investigate the source of this efficiency which might be easily found by widening the scope of analysis: the fact is usually that costs are externalized to people who live far
away in space and/or time (Read, 2001; Hepburn et al., 2010); and/or, using an even wider analysis, by stepping over the boundaries of our anthropocentric world-view, by putting the cost on other living species like hens, pigs and other animals (cf. Singer, 1995).

The basics of this cost shifting (Kapp, 1978; Swaney-Evers, 1989) or ‘profit maximizing by cost-spreading’-concept was well established by Thomas Princen (1997), who speaks about the shading and distancing of commerce. The power of his approach lies in the fact that it is fully integrated into the human drive of profit maximization also described by mainstream economics – but is extended by important structural-institutional elements. This fully rational, critical economic approach – completed with the world view of ecological economics which emphasizes its finite and limited nature – will also be adopted in our analysis.

We think there is more than enough information available to the public to reject the un-deliberateness hypothesis regarding external costs. It is now a valid research question to investigate willingness to spread costs by producers and/or consumers in order to gain advantages here and now. The technological possibilities are given and known, and yes, information about all the negative consequences evoked by the use of these advanced technologies is now also available to the informed. By a new, and – to our best knowledge – less used framing of the (dis)advantages of new, advanced technologies (cf. Pidgeon et al., 2008) we may help to develop new knowledge about human preferences in those decisions which influence patterns of costs. The problem of whether to prefer immediately available gains with costs deferred for 50 years and/or 1000 miles farther away is now far from theoretical or unrealistic.

What kind of trade-offs can be observed between present advantages that we gain and costs charged onto other humans and non-humans distant in time and space? By framing and defining technological development as a powerful, more efficient, and sometimes frightening device for spreading costs to others, which types of people definitively refuse to take advantage of these new possibilities and which are ready to use them without any scruples? This is a valid research question in a ‘full world’ where frontiers disappeared long ago: the sources of gains are usually losses somewhere else in space and time, and lots of scientific information about the potential costs of advanced technologies is available (or will shortly be available) to a wide audience.

We define this program as pilot research, designed to develop the basics of a language which is able to scientifically describe the symptoms of intentionally externalized costs in decision making (cost shifting). A new model of technological development described by the language of external costs is a promising scientific agenda here. Then, decision making, education and environmental policy might refine their focus in the light of this new approach by combining – intended – external effects and trade-offs. Costs are rarely saved in a closed, full-world system – they are rather spread onto others, which often appears as development using the perspective of a limited subset of the whole system for a limited time period. This is the point where the environmental economics of profit maximizing and ecological economics of limited carrying capacity meet in a new and fruitful scientific stream.

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On urban trends, health and mosquitoes; The evaluation of welfare levels for the control of the Asian tiger mosquito in the city of Athens

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The expansion of urban ecosystems is the outcome of a massive lifestyle change contributing to a series of side effects such as environmental deterioration, disease spreads, increase of GHG emissions, introduction of invasive species, etc. In the case of the Athens metropolitan area, where intense urbanization has and is still taking place since the 1960s, there has been a wide spread of an invasive mosquito species called the Asian tiger mosquito in the Athens area during the last decade. This spread is favoured within urban environments also affected by changing climatic trends. The Asian tiger mosquito is accompanied by risks of mosquito-borne diseases, nuisance levels, and increased expenses incurred for its confrontation. The aim of this paper is to estimate the various cost categories associated with this problem, evaluate the level of the citizens' well being from averting the problem and record their preferences over the control methods, in the Athens area. The evaluation is based on a stated preferences study in the Athens area, the employment of a web-based questionnaire to record the impact of Asian tiger mosquito in Greek households, an expert's survey on the control of mosquito problem by Greek authorities and the conduct of a cost of illness study for mosquito borne epidemics in selected cities of Greece. Evidence shows that citizens are prone to give a high value on mosquito control only once it is associated with serious health risks, they are sensitive of the environmental consequences of control methods and they are prone to consider public authorities as responsible for the problem.

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Do Mature Economies Grow Exponentially – and what if not?
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On November 2013, Lawrence Summer gave a seminal presentation at the annual IMF Research Conference on policy responses to the current economic crises. At this point, the great majority of economists studying the financial and the European economic crisis shared the view that economic growth needed to be reestablished in order to solve the crisis. They solely disagreed upon the way to get there, being divided into two camps the austerity versus Keynesian stimulus proponents. Instead of arguing for either one of the two, Summers surprised his audience with an innovative perspective on the debate. He argued, that the US economy has entered secular stagnation - a new phase with constant low growth rates, and that this situation was about to stay. Summers is not the first to observe the persistently low growth rates though. Several authors have, some already before the economic crises following 2007, argued that growth rates are falling in mature economies, that is, economies that typically were part of the first wave of industrialization and have high per capita incomes today. While most economists reason that high growth rates can and should be regained (Reuter, 2000), according to this diverging analysis the low growth rates after the crisis are a continuation of decreasing growth rates for several decades. In fact, it is argued that post-war growth in mature economies depicts rather a linear than an exponential trend.

The idea that economic growth is exponential is deeply rooted within economic discourses. In economic theories, economic growth is commonly depicted as a (constant) fraction of the level of production and therefore tends to be regarded as exponential (Barro, R. & Sala-i Martin 2004; Harrod, 1939, Solow, 1956). Public economic debates refer to the rate of economic growth, which also implies exponential growth (Schmelzer, 2015).

At the same time, several strands of literature put the idea of exponential economic growth into question. After the recent world economic crisis, a renewed debate on 'secular stagnation' has emerged. Influential economists such as Summers (2014) or Krugman (2014) argue that the United States and other mature economies have entered a long phase of low or zero growth. Another strand of literature argues that economic growth after the Second World War has empirically depicted a linear rather than an exponential pattern (Wibe & Carlen, 2006).

In the literature on degrowth and post-growth it is argued that further economic growth in mature economies cannot be environmentally sustainable and does not contribute to social welfare (Jackson, 2009; Kallis et al., 2012). It is stressed that a degrowth or post-growth economy does not only not grow but also organizes production and consumption differently. Recently, this strand of literature has been connected to the discussion on secular stagnation: from this perspective the question is not 'how can
growth be restarted?' but 'how the non-growing economy can be organized differently so that it leads to social equity and environmental sustainability' (D’Alisa et al., 2015).

The aims of this paper are to understand how exponential and non-exponential growth are explained in different strands of economic theories, to analyze whether the common assumption that economic growth is exponential holds empirically and what these findings imply for future economic theories and policies. We find that economic growth is modelled as an exponential process in almost all theories either explicitly or implicitly. This is true for both, mainstream and heterodox theories.

In order to shed light on this issue empirically, we estimate autoregressive integrated moving average time series models based on Gross Domestic Product Per Capita data for 18 mature economies from 1960 to 2013. We compare the adequacy of linear and exponential growth models and conduct several robustness checks. The overall picture of our analyses casts doubts on the widespread belief of exponential growth. The results are not distinct in the sense that we could find clear evidence whether growth in economically developed countries is in general exponential or linear. We observe, however, high dependence on the sample period, in particular on the inclusion of the recent crisis (2008-2013). We do not want to overreach in the interpretation of our results. Nevertheless, while using more appropriate time series models and more recent data, our main finding is in line with Wibe and Carlen (2006) and Bourcarde and Herzmann (2006): In contrast to the prominent view of exponential economic growth, a constant growth might be closer to the truth of what has happened in some mature economies within the last 40-50 year.

Based on these results we further discuss, what policies can shape such economies without exponential growth in a socially and environmentally sound manner. It is argued, that while the proposals from degrowth and post-growth debates are a good starting point, there is still much room for discussion and research on policies for mature economies that do not grow exponentially.

Bibliography
Divergent theories of change between farmers and conservationists: lessons from a year without green subsidies in Hungary

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Our work seeks to contribute to and disrupt the possibilities at the interface between conservation and agriculture. For over a decade, formal regulatory efforts to encourage ‘green’ agriculture within the European Union have been through agri-environment schemes, complemented by ‘traditional’ conservation techniques of territorial zoning, such as Natura 2000 and set-aside. Studies to evaluate the effectiveness of agri-environment usually focus on participation rates and farmers’ motivations with little contextualisation of what agri-environment represents and means in the overall logic of farming: what fundamental changes have programmes brought relative to how farmers used to farm? How have these subsidies changed farming business logics and motivations over time? How do farmers evaluate their environmental effectiveness, and what consequences do these perceptions have?

In this presentation, we will tackle the above questions through comparing the conservation communities’ “theory of change” and impact amongst participating agri-environment farmers, with farmers’ lived realities and work alongside these schemes. Our engagement and data draw from several years’ research and exposure to four farming areas in Hungary: Hevesi plains, Kiskunsag, Bekes and the Northern Cserehat. In late 2015-early 2016, we completed 300 farmhold surveys from the first three areas in order to evaluate agri-environment experiences and perceptions of farmers. This year formed part of a natural ‘policy experiment’, as the Hungarian government did not pay out agri-environment payments for the 2014-15 farming year, in effect breaking ten years of continuous programme support.

Our results show that there are fundamental, isolating misconceptions made by the conservation community around what agri-environment payments mean to and represent for farmers, in terms of both work and environmental impact. First, participation in agri-environment programmes are not binary, as the majority of farmers participate selectively with a portion of their lands, in general electing to farm differently (more intensively) with areas that are more fertile or bureaucratically less problematic. Participation thus takes place along a spectrum, with farmers’ financial needs determining where participation makes ‘business sense’: farmers are primarily motivated by returns and profit, and willing to cede marginal yield areas. Second, we found little evidence of an emerging conservation consciousness: although in many areas farmers cited evidence for environmental improvement, these gains paled in comparison to wider regional trends of intensification or abandonment. Many farmers aspired to “outgrow” the scheme, which in itself is perceived as a form of excessive government, particularly through its administrative and accounting requirements, with little environmental impact.

In contradistinction, conservationists approach agri-environment as fundamentally good for biodiversity and the environment as an incentive form with the promise to ‘convert’ farmers into environmentally-friendly stewards. This displays a disconnect between the perceived promise, preference for and march of mechanisation and technology; farmers’ decision-making and options in a rural context of state divestment and seeming abandonment; and the marginal (potentially irrelevant?) gains agri-environment schemes can make alongside mosaic intensification.

We will conclude with reflections as to what these findings mean for the conservation/agriculture interface, and the geographically sensitive and differential ways in which solutions need to be found for the future ‘greening’ of agriculture.

This presentation will cross-cut a range of themes of central concern to the ESEE community, in particular themes for the use of policy science for institutional change (Section 4); and the use of empirical insights (Section 6) and real-life impacts for studying (and maintaining) socio-ecological systems.
Participatory methods, agency and the question of human development
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Based on our previous participatory research, in this paper we wish to address the question of how participatory research methods may change social and political environments from within. Participatory methods may seem a step forward in the process of democratisation, yet in many countries (among others in some Central Eastern European countries) political leaders now aim to narrow down the possibilities of inputs coming from the populace instead of opening up new avenues for participation. In relation to this, a particularly painful question arises concerning participatory research. If there is no “receiving party” for the results of participatory research on behalf of the key decision-makers, is there a point in conducting such research projects emphasising the importance of participation itself?

The situation seems even worse if we take into account cultural factors such as values and social practices enforced by the starkness of everyday reality. For example, among Central and Eastern European countries, Hungary has the lowest levels of subjective happiness coupled with low levels of both perception of participation in decisions at one’s workplace and control over one’s life (Csepeli & Praszák 2011). At the same time, such psychological factors play significant roles in both initiating and/or accepting change associated with ecological and social transformations (Gifford, 2011) as well as expecting political actors to execute policies leading towards such transformations (Király et al, 2016). Therefore, finding ways to improve these aspects of behaviour is paramount for breaking the cycle of hopelessness and learned helplessness (Abramson et al. 1978; Seligman 1972).

In this paper, we argue that agency and control are the underlying factors which can catalyse change in cultural realms that in turn affects political realms and we intend to examine how participatory research can affect these factors. Firstly, we briefly touch upon why agency and control are key requirements at biological and psychological levels (Ariely, 2010; Iyengar, 2010). Based on this rich literature, it can be argued that participation in decisions about one’s life is not only a construction of our modernity but it is deeply rooted in the biological and psychological setup of higher-order animals in general. Secondly, we discuss how participatory research methods not only theoretically presuppose but also in practice reinforce these key abilities. Culturally and socially such techniques may seem out of kilter in a Central Eastern European context where the memory of past authoritarian leaderships might still affect the present. However, in projects we were involved as researchers, participants in such processes quickly found their voices and contribute to the common arguments if they feel that their participation can be meaningful. Thirdly, based on the experiences of three separate participatory backcasting projects (and all together five backcasting workshops - Pataki et al, 2012; Köves, 2015; Király et al. 2016; Köves et al, 2016), we argue that human agency and control are present as underlying values in normative visions about the future, whether the visions were about sustainable employment; sustainable and responsible business; or the future(s) of higher education. Comparing the results of these different normative visions about the future, one can easily find that the common thread is that participants depicted the people of the future having more control and agency to decide how they want to live, study and work.

In the last, concluding part of the paper, we put the above mentioned arguments into a theoretical context. In order to offer an answer to the question raised at the beginning of the presentation (namely whether there is a point to conducting participatory research at all), we reflect upon the possibility of scaling up such participatory activities to the social and cultural level. In order to do so, we draw on Inglehart and Welzel’s (2005) theory of human development sequence. This theory attempts to explain how individual value changes might aggregate and affect the cultural level, and in turn, determine the type of political leaders people elect. By offering vicious and virtuous circles of human development based on autonomy and control (or the lack of them), this social theory can offer ways to catalyse social and political change. Participatory research may just have the (un)intended effect of contributing to such processes.
The Role of Trade Unions in Socio-Ecological Transformation

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Trade unions have been at the forefront of representing the collective rights and interests of workers in the production system in the past. The goals of environmental health and safety are also tied to the interests of the workers in the long term, as climate change and environmental degradation are likely to fall unequally on the poorest who will not be able to buy their way out of environmental catastrophes (Barca, 2012: 61). Nevertheless, as has become clear from the policy papers of the largest unions in the UK (Unite and Unison), so far they have failed to do away with the growth-focused, anti-environmentalist approaches like environmental Keynesianism. This is due to a variety of reasons, including the onslaught of neoliberalism since the 1970s, which has individualised “work” and marginalised Keynesian economics, and the increasing embeddedness and institutionalisation of trade unions within the state system itself. In my study I aim to research the role of trade unions in transformative environmental justice movements.

I will specifically be looking at the two largest trade unions, Unite and Unison, in the UK, where the present political milieu is especially unfavourable to trade unions. The study will start with an overview of current policy analysis of the two unions, after which expert interviews will be conducted with area representatives to gauge the extent to which there is awareness of environmental concerns, and the extent to which these goals are important in the current political climate. Particularly, I aim to find out how the role and obligations of the respective organisations are understood both alone, and as part of the wider trade union movement, in the fight for a just socio-ecological transformation.
Historically labour and trade unions have played a key role in fighting for the rights and interests of working people, and since environmental health is a key factor for the well-being of citizens and workers, it is interesting that this link has faded. Barca argues that there is an “organic connection” between workers, the environment and health, and that this is capable of “producing a radical critique of the economic system and a new emancipatory discourse”, and is potentially dangerous for the current political-economic structure (Barca, 2012: 67). However, if the bigger institutionalised trade unions (or their leadership) benefit from or are embedded in the political-economic order, there is little hope that trade unions would cooperate with more radical grassroots social movements, like the civil rights and feminist movements in post-war America with whom they won the fight for new health and safety protection and legislation in the US. In this sense the current anti-unionist political struggle is also interesting in terms of electrifying the debate and perhaps shaking up the movement itself, with interesting possibilities for more radical goals and debates to be had within the movement. This contradictions within the trade union movement that will be further researched and the centre of the focus of the study.

The 2014 Policy Conference Summary of the UK’s largest union, Unite, is a good example of the contradictions which are disabling the development of a meaningful environment approach, as the demand-led and growth-focused view of environmental Keynesianism which underpins this thinking, is in stark contrast to the reality of the limits to growth. A look at the document provides an initial starting point of analysis for the interviews I will be conducting. The three key foci of the environmental policy of the union are explained as: opposition to fracking, supporting the creation of “green jobs”, and supporting increased government investment in renewable energy sources (Unite, 2014: 12-13). It is claimed that “combating climate change requires governmental and inter-governmental co-operation, major investment in public works, and an emergency emission reductions scheme. Tackling climate change, especially through the creation of climate jobs, is of immediate relevance” (Unite, 2014:12). The contradictions are further exemplified in Unite’s policy stance on the recent decision by the government to enlarge a third runway at Heathrow. In their own words, due to the “strategic importance of Civil Air Transport to the UK economy… the importance of its continued growth, development and interconnectivity… a strategic part of UK national infrastructure (that) would create and sustain thousands of jobs in numerous industrial sectors” (Unite, 2014: 31).

As well as further in-depth policy analyses of the two unions, I will be conducting expert interviews with 10 regional representatives from Unite and Unison to more fully look into the extent to which there is both awareness and a willingness to act amongst the mid-level leadership of the union, when it comes to environmental concerns. As the current political climate in the UK is increasingly unfavourable to the trade union movement itself, the short-term goal of the survival of the trade union movement is expected to outweigh the long-term and relatively far-away goal of environmental sustainability. The main aim of the study, which is currently in its early stages, will be to understand more fully how agents within the union view the role of both their organisation, and the movement as a whole in the struggle for a social-ecological transformation. Trade unions have historically been powerful vehicles of democratic and grassroots social transformation and social justice, and in the opinion of the author, must play a decisive role in the new transformative grassroots movement(s) for socio-ecological justice. This study therefore aims to contribute to our understanding of how specific organisations engage within this struggle, and how better collaboration(s) and an alignment of goals can be achieved.

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Integrated valuation: Integrating value dimensions and valuation methods
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Valuation of nature is attracting more and more attention in modern discussions on environmental protection, and is most often associated with monetary methods that fit into the overarching economic paradigm. Valuation is typically expected to create a platform for communication between environmentalists and decision makers, and eventually to inform decision making. However, environmentalists and decision makers, as well as others who use the environment and protect or manage it, usually perceive the environment differently – through the lens of different value dimensions. This is particularly relevant when one adopts the perspective of social-ecological systems. Relatively early in the discussion on valuation it was argued that special attention needs to be paid to establish and strengthen linkages between different valuation methods and approaches. More recently, the push for integrating different valuation approaches have intensified, increasingly requiring researchers to go beyond standard techniques of examining problems from a dominant economic perspective. Indeed, the challenge of integrated valuation is currently perceived as a frontier in the study of ecosystem services.

Here we analyse the opportunities for integrating different valuation methods which represent three value dimensions: economic, social and ecological. We argue that the highest integration potential stems from whether the methods in question refer to logically commensurable values and whether they are technically compatible. Ultimately, different methods can be co-developed specifically for the purpose of a given integrated valuation exercise. Even when full integration is not possible, different valuation methods can be combined to provide additional information that helps to interpret the results of at least one of the methods which are brought together. Finally, it is also possible to use different valuation methods in parallel, without attempting to integrate or combine them, to obtain different pieces of information on the same object of study.

To analyse the potential for integrated valuation of nature, we consider pairs of methods representative for the different value dimensions. Where possible and relevant, we provide examples indicating either what such an integrated valuation exercise might look like or how it has actually been achieved in practice. Among our key conclusions, we note that integrated valuation approaches provide detailed information about very specific situations, which may be generalizable but not necessarily relevant for broader discussions on the value of nature to people. Perhaps surprisingly, instead of broadening the scope of analysis, we are narrowing (but refining) it.

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Accounting for supply and use of ecosystem services within the Integrated system of Natural Capital Accounting (INCA) scheme for Europe. Theory and practice

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In Europe the 7th Environment Action Program and the EU Biodiversity Strategy include objectives to develop Integrated systems for Natural Capital Accounting (INCA), with a focus on ecosystems and their services. The reference accounting framework is the System for integrated Environmental and Economic Accounts - Experimental Ecosystem Accounts (SEEA-EEA) developed and supported by the United Nations, European Commission, FAO, OECD and the World Bank. The SEEA-EEA (UNSD et al. 2014) includes sets of accounts for ecosystems and for ecosystem services. Within the INCA project, the Joint Research Centre is responsible to develop the ecosystem services supply and use tables for selected ecosystem services in physical and monetary terms. The accounting conceptual framework that underpins applications is based on few principles whose aim is to guarantee consistency both in accounting and in ecological economic terms. The theory is being tested against three different ecosystem services across Europe. Two flows belong to ‘regulating services’ and they are indeed very different in nature and assessment techniques: water purification and pollination. The third flow concerns ‘cultural services’: outdoor recreation. The application is undertaken for all EU member states with a spatial resolution of 1 km.

We are here to present the outcomes of one of the three case studies: water purification (La Notte et al. 2016).

To align with SEEA-EEA definitions and methods, we use a four step procedure:

1. Identify the ecosystem service classification and underlying conceptual framework;
2. Quantify in physical terms the targeted ecosystem service;
3. Translate the quantitative assessment into monetary terms by choosing the most appropriate economic valuation technique;
4. Enter data into tables consistent with the SEEA-EEA structure:

In the first step we use the Common International Classification for Ecosystem Services (CICES) as proposed in the SEEA-EEA. The conceptual framework we use is the ecosystem services cascade model (Haines-Young and Potschin 2010). The interpretation of the cascade is however re-conceptualized through the system ecology categories (biomass, information and interaction) (La Notte et al., 2016).

Figure 1 – Telescopic view of the cascade model.

The second step of the procedure involves the physical quantification of the selected ecosystem service: here we use a biophysical model (Geospatial Regression Equation for European Nutrient losses, GREEN) to quantify the actual flow of the ES we are considering. The GREEN model calculates the amount of nitrogen retained in a river segment as a function of the river network structure, the input of nutrients from diffuse sources (mineral fertilizers, manure applications, atmospheric deposition, crop fixation, and scattered dwellings) and from point sources (industrial and wastewater treatment discharges), the estimated nutrient fraction retained during transport from land to surface water, and the nutrient fraction retained in the river segment. When nitrogen input from different sources increases, the nitrogen loading to rivers and, in turn, the total nitrogen retention increases accordingly (Grizzetti et al., 2008, 2012). However, the actual flow could (and should) be lower than the total flow that the ecosystem is able to provide of that specific single service. In order to assess the degree of sustainability it is important to assess not only the actual flow but also the total potential flow, whether it is used or not. A way to assess the potential flow is to establish a sustainability threshold and measure how above or below the actual flow is compared to that threshold. By imposing a sustainability threshold, we are able to quantify the sustainable flow that the ecosystem is able to generate for that specific service. To address the declining capacity problem, we calculate the
sustainable flow together with the actual flow. We use threshold concentrations of nitrogen to define sustainable removal of nitrogen by the river network. Below the threshold critical level the removal of nitrogen by the different ecological processes is sustainable and results in optimal flow of the ecosystem service. We assume the critical nitrogen concentration to be 1 mg L\(^{-1}\) (Bobbink et al., 2010). The amount of nitrogen that is retained and removed by rivers and lakes is first converted into a Constructed Wetland Equivalent Area (CWEA) to act as an area measure for the ecosystem capacity to provide the water purification ecosystem service. CWEA provides an estimate of the total area (ha) of a wetland extension explicitly devoted to provide the same nitrogen retention as the river network in each sub-catchment.

We then use a replacement cost approach to estimate the monetary value of the physical units produced by the CWEA. It is possible to differentiate constructed wetlands, which have different replacement costs based on their cost-effective treatment: Free Water Surface (FWS) constructed wetlands are best for the treatment of nutrients from diffuse sources typical in primary production because of their suitability to a watershed scale and because of their ability to deal with intermittent flows and low concentrations (Kadlec and Wallace, 2009); Horizontal subsurface Flow (HF) constructed wetlands are best for dealing with emissions from point sources because the nitrogen retained is mainly in oxidized forms due to the general quality characteristics of wastewater treated in conventional treatment plants (which is generally limited during the de-nitrification phase) and runoff derived from paved and agricultural surfaces. By calculating the Net Present Value (NPV) of the sustainable flow we can quantify the stock for that specific service that we call 'capacity'. According to the definitions here provided the capacity is the NPV of the sustainable flow referred to individual ES and it does represent a stock. Consistently with these definitions the actual flow can be higher equal or lower than sustainable flow but not higher than capacity, that is the stock generating sustainable and actual flows.

The third step translates the biophysical quantities into monetary terms. It is important to distinguish between welfare values, relevant in a public policy context, and exchange values, relevant in an accounting context. As the focus of ecosystem accounting is on integration with standard economic accounts, ecosystem services should be estimated with reference to exchange values.

The final step fits the physical and monetary outputs into accounting tables as follows:

- Accounting for the impact on ecosystem units and ecosystem services by economic sectors and households (e.g. for example emissions from economic activities) which represent a first linkage with SEEA-CF (ref. Table 1);
- Accounting for actual flow used and consumed by economic sectors and households from the ecosystem service (ref Table 2);
- Accounting for sustainable flows (ref Table 2): the sustainable flow of the service received by economic sectors and households, which may be lower/higher than the actual flow (as measured in Table 2) if sustainable/unsustainable;
- Accounting for the capacity of ecosystems to provide a sustainable flow of the individual ecosystem service (ref. Table 3);
- Linking ecosystem services accounts with economic accounts (ref. Figure 3).

Table 1: Nitrogen emissions ('000 tons) to water catchments generated by economic activities and households, as modeled by GREEN for each reference year.
Table 2: Use of the water purification service to the economy and society, in monetary terms (million €).
Table 3: Capacity of ecosystem to generate the water purification service in monetary terms (million €).

About the linkage with traditional economic accounts, the data source used Europe is Eurostat. Figure 2 shows how emissions relate to actual and sustainable flows for e.g. Norway. Here the pressure of N emissions is below the sustainability threshold and that allow to have a sustainable flow that is much higher than the actual one. This does not imply that the actual flow is low: it is large enough to catch
the demand from economic sectors and households. This implies that when a sustainable management regime is applied, the ecosystem process is able to generate larger flows of ecosystem services.

Figure 2 - N emissions, actual and sustainable flows in Norway.
In Norway the primary sector represented the 3.2% of total VA in 1985, the 3.4% in 1990, the 3.0% in 1995, the 2.1% in 2000 and the 1.6% in 2005. Figure 3 shows that the sustainable flow calculated for diffuse emissions generated by the ecosystem for water purification is higher than the VA of the primary sector, while the actual flow is lower. It also shows that when the VA of primary sector changes a clear change (in the opposite direction) is also visible in the sustainable flow related to diffuse emissions.

Figure 3 – Value Added and sustainable flows in Norway.
Those figures have to be interpreted with caution. We used this setting for illustrative purposes, however before implementing the integration between economic accounts and ecosystem service accounts a rigorous check of system principles and classifications of data sources must be implemented. Specifically, in this case: we assume that N emissions are estimated following the same principles at the basis of national accounts (e.g. residence principle and economic territory principle) and following the NACE (Nomenclature statistique des Activités économiques dans la Communauté Européenne) classification. The outcomes here reported are meant to show how to integrate economic accounts and ecosystem service accounts.

References

Reducing carbon footprint of city residents through increasement of municipal energy consumption
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It is estimated that the share of anthropogenic greenhouse gas (GHG) emissions caused by energy use is around 55% (IPCC 2011). From the energy-related emissions cities’ energy consumption is estimated to account over 70% (IEA 2008). Thus it is crucial that cities are developed from this perspective when climate change mitigation actions are executed.

Although GHG emission contribution of energy is dominant, direct energy demand and GHG emissions resulted from the direct energy consumption of a city can be significantly less dominant. Major share of GHG emissions are resulted from the consumption of other consumables and embedded energy within consumables. Cities and nations are part of highly globalized ecosystems where commodities are supplied based on market mechanisms. Consequentially even if the whole direct energy demand of a city would be provided through local municipal energy systems, significant share of carbon footprint would be based on indirect energy consumption. Thus, a major share of the energy consumption of a consumer is likely to fall outside the reach of local energy policies and personal energy choices. When moving towards larger boundaries, the same applies to the energy requirements of cities and nations. In Finland, it has been estimated that nearly 50% of energy and GHG emissions embodied in consumption are imported (Seppälä et al. 2009, Seppälä et al. 2011). When looking at the regional or city level, the share could be even higher. For example, according to Wiedmann et al. (2015), 58% of the carbon footprint in Melbourne is imported from outside of the city.

Because energy consumption still is a dominant source of GHG emissions, it is essential that the general impact on city residents’ carbon footprint is minimized. This can be done by minimizing the GHG emissions of energy consumption in different levels. Energy consumption can be divided into four levels: (1) the housing level, (2) the municipal energy level, (3) the national energy level, and (4) the global level. Different levels of energy consumption have different roles when defining a city residents’ carbon footprint.
The housing level of energy consumption represent individual choices. Such a choices represent direct energy consumption in individual city resident’s carbon footprint. These energy purchases are electricity, heat and fuel procurements. The municipal level’s role in energy consumption is centered on municipal energy systems such as district heating systems. District heating systems provide heat for city residents but can as well have an influence on national and even global level when combined heat and power generation is utilized and electricity produced in parallel to heat. The national level’s role in energy consumption is in accordance to national energy systems such as electricity grid, national energy market regulations and national market demand. The level’s implications can as well be seen to have an influence on a municipal level as well as on a global level. The global level’s role in energy consumption is based on global market demand and supply. In addition global regulations can have strong implications on the energy demand of particular energy sources. As the energy systems are usually complex systems with various technologies and energy sources, system dynamics of such a systems are well studied. For instance Siler-Evans et al. (2012) and Farhat & Ugursal (2010) have presented that by adjusting a demand of energy have a change in marginal energy production or source. Marginal energy is regulating energy source which is balancing the supply and demand. Marginal energy can be as well a set of different technologies and energy sources. Where marginal energy is more costly or produce more emissions than the average energy technology of a system, a decrease in energy leads to relatively larger cost or emission savings. Studies such as Holttinen & Tuhkanen (2004), Siitonen et al. (2010), Pehnt et al. (2008) and McCarthy & Yang (2010) have suggested that similar implications are present when single measures or production technologies are introduced into an electricity system. Such studies focus is more on initial system implications whereas long term temporal changes are consequents of various market impacts. Studies such as Olkkonen & Syri (2016) and Zivin et al. (2014) have suggested that marginal electricity can be highly spatially, as well as being temporally dependent. For example, Roux et al. (2016) and Kopsakangas-Savolainen et al. (2015) have suggested that even temporal changes in short term in emissions are changing the actual carbon emissions caused by a subject. Where cities are accounting their GHG emissions they are usually considering only production based local direct emissions. At their best they are supplementing production based information with a consumption based carbon footprint information. The system and consequential implications are commonly excluded. While such a system implications are not accounted within city boundaries, implications can potentially represent largest environmental implication of a city and thus dynamics of municipal energy system’s role within a larger energy system would need to be acknowledged. The purpose of the study was to present via a case study how increased energy demand in a city can lead to relatively negative emission decrease implications in city residents’ carbon footprint. Such a system implication is contrary to general expectations. Case study was a city called Tampere in Finland and the reference year was 2012. Case study was based on a simulation of reference year with six different demand side levels. It was found out that increasing the heating energy demand leads to relative decrease in city residents’ carbon footprints. In addition a national electricity system level emissions are shown to be decreased which leads to absolute emission decrease implications within the boundary of national energy system. Also if the demand would be transferred from a site with higher energy consumption emissions, emission decrease benefits are multifold.

**Human well-being and climate change mitigation**

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The need for an alternative definition of human well-being that moves beyond Gross Domestic Product is now widely recognised in science and practice. This shift in focus has important implications for sustainability research, but current approaches are insufficiently aware of the theoretical divisions
within well-being research – particularly within the field of climate change mitigation. Major strands of well-being thought are hedonic well-being (typically referred to as happiness, or subjective well-being), eudaimonic well-being (which includes theories of human needs, capabilities, and multi-dimensional poverty), and political or procedural accounts (such as the Sustainable Development Goals).

The theoretical claims and practical implications of these approaches can be summarised as follows. Hedonic well-being invites ‘single indicator’ applications that mirror the use of GDP; and this approach tends to become mired in disciplinary and individualistic perspectives regarding the determinants (and solution space) of happiness and life satisfaction. Eudaimonic approaches instead focus attention on the social and political contexts of well-being fulfilment. This requires a deeper interdisciplinary engagement to evaluate multi-dimensional, non-substitutable human needs or attributes. Finally, procedural accounts focus predominantly on quantifiable and measurable goals, potentially avoiding normative issues of trade-offs, prioritisation, and the role of power. Situating these three concepts within the challenges of addressing climate change, it is apparent that the choice of approach is highly consequential for: (1) understanding inter- and intra-generational equity; (2) defining appropriate mitigation strategies; and (3) conceptualising the relationship between biophysical resources and human well-being outcomes.

In the first instance, the subjective and adaptive nature of hedonic self-assessments render them ill-suited to measure and conceptualise the well-being of future generations. Conversely, the external and objective conditions emphasised in eudaimonic accounts may be used to examine intergenerational resource equality issues, such as the potential impacts of climate change on human health from crop yield decline or shifting disease vectors. Second, a narrow hedonic focus on the subjective well-being of individuals invites mitigation solutions that target behaviour and choice, i.e. by educating wealthy people to consume less, or poor people to better cope with climate impacts. But since eudaimonists rather see individual behaviours and choices as originating within social and political contexts, a long-running theme of structure versus agency in social theory is invoked by their work, emphasising institutional change as a necessary prerequisite to behavioural change. Finally, these differences inform our understanding of how biophysical resources are converted into well-being outcomes. Existing work linking energy consumption, carbon emissions and well-being satisfaction points to the importance of consumption thresholds, beyond which dimensions of well-being become satiated. Eudaimonic well-being research can therefore be seen as emphasising minimum resource use and upper consumption levels, inviting normative discussions on the social benefits and climate impacts associated with a given form of provisioning – a widely emphasised entry point for degrowth research into broader mitigation agendas. (But counterintuitively, framing these consumption limits in terms of hedonic well-being may be a counterproductive strategy for the degrowth movement.)

So to what extent can well-being research serve as a conduit for introducing minimum and maximum consumption concepts into the mainstream climate mitigation community? We now observe a wide uptake of well-being research (particularly the Sustainable Development Goals) both in integrated assessment modelling and in the planned Intergovernmental Panel on Climate Change Special Report on 1.5°C. Given that eudaimonic well-being implies rather more significant implications for climate change research than simply capturing additional sustainability dimensions, this presentation concludes by offering an assessment of the prevailing research philosophies and analytical frameworks in these communities that may help or hinder a wider adoption and understanding of well-being concepts.
Macroeconomics without Growth: Sustainable Economies in Neoclassical, Keynesian and Marxian Theories

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This article develops a model on conditions for sustainable economies without growth. The central motivations to organize economies without growth are that economic growth is environmentally unsustainable (Antal and van den Bergh, 2016; Jackson, 2009) and does not contribute to high social welfare in early industrialized countries (Diener et al., 1999; Easterlin & McVey, 2010). As a result, a significant amount of literature on concepts for economies without growth has developed, referring to the terms steady state economies (Daly, 1991), degrowth (D’Alisa et al., 2014), Postwachstum (Schmelzer and Passadakis, 2011) and prosperity/managing without growth (Jackson 2009; Victor, 2008).

In this article, a set of conditions is used to develop models of economies without growth. The crucial features (aggregate supply, aggregate demand, employment, emissions, etc.) of the model are formalized. The conditions for economies without growth are based on the analysis in Lange (forthcoming) and build on insights from contributions on economies without growth from the view of Post-Keynesian (Jackson & Victor, 2015; Fontana & Sawyer, 2015), Monopoly Capital (Smith 2010; Blauwhof, 2012) and neoclassical (Bilancini & D’Alessandro, 2012; Heikkinen, 2015) perspectives.

The model is characterized by collectively owned firms. The collective ownership prevents the generation of large retained earnings that would drive capital accumulation and the sales effort. Instead, increases in revenues and labour productivity are used to provide high (albeit not increasing) wages for the members of the collectives, to improve working conditions and to decrease average working hours.

Firms sell their products on markets that are embedded in a significantly different macroeconomic framework than in growing economies. Four features of this framework shape the economy. First, the government introduces strong environmental policies such as strict limits on the exploitation of natural resources and strong environmental taxes. At the same time, the government reduces the costs of labour besides wages, i.e., nonwage labour costs. The effect is a strong change in the relative prices of production factors. Energy, natural resources and physical capital become more expensive while labour gets cheaper. Second, policies that prevent economies of scale and introduce diseconomies of scale are implemented: increasing transport costs, local infrastructures, regulations to treat small firms preferentially, etc. Third, the sales effort is regulated, including measures concerning commercials, planned obsolescence and new features. Fourth, reductions in average working hours are supported by governmental policies, e.g., incentives and regulations.

On the supply side, the resulting economy is characterized by constant production, gross investments at the level of capital depreciation, a redirection of technological change and reductions in average working hours. Firms have no incentive to invest above capital depreciation due to diseconomies of scale. They introduce resource-saving technologies. Increases in labour productivity are very limited due to the high costs associated with the use of natural resources and energy. If there are gains in labour productivity they are used for reductions in working hours because of the respective governmental policies, because collectively owned firms avoid worker dismissals and because people prefer increasing leisure rather than increasing income.

On the demand side, the levels of private consumption and government spending stay constant and they shift from dirty towards clean products. Private consumption is constant because income stays constant (due to low increases in labour productivity and reductions in working hours) and because the sales effort has been largely repealed. Government consumption is constant as expansion is not needed to generate employment. Both types of consumption shift away from dirty towards clean products because clean products are relatively cheaper due to the changes in relative prices of production factors and because households and governments decide to shift consumption based on political attitudes.
Regarding monetary aspects, the economy is characterized by zero savings and no continuous accumulation of assets by any single group of economic actors. Zero savings result from zero net investments. The condition of no accumulation of assets by any one group is necessary for economic stability as accumulation of assets by one group implies the accumulation of debt by another. It is achieved by low economic inequalities, redistribution by the state and a regulation of the banking system.

The first outcome of these conditions is zero growth, because both aggregate supply and aggregate demand stay constant over time. Second, environmental pollution decreases because production stops growing, because technological change is redirected towards emission reductions and due to sectoral change from dirty products (with high emission and low labour coefficients) towards clean products (with low emission and high labour coefficients). Third, wealth inequality is low, as the ownership of firms is distributed among the population. Income inequality is also low as wages are the only type of income. Income inequality still exists because wages differ between firms. Fourth, the economy is stable in the sense that employment is constant (as increases in labour productivity are limited and absorbed by reductions in working hours) and there is no instability stemming from the monetary system.

Bibliography
Displaying sustainability related information on meals – The role of design and information depth from a consumer’s perspective

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Much research has been done on food (packaging) labeling especially in the retail sector (Campos et al., 2011; Grunert & Wills, 2007; Cowburn & Stockley, 2004). Food labels display particular product information visually, perform as additional product attribute and may facilitate decision making under restricted cognitive processing (Caswell & Padberg, 2008). It could be shown that such a labelling is able to change consumption patterns towards healthier nutrition choices (e.g. Thorndike et al., 2012) even though more research is needed in order to validate these results (Grunert & Wills, 2007; Sacks et al., 2009). In this regard the determinants that influence the labels’ effectiveness on consumers’ choice are still in the spot of research activities.

One of the influencing factors is cognitive dissonance which may lead to ignoring of conflicting information (Feistinger, 1962) as has been shown for nutrient food labels for healthy food options. These are more likely to be followed by individuals who anyway consume more healthy food options than by those who do not (Hoefkens et al., 2012; Van’t Riet et al., 2013). Another factor is the ease with which a food label can be understood. In this respect the traffic light system is discussed as a label format relatively easy to understand and to apply and hence appropriate in supporting consumers to make healthier choices (Hagen, 2010; UK Department of Health, 2016, van Herpen & van Trijp, 2011). The amount of complexity is reduced to a minimum as the information depth is limited to just one indicator. In a supermarket setting, complexity of the label might be a critical factor since many purchase decisions have to be made within a relatively short time frame.

In out-of-home catering, the decision making process appears to be different compared to the situation in a supermarket but health related labels also spread more and more. Studies indicate that health related labelling on meals can promote the sale of healthier meals. For example, Lassen et al. (2014) used a keyhole-label to indicate healthy meals in a company canteen. This led to a significant decrease of the average consumption of calories. In a study by Sonnenberg et al. (2013), a (slightly) higher number of meals were sold after introducing a traffic light system. Other studies could not confirm a behavioral change as result of a label introduction (Vyth et al., 2011). Further, studies on labels with a focus on adult guests in out-of-home catering and on nutrition-related labels confirm two basic conditions for the influence of labels on behavior. First, the conscious perception of a label (e.g. Vanderlee & Hammond, 2014; Hammond et al., 2013; Pulos & Leng, 2010); and second, the ability to rate the information displayed in the label based on knowledge and thus to understand the information (Hoefkens et al., 2012; Pulos & Leng, 2010).

This indicates that label design and the type and amount of information provided plays a crucial role for the effectiveness of food labels. Our research goal is to assess the way label design and information depth affect consumers’ acceptance and usage of sustainability labels and hence are able to induce sustainable food choice. In out-of-home catering, there are relatively little findings on acceptance and usage of sustainability labels (Grunert et al., 2014, van Loo et al., 2014). The aim of this study is to provide findings in this regard. What kind of design do consumers prefer and which and how much information should be provided?

Research design: Within the project NAHGAST three different label designs (slider vs. footprint vs. traffic light) and a set of five different sustainability indicators were developed. We include the traffic light system since it has been introduced in several canteens, e.g. university cafeterias in Berlins. The sustainability indicators used display the resource use, the carbon emissions, the calorie content, the share of vegetables and fruits as well as animal and human welfare (basis for the development are the
indicators and limits for a sustainable every day nutrition developed by Lukas et al. 2016). In total, nine variations of labels were tested; the three designs presenting either one, three or five indicators. In this way, the information depth varies among three levels up to the label designs containing five indicators (detailed methodology is discussed in the first talk of the session). The approach to vary the information depth while keeping the designs fixed and measure their effect on consumers’ preferences has not been done yet. In order to reveal consumers’ preferences on these label variations we applied a format of best-worst scaling (BWS) among the guests of the canteen of the university of Bonn/Germany. BWS allows to elicit relative preferences in a comparably easy manner and produces results that are interpretable on an interval scale (Flynn et al., 2008; Finn & Louviere, 1992). In contrast to discrete choice experiments, the respondents are forced to discriminate between the presented items as they mark not only the ‘best’ item but also the ‘worst’. Hence, the data provides considerably more statistical information (Louviere et al., 2013).

Respondents had to choose both, the most helpful and the least helpful label to support their choice of the meal. Every respondent answered eight choice sets with four alternatives per set. In total n=95 students completed the which led to 95x8x2=1,520 choices.

We identify a strong preference on labels with higher information content. All three labels containing only one indicator ranked lowest. A counting analysis of the data also reveals a clear preference for one of the tested designs. The slider design displaying three and five indicators ranked highest, far beyond the other designs. Table 1 shows the labels ranked by their average best-worst score. The last row (sum) displays the difference of ‘most helpful’ choices and ‘least helpful’ choices for the specific labels while the second row (mean) shows the average over all respondents. Results indicate that label design and information depth determine label preference.

The results indicate that consumers regard labels with a higher information depth as more helpful in order to choose a sustainable meal. We suspect that consumers rather accept a complex sustainability label in the environment of a canteen than in a supermarket. The results of this study form the basis of testing the effectiveness of sustainability labels in the field. The mostly preferred label will be used for interventions at company canteens in order to estimate changes in actual consumption behavior. We see great potential in promoting sustainable food choices in out-of-home catering and regard this study as an important contribution to the transformation towards sustainable food systems.

Literature:


Interventions to guide consumers towards sustainable nutrition out of home – the perspective of caterer vs. guests

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The transformation of food production and consumption in wealthy economies is regarded as an essential measure to reach global sustainability goals and thus has gained attention in international politics and research (see e.g. the UN sustainable development goals set up in September 2015). Consumers’ food choices play a significant role in shaping these transformations by generating demands for products with complex sustainability characteristics (German advisory council on global change, 2014; Goebel et al. 2015). Studies indicate that food choice and eating behavior in out-of-home consumption settings relate to a wide set of personal, social and situational factors such as food-related values (Lusk & Briggeman, 2009), attitudes (Sparks et al., 1992), social norms (Cruwys et al., 2015), personal comfort (Byker et al., 2014) and choice design (Hanks et al., 2012). Within these complex behavioral frameworks different possibilities (nudge, information, participation) can be applied to support consumers’ sustainable food choices (see e.g. the review by Ruby, 2012). We add to the research by providing insights into consumers’ and caterers’ perspective as to which interventions are appropriate means to induce sustainable choices.

Information can influence various parameters of sustainable behaviors (Abrahamse & Matthies 2011). Therefore, studies examine the effect of labels (e.g. the review on nutrition labels by Campos et al. 2011), the effects of prompts (memory aids for desired behaviors; Mollen et al., 2013) or calorie information (Gerend, 2009) and many more.

Nudges guide individuals to perform sustainable behaviors, depend on the situation and require little to no cognitive energy (Hansson, 2005). Changes in the choice architecture (e.g. changes in the item order on the menu; Dayan & Bar-Hillel, 2011) as well as the naming of dishes (Wansink et al., 2001) are popular strategies. The participation category includes strategies which actively include employees and/or guests of catering service providers (e.g. Bandoni et al., 2011).
Since studies are heterogeneous in respect of research methods, target population, type of intervention, design, and measurement of effects, no recommendation can be given as to which intervention can generally be considered useful in supporting sustainable nutrition choices, especially in the away-from-home catering sector.

Therefore, an expert meeting with caterers in December 2015 and a focus group of consumers in January 2016 comprise our study design. The goal was to detect the intervention strategies consumers and caterers perceive as useful to meet sustainable food choice decisions out of home. Methods: To the workshop with the catering service providers, nine company representatives where invited. First, the three intervention strategies were presented and theoretical concepts were defined. Using the world café technique, groups discussed intervention strategies. After collecting ideas and comments of all groups, results were presented. Subsequently, the discussants evaluated the intervention strategies on the dimensions “efficacy” and “feasibility”.

Consumers’ focus group participants were recruited through the local press and social media with the prerequisite of eating out of home on a regular basis. Eight individuals took part: five women and three men, between 22 and 60 years old, residing in or near the city of Muenster, Germany. As a motivation for their participation they stated a general interest in nutrition and group discussions. A guideline structured the course of the focus group. First, central terms and the theoretical background were defined. Second, different possible interventions strategies, based on the ideas of the caterers’ workshop, were explained to mesh consumers’ knowledge when discussing their preferences. Third, those strategies were discussed. All statements regarding food choices and the out-of-home catering sector were collected and evaluated. Participants also rated the intervention strategies on the “efficacy” dimension.

Results: In the group discussion with the catering service providers, information intervention strategies got mixed evaluations, with higher points in the feasibility than in the efficacy dimension. The best results on the dimensions “efficacy” and “feasibility” showed strategies, which combined information with emotions (e.g. chef explains his philosophy to guests). Descriptive food names (e.g. “tasty”, “seasonal”) were perceived useful. Information interventions clearly rejected by participants included health labels, campaigns/project days, CO2-information as well as background information on flyers, webpages or videos.

In the popular nudging category caterers favored changes in the recipes of their best-selling dishes in order to make them more sustainable. Other positively viewed nudges were bonus cards, with which purchasing sustainable dishes could be rewarded, refilling at no charge, and giving away a free dessert or more vegetables with a sustainable dish.

For the participation interventions caterers awarded higher points in the efficacy than in the feasibility dimension. They considered a guest survey as helpful if they can implement the suggestions afterwards. Including producers in participation processes was also evaluated positively, as well as tasting specials, recipe competitions and favorite dish voting for the guests. At the same time caterers doubt guests’ interest in these strategies. Rejected ideas included pay-what-you-want systems and having guests participate in the cooking processes.

Consumers’ focus group started with a discussion of the distinction between information about problems (e.g. climate change) and information about actions (e.g. consuming more regionally sourced products) (Schwartz, 1977; Homburg & Matthies 1998; Mosler & Tobias, 2007). Participants agreed that consumer’s rather lack information about effective actions than lack knowledge about problems. Information about problems was considered contraindicated to support sustainable behavior, because it might paralyze by inducing feelings of helplessness. This argument has already been used by Lorenzoni et al. (2006). Action knowledge was highly preferred by participants. Concerning the format of information, the discussants rejected flyer and brochures, as they would often be ignored. The use of new and multimedia formats was preferred. Also a combination of a QR-Code and an informative webpage was considered helpful as well as an app. Concerning the format of the information transfer, the discussants preferred precise, situation-related information in a non-patronizing tone, e.g. in the format of storytelling.
Nudging was clearly favored by consumers; all intervention strategies in this category were evaluated positively. Front-cooking was the most preferred strategy. The possibility of choosing components on a buffet and changes in the choice architecture (e.g. the arrangement of dishes at the counter and on the menu) were discussed as helpful. A sustainable default option, fewer meat offers and smaller meat portion sizes were also greeted ideas. Price reductions or coupons as well as (not misleading) attractive naming of dishes were considered supportive of decisions for a more sustainable nutrition. The focus groups’ opinion towards intervention strategies based on participation was mixed. Workshops and round tables were considered to be too time consuming, while competitions were evaluated more positively. Also feedback systems were viewed positively, under the conditions that suggestions would be implemented by the caterer. Feedback from the caterer to the guests concerning the sustainability of their nutrition was not desired as it might evoke a guilty consciousness.

Conclusions: We found that consumers and caterers both prefer nudges, over information, and over participation. Both parties see great potential in improving recipes and introducing a bonus system for sustainable dishes to meet sustainability goals. Both groups agree on combining information with emotions, e.g. by storytelling, and both reject the transfer of problem-oriented information, especially in the form of flyers. While consumers would like to have information available in multimedia formats like videos, caterers disagree. While caterers generally doubt consumers’ interest in participatory interventions, caterers and consumers alike would greet surveys and recipe competitions among the guests. To sum up, consumers and caterers see great potential in different forms of nudging to guide consumers towards sustainable nutrition in out of home settings. In the next months several interventions will be applied in real settings to test the efficacy and feasibility of the discussed interventions.

Literature

How climate change mitigation and damage costs have been incorrectly calculated and grossly underestimated
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There have been numerous studies undertaken to measure climate change mitigation and damage costs. These estimates have invariably been used to conduct a benefit-cost analysis (BCA) to determine the most efficient atmospheric concentration of greenhouse gases and the most efficient rate of emissions reductions to stabilise greenhouse gases at the desirable concentration. Besides the fact that a BCA is not the best means of determining the optimal outcome, the estimation of climate change mitigation and damage costs – which does have some informational value – has been conducted
inappropriately. In particular, it has led to the significant underestimation of climate change mitigation and damage costs.

This paper begins by explaining how Total Mitigation Costs and Total Damage Costs are typically calculated. It then goes through the myriad of reasons as to why climate change mitigation and damage costs have been incorrectly and grossly underestimated. To assist in the process, the paper discusses many of the criticisms levelled at the well-known Stern Review and Stern’s responses to them.

In terms of climate change damage costs, the reasons for their underestimation include: (i) the likely impact of climate change on natural resource scarcity and its flow-on effect on natural resource prices and the real output of the economy; (ii) the increased vulnerability of the ecosphere to climate change arising from predicted higher real output levels; and (iii) the impact on damage costs of temporarily overshooting an upper limit on the safe concentration of greenhouse gases (i.e., exceeding 450 ppm of CO2-e).

The first reason is principally due to analysts failing to properly comprehend the impact that a decline in natural capital caused by climate change and consequent higher resource prices will have on the secondary (manufacturing) and tertiary (service) sectors of the economy. In turn, this shortcoming is due to analysts failing to fully recognise the complementarity between natural capital and human-made capital, and even when it is recognised, to properly embody the complementary relationship in climate change models.

The second reason is the result of most studies assuming that real GDP losses constitute a proxy measure of the cost of climate change. Many Genuine Progress Indicator (GPI) studies have shown that GDP growth in most nations is failing to translate into tangible increases in economic welfare. Hence, lost GDP may not constitute a true cost of climate change. This aside, the focus on real GDP has obscured the fact that higher rates of GDP growth imply greater environmental impact (relative to lower rates of growth or zero growth) and thus render the ecosphere more vulnerable to the impact of climate change.

The third reason is a consequence of ignoring the damage cost impact of overshooting an upper limit on the safe concentration of greenhouse gases. It is generally assumed that the damage costs associated with stabilising the atmospheric concentration of greenhouse gases at a safe level is much the same irrespective of how the desired concentration level is arrived at. However, this is unlikely to be the case. Indeed, decelerating the rising increase in atmospheric concentration of greenhouse gases before stabilising at the target level is likely to result in lower damage costs than arriving at the desired target having first overshoot it. Since overshoot now seems unavoidable, more needs to be done to incorporate the damage costs of overshoot and the extent to which different overshooting scenarios are likely to affect climate change damage costs.

As for climate change mitigation costs, the reasons for their underestimation include the failure of analysts to recognise that: (i) more GDP growth requires more greenhouse gas abatement; (ii) more GDP growth increases the cost of using all technologies, including greenhouse-gas abatement technologies; (iii) overshooting the desired greenhouse gas target, by bringing on the harmful effects of a transient boost in global temperatures, would further increase the cost of employing low-emissions technologies; and (iv) a range of abatement implementation barriers that would significantly impede or discourage the uptake of mitigation technologies, such as market imperfections, information failures, financing hurdles, and the path-dependent nature of past investment decisions.

In all, a better estimation of climate change mitigation and damage costs and the abandonment of conventional benefit-cost analyses as a means of determining emissions targets would lead to a very different policy response to the climate change problem – indeed, one that would not only increase the likelihood of achieving a ‘safe’ atmospheric concentration of greenhouse gases, but also increase the economic welfare of current and future generations.
Emerging alternative practices in Central and Eastern Europe – Lessons learned from a Hungarian action research

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An insightful observation of modern ecological and socio-economic crisis draws attention to the failure of an economic model guided by the rules of neoclassical economics. The ecological problems which are stressed since the 1970s are accompanied by socio-economic crisis in the 2000s such as financial crisis, contemporary decline of the faith in democracy and questioning the integrity of consumption society. The failure of the last decades’ political initiatives has shown that the problems which have arisen because of the rules of neo-classical economics cannot be answered within its own framework. We seek to find new paradigm to deal with ecological issues, social inequalities or with weakening democratic systems, not only at theoretical level but in practice. Fortunately, alternative economic theories have arisen which provide a firm basis to find more sustainable pathways toward a new paradigm mainly questioning the utility and profit maximization goal of neo-classical economic approach. (North, 2015). Most of the criticisms of neo-classical economics argue that decisions are not made in a completely rational way – as neo-classical economics assume – and utility maximization is a social construction. Karl Polanyi (1997) developed the idea of substantive economy which refers to the relation of how people can interact with their social, material and natural environment. He found that before the market economy become dominant various forms of institutionalization of economy existed driven by different types of logic. These different types of institutional mechanisms are reciprocity, redistribution, market exchange and householding. Polanyi (1997) argues that in all society the combination of these logics can be found; however in Western societies market logic has become dominant during the 19th century. The dominance of market logic permeates social relationships changing the relationship between society and its social, material and natural environment as well. The problem with this change is that such relationships lack of ethics, subjectivity, and justice becoming socially and ecologically harmful.

Substantive economic perspective calls for an institutional analysis: analysing what is the dominant institutional logic of the economy and what kind of other logics are there and to what extent in which areas. Based on this substantive view of economy or otherwise based on the critics of present neo-classical various new, alternative economic approaches seek to find new logics and forms of economic activities such as civil economy, social economy, plural view of economy, diverse economy, degrowth, etc. They introduce different concepts to organize our economic activity, such as the (re-)embeddedness of economic activities into society; social justice; equity; localization; ecology; democracy; civil society; autonomy; reciprocity; redistribution; etc. Integrating these concepts into the economic activity can lead us to an organization which goal goes much beyond creating profit and maximizing utility. The list of the concepts also highlights that such organization should have such diverse goals. It is not enough anymore to focus on environmental protection or to deal with a social problem, but economic activities, even solidarity economy initiatives and social enterprises must have a holistic approach.

This research intends to build on Karl Polanyi substantive understanding of the economy which can help to understand the limits of the market centered neoclassical economic system and to find new ways of interacting with our material and natural environment. The presentation aims to demonstrate an ongoing action research driven by Polanyi’s substantive view of economy. The research targets an organization which integrates various types of organizational logics. The targeted organization called “Cargonomia” operating as a hub for local food distribution and for low-tech urban transport system in Budapest, Hungary integrates reciprocal activities, redistribution and market exchange as well. The organization bringing together organic food production, low-tech “Do It Yourself” transport systems, self-management, direct trade, and reciprocity economy aims to achieve a socially, environmentally and economically sustainable form of functioning. The project with its diverse activities plays a key role
in the implementation of serene and democratic transition toward more social and environmental justice, more well-being, conviviality and autonomy. These diverse activities offer a great opportunity as well to analyze different types of horizontal organizational logics.

Through the action research process participants aim to highlight the challenges and limitations for this organization, especially how it can survive while trying to present alternatives to the neo-classical economic system. Aim of the action research is to identify how the resilience mechanisms of Cargonomia model works occupying "new innovative space" within a dominant surrounding model. Action research enables participants to reflect on and possibly to find answers to every-day challenges related to this issue while using academic knowledge. On the one hand, in action research the research question grows out from a practical issue grounded in practice therefore research results are more likely to be used in practice (Greenwood et al. 1993). On the other hand, action research contributes to the academic body as well through knowledge generated in a participatory process. Researchers and practitioners work as partners, hence researchers need to enter to the life of the community or group. In this case it means entering to Cargonomia’s life and to contribute to every-day operational tasks. In this on-going action research process participants – both researchers and practitioners – work together to fulfill Cargonomia’s mission altogether five persons; while reflecting on their own assumptions, values and actions. During action research, the participants reflect on their activities in monthly meetings which are recorded and transcript for further analysis. The action research process is supported by other qualitative methods, e.g. deep interviews and by creative technics, e.g. ethnographic observation through photo-documentation. The different types of research methods and their analysis are used during the reflection on the actions and also for triangulation of the results. The research process enables participants to deepen understanding about Cargonomia model and its relation to the surrounding system.

The research reveals how the different institutional logics utilized in the everyday operation can help in forwarding transition within the present political and economic context. Based on the identification of its activities and the members’ relation to the activities and the core values of Cargonomia the research seeks to understand the logic of this model and to better characterize its strengths and limitations as well. Preliminary results show that such kind of organization only can be understood based on the substantive understanding of economy. The diverse type of organizational logics in the functioning – in addition to market exchange – develop relations between members and toward their economic activity which are different and more meaningful than the ones developed by market centered consumption society. The holistic approach to a diversity of complementary activities plays an impactful role in the resilience of this project.

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**Contribution of institutionally-oriented ecological economics to the ‘opening up’ of megaproject evaluation**

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Conventional approaches to megaproject evaluation have hitherto largely adopted a linear-rationalist perspective to explain the frequent failure of megaprojects to meet the ‘iron triangle’ criteria of project performance: delivering on time, within budget, and according to specifications [1]. In their view,
megaprojects fail because of project selection dynamics that favour the “survival of the unfittest”, i.e. the least viable projects [2]. The main reasons would be the inherent optimism of human beings (“optimism bias”, or “planning fallacy”), and above all, “strategic misrepresentation” [2]. Problems would essentially follow from strategic, rent-seeking, and opportunistic behaviour by planners and other key actors, and the short-sightedness of politicians, in their advocacy for their favourite project [3]. To solve the problem, the advocates of this perspective call for greater accountability, ex ante control, and more effective ex post monitoring and enforcement designed to minimise strategic, self-interested behaviour [4].

Alternative readings of megaproject governance and evaluation interpret megaproject governance in the light of the multiple alternative rationalities governing the behaviour of policy actors. While well placed to suggest such alternative interpretations and associated evaluation approaches, ecological economics has thus far paid little attention to megaproject evaluation (for a rare exception, see e.g. [5]). The alternative interpretations found in megaproject literature characterise megaprojects as fluid and open systems, with constantly changing boundaries — “programmes of projects” [1] or loosely defined networks of people and organizations work more or less coherently and purposefully to solve given complex problems. Finally, these alternative approaches take uncertainty not merely as a problem, but also and above all as an opportunity to foster voluntary, horizontal, reflexive and adaptive governance and coordination among interdependent actors, involving the exploration of alternative pathways [6].

Drawing on lessons from megaprojects from various sectors [7], this paper analyses these “alternative” variants of current megaproject literature, and their commonalities and differences with an “institutionally-oriented ecological economics” (IOEE) approach [8, 9], as a basis for the elaboration of an ecological economics approach to megaproject evaluation. It does so by exploring two strategies of improving megaproject evaluation through ‘opening up’: 1) going beyond the dominant linear-rationalist notion of policy processes, and stressing the objective of opening up appraisal processes in order to enhance learning and reflexivity; and 2) extending the evaluative criteria beyond the ‘iron triangle’, to cover the various socioeconomic impacts and preconditions for project success.

The first strategy would entail embracing the multiplicity of interpretations of policy processes and rationalities motivating human behaviour – an approach that would highlight, take seriously, and embrace uncertainties. This approach has affinity with some of the key tenets of IOEE, notably the critical reflexivity; the recognition of complexity and the multiplicity of rationalities and explanatory frameworks; and the emphasis on coevolution and the multiple dimensions of power. The specific contribution of IOEE here would consist of an explicit consideration of biogeophysical limits to human activity, and greater attention to the tensions, trade-offs and synergies between the various scales and dimensions of sustainable development.

The second strategy refers to socioeconomic aspects as performance criteria in project evaluation, including both socioeconomic impacts and the socioeconomic preconditions for successful project implementation. Arguably, the ‘iron triangle’ evaluation neglects notably the implementation processes, and the ‘subjective’ dimensions of ‘the social’. Here, IOEE could help in current efforts of reacting beyond the ‘checklist approaches’ of ‘social impact monitoring’ that concentrate on the ‘objective’, the measurable, and are therefore poor at fostering learning, tend to disempower and objectify people, reduce the ‘socioeconomic’ to ‘economic’, while reinforcing the existing power asymmetries and failing to involve local communities [10]. Here, the IOEE could contribute via its notion of incommensurability of values as a basis for measurement. Its conceptualisation of ‘the social’ through notions such as values, meaning, identity, and culture, instead of mere reference to distributional equity [8] are in line with similar approaches in social impact assessment (SIA) [11] and various conceptualisations of the social dimension of sustainable development [12, 13]. In particular,
research and experience in the area of environmental justice would provide a particularly welcome contribution to current megaproject evaluation [5, 14].

The paper concludes by highlighting a number of key challenges and dilemmas faced in efforts of opening up of socioeconomic evaluation of megaprojects and the integration of current approaches with IOEE. Four issues stand out in particular:

• Balancing between two objectives: keeping the options open to retain the capacity of adapt to evolving situations, and maintaining sufficient control over the system through the reduction of complexity, closing down decisions, and establishing clear lines of accountability.

• Complementing accountability – the current main objective – with a greater attention to learning as a key function of megaproject evaluation [15]. This calls for a redefinition of accountability, drawing on the ideas of network governance [6].

• Dealing with the inherent tension between the objectives of ‘opening up’ and ‘getting things done’ – between an ‘external’ and an ‘internal’ approach to megaproject evaluation and management. The latter would, as SIA, for example, seek to ensure that the project in question gets done, albeit in the socially least obtrusive – or indeed most favourable – manner, ‘opening up’ would imply stepping ‘outside of the system’, exploring not only the impacts, but also the problem framings, the raison d’être of the project, as well as our assumptions concerning evaluation and its role in policymaking.

• Since options and perspectives cannot be kept open forever, who and through which process and according to which criteria should decide when the situation is ‘ripe’ for closure? Does a ‘fair and inclusive process’ suffice? Does closing down a technology choice also imply closing down the knowledge and problem framings?

REFERENCES


Food for thought. Or, how a University of Applied Sciences is integrating people, planet and profit by seeing the food forest for the trees

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In order to provide education that is fine-tuned not only to an individual’s interests and needs but also to the challenges that society presents future professionals with, a University of Applied Sciences (UAS) is presented with three distinct but interrelated challenges: a didactical, a practical and a scientific challenge. In this paper we describe how Van Hall Larenstein UAS (VHL) in the Netherlands, a ‘green’ university of applied sciences, is tackling these challenges in light of the post-normal governance condition in which a UAS is operating. This condition is typified by two interrelated shifts. The first is the shift from normal to post-normal science that emphasizes joint knowledge production in order to address real problems that are characterized by uncertainty, contested values, risks and urgency. The second shift is from government to governance in which a multitude of public and private actors influence policy and practices. The post-normal governance condition is especially applicable to the issue-driven field of forest and nature conservation for which VHL aims to educate future professionals. By discussing our involvement in the search for new economic models - such as food forests - on behalf of private forest owners, we show how a UAS can educate future professionals as well as contribute to a sustainable future.

A University of Applied Sciences (UAS) is in contrast to its academic sibling first and foremost an institute that trains and educates professionals rather than academics. UAS graduates are able to contribute to societal challenges by putting to work a set of competences acquired in their studies, which were taught by the lecturers and researchers that make up the staff of the UAS. Science plays a part, but it has its purpose in supporting applied practices. A UAS thus faces three distinct challenges: a didactical challenge of educating future professionals, the practical challenge of staying connected to society and its problems, and the scientific challenge that is focused on applied research. This characterization might seem straightforward, but within a post-normal governance context these three challenges are significant.

The practical, didactical and scientific challenges the VHL staff faces, requires them to leave the classroom and participate in the forefront of the complex practical reality of Dutch nature conservation. In the case of private forest owners who are looking for new ways to keep their terrains economically but also ecologically and socially sustainable, no easy answers are present. Although timber provides a steady income, dwindling government subsidies and increasing costs put stress on daily management. Because future professionals need to be able to address these kind of challenges, VHL staff is facilitating a learning community with the Dutch Forest and Nature reserve owners association (VBNE - Vereniging van Bos en Natuureigenaren) and the Federation for Private Landownership (FPG, Federatie Particulier Grondbezit). This community is focused on addressing the individual challenges of its participants, but does so with manageable contributions of students from the course Forest and Nature Management.

Based on our experiences with this learning community, we sketch an integrative approach of six steps to tackling the post-normal governance condition. The six steps that we distinguish are:
1. Create a learning community focussed on a shared challenge
2. Generate questions rather than answers
3. Inspire!
4. Provide room for spontaneity
5. Take small steps
6. Come up with new questions

By discussing these steps in relation to the challenge of one of the participants, which focuses on the
realisation of a food forest in his pine forest, we show how a societal relevant challenge is being tackled
by a learning community. Not only are the individual private forest owners supported in their daily
challenges, but we also succeed in presenting students with manageable tasks that help them to
become the professional that strive for a sustainable future.

With the analyses presented in this paper we want to challenge and inspire researchers and lecturers
in their post-normal domain, but we also aim to elicit experiences and best practices of other UAS's.

Environmental Justice and Degrowth in the anti-Ilva Struggle in Taranto (Apulia, Italy)
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The case of the Ilva steel plant in Taranto can be considered as a paradigmatic example of
environmental injustice in its specifically industrial form. Established in 1960, the plant was publicly
managed (under the name of Italsider) until 1995, when it was included in the wave of privatisations
set in motion by the Italian Government and hence sold to the holding company owned by the Riva
family (Riva Fire). Originally met with enthusiasm by the local population and institutions alike, the
steel plant did not take long to show the nefarious side of its vast industrial scale. Taranto is today a
sacrifice zone created not only by Ilva’s facilities, but also by other polluting activities variously linked
to them: a refinery, waste landfills, and illegal dumping sites. The first part of the paper explores two
interrelated issues: the discursive violence of a gendered and colonial paradigm of development, and
an industrial strategy which from the 1980s onwards constitutes a perfect example of accumulation
by contamination.

The second part of the paper investigates the history of working class environmentalism in Taranto,
with a particular focus on the emergence of workers-led environmental justice campaigns. Such
campaigns, we argue, represent a practical critique of wage labor and of its quantitative, growth-based
political imaginary. From this perspective, although Degrowth is not explicitly discussed either in social
movements circles nor within unions, the paper argues that Degrowth-related analyses as well as
policy proposals are present in the practices and discourses of social actors opposing Ilva pollution.
Finally, the paper advances a few interpretative hypotheses about why this is the case, and how
Degrowth’s toolkits may be more directly employed in this struggle.

The case has already been analyzed from the perspective of Environmental Justice (Barca and Leonardi
2016). The paper aims at expanding such approach to show:

a) how the case of Taranto is a fitting example of accumulation by contamination;
b) how Degrowth-related analyses as well as policy proposals are present in the social movements’
practices and discourses (but are not recognized as such);
c) how Degrowth-related analyses as well as policy proposals are present in the practices and
discourses of unions which have refused the job blackmail (but are not recognized as such).

The paper will rely on empirical data produced by using the following methodologies: Social
Ethnography (semi-structured interviews, ethnographic notes) and Discourse Analysis (of existing
scientific literature, media-related materials, press releases, official statements).
Ownership and land use in agriculture: the influence of tenancy and payments for ecosystem services on soil conservation

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Institutions, be they formal or informal, have a profound influence on human behaviour. One important category of such institutions are property rights and ownership. In agriculture, for example, there has for centuries been an ongoing debate about institutional arrangements of landownership and possible detrimental effects of tenure – or insecure ownership – for land and soil conservation (see e.g. Johnson 1950; Lee & Stewart 1983; Arora et al. 2015). The general reasoning conceives a trade-off for farmers between short-term economic and long-term environmental considerations: first, referring to economic arguments, tenants may have a shorter time horizon for calculating returns from farming, or a lower discount rate of future benefits than owners (Lee 1980). Both may lead to soil exploitation in the short run rather than long-term sustainable soil use. Second, there may be socio-psychological and behavioural effects, such as reduced attachment to a piece of land, or absent ‘feelings of ownership’ (Arora et al. 2015). Again, both these mechanisms would lead to increased exploitation of soil and/or lack of investment into soil conservation by tenants in the present through their farming decisions.

In the past, classical economists such as Adam Smith or John Stuart (and Harriet Taylor) Mill have already contemplated this issue (Johnson 1950), but empirical evidence has been lacking or, later, been inconclusive (Knowler & Bradshaw 2007; Place 2009; Wauters & Mathijs 2014). Recent societal changes, such as increasing awareness of environmental problems stemming from agriculture or the accompanying focus on policy intervention to mitigate such effects, have renewed interest in the subject. While much of the literature studying the effects of ownership and tenure for land use and land conservation focuses on the Global South, where property rights are often insecure and pressures on the environment are sharply increasing (Place 2009), little research has been done in the Global North and the EU in particular (Wauters & Mathijs 2014). This is surprising, given that tenancy shares increase in almost all EU-countries (Ciaian et al. 2012) and the EU places increasing emphasis on addressing environmental issues (through the second pillar of the Common Agricultural Policy) and generally intervenes heavily in agricultural production. In this context, an additional question has emerged: can agri-environmental payments – which are, in fact, payments for ecosystem services (PES) to farmers – mitigate possible detrimental effects of tenure by appealing to the economic reasoning of tenants? However, few studies have so far attempted such an inquiry.

The present research therefore addresses two interrelated questions concerning tenancy and land use: (1) How does land ownership influence farmer’s land use decisions such as planting of plants with soil-degrading effects and crop rotation, and (2) What is the association between land ownership and participation in voluntary PES-schemes that aim at enhancing soil conservation?

These questions are – in a first step – addressed using secondary data and regression analysis. Austria serves as a case study country, as tenancy shares are considerable and increasing (Ciaian et al. 2012), the structure of agriculture is very diverse, and data are available in high quality and detail. More than 2.8 million plots are documented every year (covering the majority of farms), including information on tenancy status, crops grown, soil quality parameters, farm characteristics, and agri-environmental scheme (AES) participation. Regression analysis controlling for farm fixed effects can therefore be used to single out the effect of tenure on crop choices.

First results show that farmers are indeed more likely to plant crops with soil-degrading effects on rented fields than on owned fields. For example, tenants plant up to 20% more corn than owners (25% vs. 30% of all plots on cropland in the Alpenvorland region; smaller but still significant differences prevail in Austria as a whole) – a difference that remains highly significant when controlling for farm fixed effects and soil parameters. However, no statistically significant differences exist concerning plants with soil-enhancing effects, such as legumes. Moreover, a composite indicator covering the number of different crops grown over a period of five years (intended to indicate the diversity of crop
rotation systems) shows statistically significant differences as well: farmers use, on average, less diverse crop rotation systems on rented fields than on owned fields. This analysis does not yet, however, take into account AES and their possible mitigating effects. A study conducted in the Czech Republic has, for example, found such effects (Sklenicka et al. 2015); others, however, contradict this finding (Wilson & Hart 2000). Therefore, the next step of the present study will be to assess – again using a quantitative approach – the important determinants of AES uptake, and the influence of tenure in this respect.

Using an extensive dataset, the present study therefore finds that ownership status does matter for farmers’ land use decisions. In the light of increasingly tight agricultural land sales markets and correspondingly increasing tenancy shares this may be worrying and potentially counteracting policy efforts in soil conservation. However, the study will also investigate interactions between these developments in order to identify whether public PES schemes such as AES in the EU can mitigate or halt detrimental effects of tenancy for soil conservation. In the future (although out of the scope of this very presentation) we additionally intend to uncover why these connections exist, and whether there are differences in motivational aspects, especially concerning economic vis-à-vis socio-psychological considerations.

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Exploring a Degrowth project through participatory prospective modeling
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With the emergence of the Degrowth movement (Demaria et al., 2013), the call for transitions towards sustainable “post-growth societies” is now consolidating into a multifaceted political project. Yet, such a project raises numerous questions, for instance: what concrete proposals could initiate such a
transition? At what scale? In which order and timing? What could they induce in terms of employment, public debt, energy consumption, environmental impact?

In 2013, Liegey et al. published in France “A Degrowth Project, Manifesto for an Unconditional Autonomy Allowance” (Editions Utopia). This book offers to synthesise and to put into perspective the main proposals and strategies discussed within the French Degrowth movement, as well as other related initiatives from all around Europe and the world, from concrete grassroots experimentations to wide scale institutional reforms. The authors suggest different pathways for a serene and democratic transition towards social and environmental justice, and open the ground for a collective deliberation on “what to produce, how, and for what purpose?”. The book introduces concrete examples and raises key qualitative questions, for instance about the definition of basic needs, or of a “good, meaningful and sustainable life”. It also draws concrete steps from grassroots initiatives, cultural transformation to institutional reforms. However, in order to leave space for open discussions and deliberations, the authors decided not to enter into details and quantitative issues. Since its publication, the book has often been debated and the pathways suggested have been analysed, discussed, and refined.

In particular, in 2015, the “Degrowth Project” scenario, among others, has been explored through an innovative prospective modelling approach (Briens, 2016). This approach involves a series of interviews, aimed at collecting various detailed and quantified visions and narratives, about what Degrowth – and more broadly speaking, “transitions towards sustainable and desirable societies” – could look like for France, especially in terms of institutions, lifestyles and consumption patterns. These visions are then turned into scenarios, and investigated over the long term (2060), using two advanced numerical models: a specific dynamic input-output simulation model of the French economy, and a bottom-up (technology rich) energy system optimization model, of the MarkAl-TIMES family. By coupling these two models, we explore the possible outcomes of the different scenarios, in terms of employment, public debt, energy demand, waste and atmospheric emissions (including GHG), and we offer detailed prospects about their potential implications for the French energy sector (including an analysis of technical options to meet ambitious renewable targets).

Using our numerical models in a dynamic and didactical way, we study the role of different proposals presented in “A Degrowth Project” (for instance: development of agroecology/agroforestry, low-tech and DiY initiatives, localization using local currencies, reform of health and educational systems, fiscal reform, implementation of a basic income and a maximum income, development of commoning practices, changes in mobility, etc.). More qualitative issues about our lifestyles and habits are also discussed (e.g.: about our conception of health, of our mobility, about our food, about our collective organization for tool-sharing, etc.), with the following questions in mind: what do we define as basic needs? How to fulfill them in a sustainable way? What concrete steps? What temporality? What pathways?

The approach described in this paper offers a powerful tool and a inspiring basis for common understanding and collective deliberation about transitions towards sustainable and desirable societies, and meaningful lives.

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Briens F., 2016, Une alternative paradigmatique au prisme de la modélisation prospective – Exploration macroéconomique de scénarios de décroissance (A paradigmatic shift through the prism of prospective modelling : Macroeconomic exploration of degrowth pathways), Thèse École nationale supérieure des mines de Paris, Spécialité “Contrôle, Optimisation, Prospective”, under the direction of Nadia Maïzi.
Local preferences for financial and procedural engagement in wind energy projects: Results from focus groups and a choice experiment

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This paper describes an empirical study on local preferences for wind power developments in Germany. The country currently faces its greatest energy-political challenge in history regarding its decision to transform its energy supply from conventional to renewable energy sources. The energy transition involves a significant expansion of renewable energies to cover 80 per cent of the German power supply by 2050 (EEG, 2014). This process has brought forward several challenges, among which the local opposition of wind power projects is vitally important. While wind power is currently – and will continue to be – the dominating renewable energy source, local opposition leading to a delay or halt of certain projects jeopardise the success of Germany’s energy transition. This case study from Germany is informative for other countries involved in the expansion of on-shore wind energy.

The continuous increase of wind power projects and related rise in conflicts and protests has led the German Government to search for ways to improve the local acceptance of wind power projects. The focus of attention evolves around models that involve the financial participation of the local public, as this is regarded to compensate local residents facing the external costs of wind power plants, and thus leading to acceptance (Hall, et al., 2013, Scheele, 2012, Wunderlich, 2012, Beckmann, et al., 2013, Buchholz und Huge, 2014, Kment, 2015). Only recently a new legislation was passed in the North German stated Mecklenburg-Vorpommern, that requires developers to offer financial participation to local residents through shareholding. Less political action is currently taken with respect to participation in planning and decision-making processes (Schweizer-Ries, 2011), but researchers urge for more sophisticated participatory models that include consultation or even cooperation between developers, planners and the local public (Agentur für Erneuerbare Energien, 2012).

To date there is a dearth on research on how these participatory models affect local acceptance of wind power developments. While there is an overwhelming number of sources claiming that financial participation enhances acceptance, the evidence is rather scarce. Furthermore, there is little knowledge about the extent to which affected residents are prepared to participate in a more participatory planning process.

As the design and implementation of participatory models involves considerable costs, knowledge about the benefits of financial and procedural participation to the local public is essential in order to justify expensive planning processes. To this end we formulated the following aims:
- Better understanding on the local public values new forms of participation.
- Explore the direction and strength of local preferences for 1) financial participation in wind energy projects, and 2) different degrees of participation in the planning and decision process.
- Formulate recommendations on how these factors should be integrated in regulatory development and consultative engagement.

In order to address these research questions we conducted focus groups as well as a choice experiment. Both focus groups and choice experiments reveal that respondents prefer procedural participation and have strong preferences for active engagement in the planning and decision-process on windpower plants. In the focus groups, respondents are sceptical with respect to financial participation, whereas in the choice experiment there is some willingness to pay for this participatory form. Current government focus on developing financial participation and neglecting procedural participation does not match with our research findings. According to the results more action should be taken in involving local people in the decision process.
The great bifurcation: universal basic income, cognitive capitalism and post-growth future

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That capitalism mutates has been recently argued by many authors, e.g. Moulier-Boutang (2012) or Wallerstein et al. (2013). Particularly, Moulier-Boutang raised the thesis of cognitive capitalism (CC), which can be specified as economic system based on accumulation by means of exploitation of knowledge, creativity and attention instead of labour. Human labour understood both as waged work as well as in its physical, mechanical sense loses its centrality in favour of intellectual activity broadly conceived, and information and communication technologies (ICT) play essential role in new constellation of productive forces.

In this respect, the related concept of platform capitalism is being developed in contemporary political economics, mainly thanks to the work of Srnicek (forthcoming 2016). Platforms are also one of the central concepts of novel geopolitical vocabulary developed in Bratton (2015). They can be understood as new, emergent sites of political deliberations, social interaction as well as economic transactions (Bratton 2015: 41-43). Uber, Google, Facebook, Spotify, PayPal and beyond – all these represent specific, capitalist models of platforms. They are emergent modes of organization that allow otherwise distant and heterogeneous actors to encounter “on the same ground”.

On the one hand, concepts of CC and platform capitalism raise a general problem of work, evident also in Weeks (2011) or Srnicek and Williams (2015). CC disrupts job market and traditional division of labour as it tends to precarious, flexible contracts and demands the constant attraction of working subject to the creative process or brand identity (Moulier-Boutang 2012). Thus it slowly merges life with work and subsequently invents wholly new mode of exploitation – the added value is no more extracted only from one’s working time, but from one’s lifetime in general. Hence CC invades regenerative activities and feeds on them, but it does not repay them – the fact well known for all feminist scholars (Weeks 2011) or ecological economists, applying also to industrial capitalism.

On the other hand, platforms are key actors of workforce automation (Bratton 2015: 277-284) – once deployed, smart ICT systems demand minimal human control and operation. Thus in future, less and less human labour will be really needed to conduct productive (and reproductive) activities in CC (Srnicek and Williams 2015). This raises the potential problem of massive structural unemployment (Srnicek and Williams 2015.).

Combining these two problematic trends, we are standing now at a following problem – CC depends on creative human activity and attention, but this activity can be conducted only under some conditions – namely that it needs to be regenerated as well as an “old-fashioned” labour (Marx 1976 [1867]: 340-344). Thus, in order to exploit human life, CC must pay for this life. And as far as this cannot be achieved under conditions of massive workforce automation and deconstructed wage system, it can meet this requirement only if it accepts accept universal basic income (UBI) as the solution to its own structural problem (Moulier-Boutang 2012).

UBI is often seen as a voucher to post-capitalist future. However, the thesis of this paper is that this precondition is by no means guaranteed. Under aforementioned conditions, UBI can easily function as the stabilizing element of CC and hence the sole strive of social and ecological movements for UBI can prove to be insufficient. Henceforward, there are (at least) two potential scenarios after introduction of UBI that will be considered in this paper. First is UBI stabilizing CC, second is UBI as a policy driving transition to post-capitalism. Which scenario will happen depends on infrastructural conditions, i.e. on which interlocking complementarities (Pagano 2011) will be the case in situation of UBI’s introduction. Given the instructive vocabulary of Easterling (2014), UBI and wage system can be described as two different protocols of aggregate evolution of socio-economic assemblages, mapping different topologies, presupposing different switches and multipliers, or Latourian mediators and intermediaries (Latour 1998, 2005). UBI and platforms are considered here as two interlocking complementarities. However, the trajectory of socio-economic dynamics is mapped from the triangulation of these two
complementarities towards third element that controls the organizational dispositions of platforms – the ideological framework of platform innovation. If CC with its exploitation of creative capacities and attention of human workers prevails, the effect of interplay between UBI and platforms will be different than under some competing, counter-hegemonic ideology (Mouffe 1979: 181). For this reason, given the likeliness of aforementioned scenario of UBI introduction in CC, it is important – from the perspective of de-growth as well as overall ecological movement broadly conceived – to develop strong ties with and strategies of technological innovation outside of ideological coordinates of CC.

The conjecture of this paper is that in order to sufficiently develop conditions that enable potential transitory process to post-growth and post-capitalist future, the de-growth movement should develop strong attitude towards platform organizational principles, implying the parallel process of technological innovation outside of the commercial sphere of high-tech ICT corporations. The alternative path of development of platforms (such as GitHub, Wikileaks or Wikipedia) can help de-growth to construct the necessary interlocking complementarity (Pagano 2011) to introduction of UBI, thus stabilizing infrastructural conditions to seizing the stream of mainstream tech innovation from the hands of big corporations and subsequently to prevent UBI from its denunciation as mere stabilizing policy for new mode of capitalist accumulation.

The analytic framework that paper develops on the issue of UBI can be understood as complementary to ecological economics, in terms of being a device of modelling political-ecological consequences of technological and institutional change. This sort of evolutionary economic perspective is considered as progressive elaboration upon basic pre-analytic vision of ecological economics: “... the human economy is embedded in nature, and economic processes are also always natural processes in the sense that they can be seen as biological, physical and chemical processes and transformations.” (Røpke 2004: 294). This intuition is considered here to be deeply materialistic, anti-anthropocentric and focusing on non-human and supra-human infrastructures rather than individual or collective human actions. Institutions and technological infrastructures are also environments, and to fully grasp all the nuances of dynamics of socio-natural metabolisms, they are proposed here to be accounted into ecological economic research.

Bibliography


Silver as a techno/biophysical constraint for a large-scale development of Solar Photovoltaics: current trends and data quality
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The current demand for renewable energy sources keeps increasing due to efforts finalized at reducing the current fossil fuel consumption given the present concerns about the effects of the human-driven climate change as well as the actual fossil-fuel availability. Significant efforts have been put in place to achieve higher production especially for electricity generation, in particular from wind energy and solar photovoltaics. The installed capacity of another important renewable energy source for electricity production, hydroelectric power plants, cannot be significantly further expanded in developed countries. On the contrary, a reduction of the overall installed hydro capacity in these countries is more likely due to the fact that several hydro reserves will have completed their typical lifespan of 100 years in the forthcoming years and decades. For this reason, most of the present-day efforts are focused on solar photovoltaics as well as wind energy. In spite of the fact that wind turbines and solar photovoltaics are practically emission free in their utilization phase, the assembling and manufacturing of these energy-harvesting devices requires non-negligible energetic, material and labour inputs. The manufacturing of both the technologies is based on the use of rare metals present in the earth crust in low abundance and low average concentrations.

In our contribution, we will focus on solar photovoltaics, precisely the first-generation technology developed on the use of crystalline-silicon-wafer-based solar cells. In spite of more recent technological developments, solar panels based on this cell typology are firmly dominating the market and actually slightly increasing their share, which amounted to 94% of the global yearly installed power capacity in 2015 (IEA PVPS 2016). The use of silver paste is required for the rear and especially for the front electric-contact metallization of crystalline-silicon-wafer-based solar cells. A present question is whether the estimated amount of global silver resources could actually represent a biophysical/technological constraint for a large-scale deployment of solar photovoltaics. The existing literature points to contrasting conclusion (Elshkaki and Graedel 2013; Feltrin and Freundlich 2007; García-olivares 2015; Grandell and Thorenz 2014; Jean et al. 2015). As a matter of fact, nowadays only roughly 1% of the yearly world electricity demand is met with generation from photovoltaics, therefore a remarkable installation of solar-modules power capacity will be globally required if a meaningful fraction of electricity is to be produced from this technology.

In our presentation, we assess the evolution of the silver consumption in photovoltaic-module manufacturing. We consider the recent progress made in the metallization techniques that have allowed a reduction of the silver use per cell unit, and while acknowledging the state-of-the-art technologies, we simulate a progressive and continuous reduction in the silver use as forecasted by the experts of the sector (Schubert, Beaucarne, and Hoornstra 2013). In addition, we also model a progressively increasing deployment of photovoltaics power capacity as envisaged by the main energy institutes and observatories, considering the proposed scenarios to the year 2050 (Henning and Palzer 2015; International Energy Agency IEA 2014). By analysing the trends of silver use in other applications (such as other industrial sectors and non-industrial uses, such as jewelry, silverware and so forth) we are able to estimate whether - and under which conditions - the metal usage in photovoltaics could represent a constraint. Besides the yearly trend, also the cumulative consumption over the course of the years is evaluated in order to quantify which share of the natural silver resources will be actually
required to be allocated to solar-cell manufacturing. In the overall schematization, also the role of scrap recycling, that typically contributes to cover around 20% of the yearly silver demand (Silver Institute 2015), has been acknowledged.

Our conclusion – which incorporates existing uncertainties - is that silver would not represent a constraint for a TeraWatt-scale deployment of solar photovoltaics power capacity provided the current efforts in silver reduction in the metallization paste continue at a relevant pace. This capacity (4.6 TW) would allow to cover a significant projected demand of electricity, i.e. 10% of the world estimated requirement in the year 2050. Also for the very optimistic Fraunhofer Institute scenario (Henning and Palzer 2015) - according to which PV installed capacity could amount to more than 31 TW in the year 2050 (enough to cover 90% of the world electricity demand) - silver would not represent a constraint under the same silver-paste reduction condition. Finally, a NUSAP (Numerical Unit Spread Assessment Pedigree) data uncertainty analysis is performed in order to appraise the overall quality of the adopted and available data as well as the quality of the overall assessment. This type of analysis allows to flag up the most doubtful assumptions and sources of information. As a consequence, also the robustness of the state-of-the-play diagnosis as well as of the future scenarios can be validated by this approach.

References
Puzzling Out Multiple Values of Ecosystem Services: Insights from a stakeholder-based Process in Arrábida Natural Park
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Ecosystem services (ES) embed multiple values. Thus, capturing and integrating plural perspectives when conducting ES studies is a recognized need, and yet a challenge. Looking into one dimension of value brings several associated risks and biases (O’Neill 1996; de Groot et al. 2002; Spash, 2008). Hence, different authors have been following a more integrative perspective, calling attention to the importance of considering a broader range of ecological, social and economic ES values (Chan et al., 2016; de Groot et al., 2002; Spangenberg and Settele 2016). However, practical questions on how to articulate multiple ES values still remain. Once different ES values are recognized, the way they are integrated is determinant to support decision-making processes, as highlighted by recent studies on ES value pluralism and articulation. Following such integrative perspectives will expand the scope of traditional ES valuation by openly supporting a more comprehensive approach.

In this article, participation and deliberative ES-based valuation processes are assumed as value articulating institutions, following Vatn’s definition of the concept (Vatn, 2005). Within this context, our aim is to develop and test a participatory methodology to foster articulation of multiple ES values in decision-making processes. The proposed approach is part of a stepwise participatory conceptual framework for ES valuation and assessment (Lopes and Videira, 2013) that was tested in a coastal and marine protected area in Portugal – the Arrábida Natural Park (ANP). In the first stages of the framework implementation, we conducted collaborative scoping and systems mapping workshops to ‘set the scene’ and promote a ‘deepen understanding’ of ES provided by the protected site (Lopes and Videira, 2015; 2016). Insights from these two workshops revealed that local stakeholders give high importance to provisioning and cultural services. The final stage is then oriented towards the investigation of an approach to articulate the multiple value dimensions of the identified ES in the context of decision-making processes that are relevant for local managers.

To frame our study, we started by conducting a literature review on previous experiences using distinct methods and tools that promote, to some extent, articulation of ES values. Stakeholder participation was identified as an important feature in the majority of the reviewed studies. However, involvement of interested parties was seemingly promoted for a specific task and not as an integrative feature of the value articulation process, and few studies are considering the active involvement of stakeholder groups in the articulation of two or more value dimensions. The use of multi-criteria analysis techniques was found promising due to its capacity to assess trade-offs and accommodate value pluralism. Nevertheless, some contested issues may arise regarding the choice of aggregation rules, trading-off incommensurable values, or increasing the risk of under representation of minority goals. The importance in identifying and capturing multiple ES values does find resonance in the literature. Still, the question of how to operationalize such articulation in participatory decision-making processes remains open.

In preparation for the third and final value articulation workshop, we consulted the Park management team to select relevant decision-making processes suitable to apply the proposed approach. This resulted in two prominent decisions: a) a pressing environmental conflict – the expansion of vineyards land use category in the Park – and, b) the comparison of project alternatives for regulating access to protected beaches and recreational activities. For each decision process, the alternatives under consideration by park managers’ were scrutinized for further discussion in the workshop, which took place in April 2016 in Setúbal, Portugal. Fourteen participants from different backgrounds and representing different stakeholder groups – public administration, research institutions and local businesses – attended the workshop. They were engaged in a sequence of exercises working in two subgroups, one for each of the selected decisions.

Vineyards are a standout feature of the Park, with various recreational activities based on wine production and with a high cultural value. However, restrictions on expansion of this land use are in
place leading to conflicts among wine producers and nature conservation managers. Beaches are also very important sites in the Park, largely contributing for recreation and ecotourism activities in the area. How to regulate access to different recreational activities without stressing the natural functions of Arrábida ecosystems was the focus of the discussion of this subgroup.

The workshop started with the framing of the decision problems, followed by a sequence of exercises where participants were asked to identify which ES are affected by the decision alternatives. This led to the elaboration of a first matrix reflecting the effects of each alternative in relation to ES identified by participants. Subsequently, participants deliberated on multiple criteria and ES value dimensions that could support assessment of alternatives. They did so based on the causal models they had previously built depicting the interrelationships among key variables that explain functioning of ES in the AP. Such variables were translated into ES indicators to support the definition of ecological, economic and social evaluation criteria, which were then considered in the construction of a second assessment matrix. Participants defined the criteria against which each alternative is compared using a qualitative scale translating the direction of change induced by alternatives on each criteria (e.g., increase, decrease, or maintain). Following the analysis of the impact matrixes, participants proposed a set of the rules to follow in each decision process.

Lessons from this case study revealed positive outcomes regarding the role of involving inter-organisational stakeholder groups in deliberative ES assessment processes. Results demonstrate that the proposed deliberative process fostered changes in participants’ initial mental models and created new insights, namely by generating additional alternatives, expanding perceptions on affected ES, and supporting the formalization of multiple evaluation criteria and decision rules. The evidences from workshop observations and individual questionnaires (both ex-ante and ex-post) showed that new insights are created and a shared understanding is possible when participants are brought together to appraise decision alternatives based on scientific information and tacit knowledge on functioning of the underlying socio-ecological systems. Hence, the process described in this paper brings useful arguments to the debate on the operationalization of stakeholder-based ES assessments and illustrates how multiple value dimensions may be puzzled out in deliberative decision-making settings.

Sustainable water use – the way forward towards comprehensive measurement and management

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Water is a crucial resource for the survival of our societies on the planet. A comprehensive measurement of anthropogenic water appropriation and, building on this, the identification of thresholds of sustainable appropriation levels will facilitate a sound water management on different geographical and economic levels. As pressures on available water resources increase, there is a high demand for a solid accounting approach including all relevant aspects of water appropriation. Integrating data on water use and economic data within a consistent accounting framework allows to quantify the potential impact of specific economic sectors as well as relative benefits of mitigation measures also in countries as well as watersheds far away from final consumption. To do so, there are two main approaches to achieve this integration – “top-down” and “bottom-up” approaches. “Top-down” approaches use multi-regional input-output (MRIO) models and start with the overall water appropriation for the production of a specific sector in a specific geographical. These water volumes are allocated to final demand via monetary information on national and international trade (for instance, Tukker and Dietzenbacher 2013). In recent years, this approach has gained high scientific attention. A number of studies applied it for specific countries like Spain (Cazcarro et al. 2013; Cazcarro et al. 2012; Dietzenbacher and Velázquez 2007), the UK (Yu et al. 2010) or China (Zhang and Anadon 2014); others for regions such as the EU (Feng et al. 2011) or on the global level (Steen-Olsen et al.
Two of the most recent contributions are studies by Lenzen et al. (2013) and Lutter et al. (2016), who incorporate water scarcity into an assessment of global “virtual” water flows. In the latter, national water use quantities are broken down to the watershed level. This consideration of local water availability and consumption levels is of specific relevance, as certain amounts of extracted water can have different impacts in different watersheds within a country, depending on hydrological and ecosystem structures (Pfister et al. 2009).

In this paper it is argued that multi-regional input-output analysis extended by data on national water use data (W-MRIO) is the best suited approach to track the distribution of water use along product supply chains within and across watersheds and countries. One specific strength is that relevant hydrological as well as methodological aspects such as, among others, the different types of water (blue, green, and grey) and water flows (abstraction vs. consumption), and the necessary spatial, temporal and sectoral differentiation can be taken into account. The paper identifies the main areas of necessary methodological development steps. One of them is the disaggregation of economic sectors of high water appropriation. Providing a more detailed disaggregation of water intensive sectors allows considering the different use structures of water and avoids errors due to aggregation of inhomogeneous products. Another crucial area is the availability of data of high quality for all the disaggregated sectors. Especially for sectors such as manufacturing or electricity production data availability is scarce. Designing a scientifically sound approach to fill data gaps where no real data are available is hence of utmost importance.

Finally, it is discussed where, in contrast to its potentials, also the limitations of the W-MRIO are to be found. This is of specific relevance, as the best methodology will produce erroneous results when applied to the wrong area. For instance, a top-down approach will not be able to analyse water appropriation on the product level.

This paper argues that pushing the W-MRIO method will ensure the setup of a comprehensive as well as scientifically sound approach to account for anthropogenic water appropriation along international supply chains. Building on such an approach solid thresholds of sustainable water use can be identified as well as policy makers informed to what extent their correspondent aspiration are successful.

Information overload, growthmania, and unsustainability: learning from H.A. Simon and W. Wenders

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The purpose of this paper is to show that both growthmania and hesitation to address sustainability problems in rich countries can be explained by referring to some core ideas of the economist Herbert Simon and the film director Wim Wender.

The first section of this paper will introduce the concept of cinema in Wim Wenders. Born 14 August 1945 in Dusseldorf, Wenders is a film director, playwright, author, photographer and producer. After a short experience as student in medicine and then philosophy, in 1966 he moved to Paris to become a painter. Instead, he worked as engraver in the morning and spent most of his afternoons at the Paris Cinémathéque, where he viewed as many film as possible, as many as four a day. In this period he began to write articles for cinema magazines. Back to the Germany in 1967 he was admitted to the "Hochschule für Fernsehen und Film München" (University of Television and Film Munich) and realized his first short films (Kolker and Beicken 1993). He became a major figure in the New German Cinema and received many awards, among which the Leone d’Oro at the Venice Film Festival, Palme d’Or at Cannes Film Festival.

We know about the ideas of Wenders through his essays, interviews and books. A huge quantity of materials is also available from conferences, festivals and exhibitions dedicated to him. Our analysis is based both on some texts of him and about him, and on some of his early films.
We will see that his style is quite influenced by his experience in painting, and his ability to use images to communicate. The film is thought of as a sequence of snapshots, of pictures. The role of images in the Wenders’ opera is central, mainly due to his (ethical) idea of giving the spectator a central role in building the dramaturgy. Particularly, his early films are characterised by vast images, by landscapes and slow tracking shots that bring the heroes during their adventures. In the author’s concept, a film must be a cognitive experience for the spectators. In this sense the spectator has to be free to live the film experience without visual constraints and forcing. Wenders thinks that cinema has to make the spectator-listener able to decide, to choose which sense or emotion put into the history. The film should not impose violently to the spectators, but it must give the possibility to imagine and create a history in the spectator’s mind. For that reason, Wenders criticizes most of television productions, characterized by crowded images, pressed and quick montages, that do not permit to breath and to think freely. In fact, according to the German director, the vision of a film is a possibility to think, to create, also for the public. To realise this goal is very important to create the necessary conditions, playing with the rhythm and the images. It is not only a creative question, but also a social and political objective: the art has to stimulate the capabilities and the opportunities to free think, to choose without constraining conditions.

The second section will briefly recall the extraordinary scholar that Herbert Simon was. Nobel Prize laureate in economics 1978, Simon gave relevant contributions to several disciplines, economic theory, behavioural sciences, psychology, and computer science. The unifying thread of his different studies is best expressed by what he said about himself: “I am a monomaniac. What I am a monomaniac about is decision-making” (Feigenbaum 2001). Simon emphasised that rational choice is based on processing information. As a consequence, “in a world where information is relatively scarce, and where problems for decision are few and simple, information is almost always a positive good. In a world where attention is a major scarce resource, information may be an expensive luxury, for it may turn our attention from what is important to what is unimportant. We cannot afford to attend information simply because it is there” Simon (1978, 13).”

The third section will show that the word idea offers a bridge between Simon and Wenders. In the platonic philosophy – and in the ancient Greek culture in general – thinking and seeing were intrinsically and tightly related. In fact the word οιδα (perfect tense of the verb ειδειν, that means to see) means “I know because I saw”; furthermore, the term idea (ειδος) – also derived from ειδειν– is used by Plato in his Dialogs to designate “the visible form of the things”, that is the correspondent thought at an exterior object, the image of an object. The idea was conceived not as the essence of the observed thinks, but as a relation between the observation object and the observer: something that can be seen by the eyes and the mind. The etymological Greek intuition that observing and thinking are strictly related does not move away from the effective functioning of physio-psychological system of vision. Eye and mind work together, and they influence each other: the first offers materials to the mind and activates the information storage, the other stimulates the reception abilities/skills of the eye until the fine grade of vision that we normally know/use. Therefore the quality of perception of the external reality – also from the others sensorial channels – influences our mental processes and our choices: we are thinking and feeling beings, in every moments of our life.

The fourth section will move into the economics. As a first step we will show that traditional rational choice can explain the persistence of growthmania as stemming from unregulated greediness in the presence of market failures and undefined property rights. Selfish individuals, acting in unregulated markets, ask for economic growth, disregarding the negative side-effects of economic growth on others, both in the present and in the future. The quest for growth has the same root of free-riding or of overexploitation of open access resources. A complementary explanation can be put forward on the basis of Simon’s and Wenders’ ideas. The speed of our life, involving lack of attention, and the information overload we are exposed to, make us scarcely aware of the consequences of our life-styles and choices. ‘Fast’ and abundant information becomes then an obstacle for “using reason and science for the exploration of goals and as a basis for judgements as to the kind and direction of action to be followed” (Kapp 1965, 76-7). Several examples are brought in support of the actual relevance of “not seeing” in explaining both growth mania and unsustainability. Connecting seeing with understanding,
we argue, is a possible way to reconcile the two different ways the brain forms thought, “system 1” and “system 2”, as highlighted by Kahnemann (2011) in the book which summarises the research he conducted over decades with A. Tversky.

References

Trading with transaction costs in global value chains
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This paper conceptually examines the use of ‘transmission’ or ‘transaction’ as a unit of analysis of trade in resources, as proposed by Ponte and Sturgeon in 2014, and by Commons in 1934, respectively. It discusses what implications the use of this unit of analysis would have on data collection and requirements for analyzing trade, from within the concepts that define the framework of Global Value Chain (GVC) analysis in the sub-discipline of Economic Geography. Hypotheses are used to elucidate the type of advances this unit of analysis could achieve, as compared to conventional units of analyses that focus on physical and monetary accounts (i.e. value and quantity of, or actors participating) in the trade. The paper moves on to the type of research questions which could benefit from using this unit of analysis and draws on examples from within the resource trade of minerals to make the case that this unit of analysis offers a nuanced reflection on the variegated effects of the dynamics defining transactions in trade which allocate minerals in the global value chain.

Extended abstract
In 1934, John R. Commons advanced the suggestion of using transaction as the basic unit of economic analysis (Williamson, 1981). Thereafter, Ronald Coase (1937) argued that the boundaries of the firm were a variable up to economic assessment rather than a constant. Williamson (1981) built on these findings and defined transaction as the process that occurs ‘when a good or service is transferred across a technologically separable interface’ (Williamson, 1981, p. 552). In principle, transaction cost economics addresses the question of how a firm is to decide whether to make a certain product or component in house or to outsource and buy it.

It was not until Ponte and Sturgeon (2014) and their introduction of two forms of coordination among firms, ‘governance as linking’ and ‘governance as normalizing’ that transaction cost theory and bounded rationality were reintroduced into theory building in the global value chain (GVC) framework (Gereffi, Humphrey and Sturgeon, 2005). Ponte and Sturgeon (2014) build on their earlier contributions to GVC governance theories, ‘a theory of linking’ in GVCs (Gereffi, Humphrey and Sturgeon, 2005), and ‘a theory of conventions’ in GVCs (Ponte and Gibbon, 2005) to propose an approach which supports flexibility in analyses of highly complex, variate and dynamic [industrial] areas, and is to enable the connecting of micro, meso, and macro scales systematically.
Ponte and Sturgeon (2014) argue that with value as a moving target, the choice of the unit of analysis needs to reflect this dynamism: This is important since the selection of the unit of analysis determines how research is designed and from which perspective the findings will be presented. The proposal of ‘transmissions’ as unit of analysis by Ponte and Sturgeon (2014) as compared to ‘actors’, namely firms or organizations, as unit of analysis in Yeung and Coe (2014) seems to make exploring the nature of a movable target operational. Arguably this proposal is also more representative of the ‘metamorphosis’ that industry is going through and which affects how industry is conceptualized (Ponte and Sturgeon, 2014).

In this paper, hypotheses are produced that are to elucidate the type of advances this unit of analysis could achieve, as compared to conventional units of analyses that focus on physical and monetary accounts (i.e. value and quantity of, or actors participating) in trade. The paper moves on to list the type of research questions which could emerge and benefit from using this unit of analysis. Among these question could be (i) which type of transaction underpins this trade and how does this transaction affect the relative well-being of the involved parties, (ii) which characteristics best describe this transaction, (iii) what are the motivations for this transaction, and (iv) how are the circumstances under which the transaction is effectuated, best described.

This paper discusses what implications the use of this unit of analysis would have on data collection and requirements for analyzing trade, and draws on examples from within the resource trade of minerals. This serves to make the case that a dynamic unit of analysis such as ‘transmission’ enables a more nuanced reflection on the significance of examining the conditions underpinning each transaction in trade relationships as these have social consequences in form of distributional effects such as from externalities of environmental damage caused e.g. by mineral driven export-oriented development.

End-use energy study of India 1971-2012

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This study presents a first time exergy and useful work analysis of the Indian economy from 1971-2012. Alongside China, the country has experienced a magnificent economic growth in recent years, and has been ranked as 7th largest economy by GDP in 2015 (The World Bank, 2016a). It is on course to become one of the biggest economies in the world, thus its development path is of crucial importance for the global community. While the country strives to develop, aiming to provide wealth and energy for all of its inhabitants, concerns arise about the local and global environmental impacts of India’s growing energy demand. Given its enormous population and its dependence on inefficient fuels, this is important especially in the light of climate change and the agreement on climate mitigation made at the UN climate change conference in Paris 2015. Therefore, in the context of future global sustainable development, it is crucially important to understand how energy consumption patterns of Indian citizens have changed in recent years, and what resources and energy carriers the nation is planning to utilise in order to meet its growing energy demand.

In response, this presentation explores the mechanisms and trajectories which drive the socio-ecological transition from a developing country to an industrialised nation. For this, we look at the energy use of India, in particular the exergy inputs and energy services derived (useful work outputs), and the aggregate as well as individual efficiencies of technologies in-use. Data from the International Energy Agency (IEA) and a variety of other sources have been used and analysed following the framework for exergy and useful work studies based on early work of Ayres and Warr (2009), and further developed by Serrenho (2013) and Brockway et al. (2014). Very few studies, e.g. Brockway et al. (2015), examined exergy and useful work time-series of developing countries. Most analyses focused on industrialised countries such as the USA, UK, Austria, Japan, etc. Given the above
mentioned development challenges, it is vitally important to examine the development path of so-called emerging economies like India. The exergy and useful work approach allows for a direct comparison of the development patterns of an economy in transition with the well-known trajectories of already industrialised service-based economies, in order to identify similarities and differences. Opposed to an analysis focusing on the input side (or so to speak, the primary energy inputs) of a socioeconomic system, exergy and useful work studies examine the other end of the energy conversion chain, broadening the view towards efficiencies in energy transformation through to energy services. The concept of exergy is applicable on all stages of energy use. While exergy represents the ability of a given source of energy to perform work (e.g.: the heat released from coal when it is burned), the fraction providing the actual energy service for humans is entitled useful work (e.g.: mobility provided by a vehicle, boiling water, heated up by a water cooker, thermal comfort due to air-conditioning,...). By calculating exergy inputs and useful work, aggregate exergy-efficiency can be derived, representing time-dependent technological evolutions and energy efficiency improvements.

This presentation will give an overview of the Indian socio-economic system and portray the magnitude and varying end-uses of the 8 different sources of energy (coal, oil, natural gas, electricity, combustible renewables, food & feed, renewables, and nuclear). Furthermore, the main energy-intensive sectors have been identified. Lastly, insights into the structures of end-use services and useful work, as well as the underlying drivers for change will be presented.

During the 41 years studied, India has experienced a rapid transition from a mostly biomass based to a fossil fuel dependent society. Indian energy consumption patterns are largely diversified: The overall energy mix is nowadays dominated by fossil fuels, foremost by coal and oil. A growing portion of urban households is equipped with modern appliances, while traditional fuels such as firewood, which are used mainly as cooking fuel, are still dominant in rural households. According to the World Bank (2016), 20% of Indian households still lack access to electricity; at the same time, electricity has emerged as one of the fastest growing energy sources in the country. The growing demand for fossil fuels can be attributed to the requirement for electricity generation and the expansion of energy-intensive sectors such as the iron & steel sector. These sectors’ energy needs are met mostly by the use of poor quality domestic coal, a trend that is likely to continue (de la Rue du Can et al., 2009). It must be noted though, that aggregate final-to-useful exergy efficiency (aggregate useful work divided through aggregate exergy input), representing overall technological efficiency improvements throughout all sectors of the economy (Serrenho, 2013), has risen significantly from around 7 % in 1971 to almost 16 % in 2012. Improving the availability of modern and clean sources of energy for households, especially in rural areas, as well as finding adequate ways to fuel its economy without massively harming the environment will be the big challenges for India in the decades to follow.

References:

The Future of Work: Lessons from the History of Utopian Thought
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There is considerable anxiety about the future of work. Some suggest that work may be ending in affluent economies: either because of automation or stagnation (Brynjolfsson and McAfee, 2014). Such issues are especially pressing for ecological economists. If we are to facilitate sustainable economies, we must provide compelling narratives about how we can all live better while consuming and producing less (Jackson, 2016). Recently, questions about work and leisure have been a central focus for ecological economists (Jackson and Victor, 2011, Druckman et al., 2012, Antal, 2014, Buhl and Acosta, 2016), but it remains unclear exactly how work fits into narratives of sustainable prosperity.

In this paper we contribute to the development of ecological economics narratives about the future of work. To do this we explore the role given to work by writers of historical utopias. We understand utopias as ideal societies characterised by “the refusal to take at face value current judgements of the good, or claims that there is no alternative”(Levitas, 2007, p. 294). We see utopian ideas of work as reactions to the economic conditions of the society in which the authors of utopias lived. By analysing utopian ideas of work in a way that links the historical economic contexts and modern theories of work, we hope to broaden the future of work debate.

We structure our analysis around three utopias, each representing a different theory of work. 1) The Land of Cokaygne, which deals with work as a burden, and issues of equity in the labour-reward relationship. 2) William Morris’ News from Nowhere, which views work as a source of prosperity, but only given societal transformation. 3) Plato’s Republic, which sees work as creating fulfilment through the development of skill.

First, we review the usual reading of The Land of Cokaygne, (a medieval poem (Millett, 2003, Parsons, 2015)), where work is useful only for the material comforts it provides. This reading emphasises two aspects of Cokaygne: the lack of work, and the great spectacles of consumption – rivers of milk, honey and wine; self-roasting animals; buildings made from the finest cakes. These two themes are taken to be a rejection of the hardships of peasant life in Medieval Europe, and said to reflect the desires of peasants to live in comfort without working (Garrett, 2004). This reading of Cokaygne links to techno-utopias where work is replaced by machines (for example, Etzler, 1836), as well as to neoclassical economic views of work as useful for meeting basic needs, but not deeper satisfactions (Brynjolfsson and McAfee, 2014). We can also identify similar ideas in ecological economic calls to reduce working hours (e.g. Buhl and Acosta, 2016).

However, there is a more critical reading of Cokaygne. Drawing on Morton (1969), Sargent (2015) and Lochrie (2016), we set out an alternative reading of Cokaygne that emphasises how Cokaygne democratises consumption, and deals with issues of social justice in relation to work. We argue that the central issue of work in Cokaygne is the issue of fairness in the labour-reward relationship. Rather than reflecting a desire to do without work, the material excess without work depicted in Cokaygne reflects how the upper classes lived in medieval society. We suggest that Cokaygne inverts the labour-reward relationship of medieval society.

Work is also a central theme of News from Nowhere, a socialist utopia set in a communist England. In contrast with the rather dismal view of work in the usual reading of Cokaygne, work is the principal source of fulfilment for the residents of Nowhere. In fact, we are told that work is life, to labour is to create, and to create is to receive the “the wages which God gets” (Morris, 1970, p. 77). It is important to note, however, that Morris’ utopia imagines a complete restructuring of society away from consumerist values, and a restructuring of production away from profit and specialisation. Only then
can work be good (Breton, 2002). This is because, for Morris, good work must embody “hope of rest, hope of product, hope of pleasure in the work itself” (Morris, 1884).

In ‘hope of rest’ Morris (1884) is recognising that there is “some pain in all work”, and so work that is fulfilling must allow for rest. In News this pain is alleviated because workers decide their own schedules. They therefore work only as often as they wish, and change the nature of their work regularly – a stark contrast from the regimented ‘division of labour’ in 19th century England, and the specialised nature of the modern economy.

In hope of product, Morris is railing against an emergent consumer capitalism. Morris felt that much production did not meet any real need, but was driven by needs of the profit driven industrial system (Davis, 2009). In News, Morris describes how this system has been overturned such that production now consists of only socially useful goods. As a result people are able to derive pleasure from their work because they are contributing usefully to society. Here we see echoes of Graeber’s (2013) concern about the rise of ‘bullshit jobs’.

Finally, Morris’ third hope reveals his idealisation of artisans and ‘craft’. In News, the demise of consumerism substantially reduces the level of production. This allows people to take more time when producing their products. Consequently, they make the output of their work high quality and beautiful, such that production becomes art. There are clear parallels here with modern ecology, particularly slow and degrowth movements (Davis, 2009). What Morris illustrates is that such an approach flows from a radical overturning of the economic dynamics that currently dominate capitalist economies.

In the final analytical section of the paper we explore the role of work in Plato’s republic (Plato, 1974). Unlike Morris, Plato rejects any notion that autonomy is important: Plato’s workers are assigned jobs. Similarly, Plato disagrees that the division of labour is a problem. In fact, Plato is commonly credited as being one of the first to outline a theory of specialisation. In Republic, Plato considers the desire to develop skill (through the application of intelligence and creativity) to be a fundamental part of human nature (Greco, 2009). For Plato, true development of skill is only possible when we work our whole lives in an occupation that fits our natural aptitudes. Consequently, for Plato we can only fully realize our human nature through work.

Having discussed three narratives of work from historic utopian thought, we conclude by sketching a new narrative of the future of work in ecologically sound societies. This narrative develops the theme of justice in the labour-reward relationship from Cokaygne, the themes of hope in product and the need for structural change from Morris, and the theme of skill development from Plato. We argue that a shifting of production from materially intensive goods sectors to labour intensive service, care and artistic sectors (Jackson and Victor, 2011) can provide high levels of fulfilment because they allow workers to develop their skill (Plato) in producing socially useful products (Morris’ hope of product).

But, like Morris, we argue that this requires a rethinking the profit motive and the productivity drive. Without reform, price and productivity dynamics (Baumol et al., 2012) are likely to undermine both the social benefits and implementation of this approach.

References
To be usable or to be transformative? The tension among Beyond GDP indicators and the case of Social Progress Index

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The last four decades have seen the multiplication of new indicators aiming to challenge GDP. These intend to measure prosperity from a broader perspective, in order to foster the pursuit of other goals than exclusively economic growth. If this new field of research received institutional and academic recognition (Stiglitz commission, 2009; OECD, European Commission, etc.), it appears that the effective uptake of new indicators in policy making is still weak. While traditional literature focused on the intrinsic quality of indicators, more recent trends driven by institutions (e.g. BRAINPoO project of EU commission) or academics concentrated on the use and influence of indicators. One of the findings of this recent literature revealed that indicators are more likely to be used if its conceptual and methodological framework fits the one of its users, and if the actors carrying it are powerful (Thiry et al., 2013). However, if an indicator perfectly matches the conceptual frameworks of policy actors, it is unlikely to shake established mental models and institutions (Lehtonen et al., 2016). We explore this tension between usability of indicators and their transformative potential building upon the case of Social Progress Index (SPI).

The SPI is a new composite indicator developed in 2013 by the Social Progress Imperative, aiming to complement GDP and to be “a robust and holistic measurement framework for national social and environmental performance” (Porter et al., 2016, p.11). It is calculated yearly since 2013 for 133 countries and includes 51 social and environmental variables aggregated by principal component analysis. Designed to be usable by governments and firms, carried by a broad consortium of private companies (Deloitte, Rockefeller Foundation,...), scholars (Harvard Business School,...) and local and regional actors (e.g. more than a hundred organizations in Latin America), SPI has the features of a usable indicator. Composed exclusively of social and environmental variables, it has, at first sight, a potential to be a tool for a social and ecological transition. But is this indicator liable to overcome the informed tension between the width of the uptake and the depth of its potential for change?
We investigate the function of challenger of the SPI by observing the country ranking it gives rise to. Our method, similar to the one used by Borgnäs (2016), is the comparison of the rankings delivered by SPI to the ones of six other indicators selected because of their country coverage, recent data calculation, and their holistic approach: Happy Planet Index (HPI), Sustainable Society Index (SSI), Global Well-Being Index (GWBI), Quality of Life (QoL), Human Development Index (HDI) and Gross Domestic Product (GDP) per capita.

Firstly, our analysis shows that two subgroups of indicators appear: SPI, GWBI, QoL, HDI, GDP on one side, and HPI and SSI on the other side. The indicators of the first group see their ranking strongly correlated with those of GDP (all coefficients of correlation are between 0.85 et 0.98), and place OECD countries in top positions of the ranking (non-OECD countries in the bottom). The second group’s ranking (HPI and SSI) is weakly correlated with GDP (coefficient of correlation of 0.28 for both) and is much more nuanced when classifying OECD and non-OECD countries. When the sample is restricted to the industrialized countries identified by Esping-Andersen (1999), in order to study the ranks by type of social regime, the same groups of indicators appear. The first one (SPI, GWBI, QoL, HDI, GDP) favors social democratic and liberal countries, while the second group (HPI, SSI) favors social democratic and conservative corporatist countries. While Beyond GDP indicators were precisely developed to counter insufficiencies of the latter, indicators with outcomes very close to GDP seem poorly designed to shake established mental models.

Secondly, we study the determinants of the separation between these two groups by an analysis of the effect of several variables on their ranking. By doing so, we highlight (1) the respective weight of social and environmental variables in determining the correlation between the indicator and GDP and (2) the kind of social and environmental variables that are used. To this respect, it appears that the strong correlation with GDP is linked to the exclusion of social and environmental variables that are weakly or negatively correlated to the economic product (e.g. inequalities or ecological footprint), even in non-economic indicators like SPI.

Finally, we discuss our results, noticing that SPI, despite its usability potential, is too close to GDP to be a reliable indicator favoring a social and ecological transition. After the formulation of proposition in order to improve the indicator, we discuss the degree at which our conclusion can apply to other current Beyond GDP indicators with great usability potential.

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Participatory action research (PAR) as a tool for representing silenced voices and oppressed interested on a local level — experiences of a case study
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1. Problem – inefficiency of conventional (social) science in serving the needs of the voiceless and oppressed human and non-human world
According to its critiques social science is either ineffective of contributing to social changes or even shows oppressive features (Clover 2011) by often being socially irrelevant to non-university stakeholders except serving as legitimator for those in power (governments and global financial markets) (Greenwood 2015). Even though if such an approach about the futility/contradictory nature of conventional social science is excessive, it is obvious that numerous factors exist which exclude the most marginalized and oppressed from the access to (social) scientific results, while political and economic elites are able to either ignore or utilize these even in accordance with potential vested interests), since “social power often ends up by attempting to impose a particular construction on reality.” (Greenwood 2015, 201).
Therefore, it is questionable whether conventional scientific approaches help oppressed and marginalized social groups to escape the situations they face. Especially if oppression leads to the presence of significant counter-interests being present related to such changes. (Two simplified examples for that might be that (1) environmental taxes result in lower profits, real income and state revenues and therefore face opposition from business, workers and government; or (2) putting systemic/institutional efforts (resources) into the empowerment of oppressed social groups facing harsh prejudices leads to loss of votes for politicians (and thus face their opposition).

2. The approach of PAR
Participatory action research (PAR) as an approach to social inquiry was developed to challenge the “limitations and oppressive features of traditional scientific research, opening spaces for experimentation of alternative approaches” (Clover 2011, 13.) Action research is about “combining research and development for their mutual benefit, through direct interaction involving the different practitioners and people concerned”. (Johansson-Lindhult 2008, 97.) PAR is counter-hegemonic: it aims to develop of the voice of the oppressed and claiming and legitimating it in larger arenas as part of its counter-hegemonic attitude (Greenwood 2015).
Action research is made up of action research cycles: (1) actions alternating with reflection; or (2) planning, acting, observing and reflecting (Dick 2015). Therefore, action is a core element of the process beside observation and serves to both change the world around us and generate meaningful understanding (from and for actions and social change).

3. PAR case study, methods
Within our presentation we reflect on the merits and limitations of PAR as a tool for representing voiceless and oppressed human stakeholders and contributing to social changes in favor of them. Our analysis is based on a PAR cooperation of local academics/activists, Roma representatives and underclass Roma families living in the segregates of a major Hungarian city. Underclass Roma are extremely poor, marginalized and oppressed: they face discrimination in all aspects of their life. The process is aimed at long term empowering and transformative goals, including breaking the poverty trap and reducing extreme local social inequalities. Here, Amartya Sen’s capability approach (1999) provides us a useful theoretical framework: the evaluative space is the space of capabilities, i.e. opportunities to live the life we have reason to value. Empowerment (self-determination and sense of control) means broadening the real opportunities – capabilities – of people: people’s freedom to choose the life they want to lead. In order to contribute to these goals, cooperation is supposed to be action-oriented, continuously expanding and including previously non-existent activities connected to (1) social welfare, (2) capacity building and (3) political activism (anti-oppressive work).
Our analysis is focused on the anti-oppressive (political) pillar of PAR. We show the opportunities PAR offers but also limitations and difficulties it faces in case it aims to contribute to meaningful changes and representation of interests in an oppressive environment. Our analysis is based on (1) semi-structured interview-based evaluations which have been carried out by academic participants about the cooperation on a regular basis; (2) structured reflection activities within PAR; and (3) research diaries of participating academics. Qualitative content analysis (Titscher et al. 2000) has been carried out on these data sources to identify the opportunities offered by and PAR and related limitations and difficulties.

4. PAR as a tool for representing voiceless and oppressed human stakeholders?
Our preliminary conclusion is that PAR is a useful approach to combine meaningful research and social activism and helps researchers to live and work in a way which enables them to “not to split their work from their lives” (van der Muelen 2011, 370). PAR allows academics to transform themselves into „a hybrid of scholar/activist in which neither role takes precedence...” and allow for „their academic work to take place within and is made possible by our political commitments” and „to be political and concerned with achieving real outcomes with real people.” (van der Muelen 2011, 375). Furthermore, carrying out research in oppressive environments in an action-orientated way also helps researchers to experience the (lack of) usefulness of their scientific methods and knowledge by testing their efficiency of changing real world settings characterized by unsustainable and oppressive preferences, counter-interests and power and vested interest. This way carrying out PAR for social change highlights that the workability of knowledge (Bradbury-Huang 2010, Greenwood 2015) is among the most important quality criteria for science in case it is to contribute to real world social changes for social and environmental sustainability - as it is suggested by studies on the approach of ecological economics itself (Röpke 2004, 2005).

References

An Economic Perspective on Industrial Ecology
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Industrial ecology involves the examination of material and energy flows through society in order to determine how industry can move toward a closed loop system, where waste streams are reduced. In particular, industrial ecology focuses on how industry might engage in the recovery, reuse and recycling of waste products. It is ecological in the sense that it looks to the lessons that natural ecosystems can provide for the efficient use of materials and energy, and for operating within the environment’s assimilative capacity for waste. For example, industrial symbiosis examines how traditionally separate industries might exchange by–products for their mutual benefit. By suggesting how environmental impacts from economic activities might be reduced, industrial ecology can inform both public policy and private enterprises. Among many other contributions, research in industrial ecology has addressed the design of environmentally friendly products and processes, technological change and eco-efficiency, decarbonisation and dematerialisation of society, and the development of eco-industrial parks. Key tools of analysis in the industrial ecology literature include: (1) Material flow analysis (MFA), which aims to quantify flows and stocks of a material (for example, wood, glass or plastics) from source to sink, at a point in time and within a defined economic system; and (2) Life cycle assessment (LCA), which is a framework that quantifies the environmental impacts of a product across all stages of the life cycle, from the extraction of raw materials, manufacture, use, maintenance, and through to the final disposal or recycling (incorporating interdependencies between these stages). The attractiveness of MFA and LCA is that by taking a systems-based approach, they provide a comprehensive picture of the multiple parts of the system and the multiple environmental endpoints. This is in contrast to traditional environmental reporting, which is based solely on direct (in-house) impacts and does not include upstream and downstream impacts.

While industrial ecology is considered a multidisciplinary field that includes social sciences, it is largely dominated by scientists and engineers. The contribution that economic analysis can make to improving environmental quality is not fully incorporated in the literature. As a result, industrial ecology often focuses on descriptive studies that may benefit from greater consideration of economic dimensions. Likewise, the emphases placed by industrial ecologists on physical reality, life-cycle perspectives and ground truths can help to further advance ecological and environmental economics. This paper argues that greater collaboration between economists and industrial ecologists could help to realise these gains, and add further insights into environmental improvement, environmental policy, and sustainability.

This paper provides a critical analysis of the industrial ecology literature from an economic perspective. Reviewing the field can be an elusive task, as it is rapidly growing and constantly evolving, and without a clearly defined boundary. A certain level of generalisation is unavoidable. While recognising these difficulties, the main objectives of this paper are: (1) To provide an introduction to key concepts and techniques of analysis in industrial ecology for the benefit of economists. In particular, we provide a detailed explanation and discussion of MFA and LCA, and consider a range of influential case studies and the contributions they have made.

(2) To point to areas where economists and industrial ecologists have gained from working together. These include in the use of input-output economic models in LCA to overcome data limitations, and in the use of economic models in LCA in order to capture the impacts of indirect market-mediated responses.

(3) Identify further opportunities for economists to make fruitful contributions to the industrial ecology literature. In particular, there is considerable room for improvement in the use of monetary valuation in LCA to weight environmental impacts. In addition, there is potential to broaden the scope of industrial ecology by incorporating economic impacts alongside environmental considerations, which may help provide a basis for prioritising possible strategies, either for businesses or society. Closer attention may also be paid to the role of economic incentives in the implementation of policy recommendations, while the biological analogy at the center of industrial ecology has various limitations when it comes to understanding the flow of energy and materials through industrial systems, and the evolution of those systems. We argue that the contributions of economists can help
to address these limitations and thereby further expand and deepen the contribution made by industrial ecology, to ensure the field reaches its full potential.

The potential of landscape labelling approaches for integrated landscape management in Europe
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Landscapes are dynamic human-nature interactions in a geographic space that are determined by biophysical characteristics, societal perceptions and governing institutions. Actors negotiate land-use objectives, management approaches and trade-offs in landscapes (Görg, 2007; Ros-Tonen et al., 2015). The landscape concept has become widely accepted for embracing the natural sphere as well as human activities and heritage to guide decisions towards more integrated and sustainable management practices (Owen and Herlin, 2009; Plieninger et al., 2015; Stenseke, 2016). However, there is considerable ambiguity about which governance arrangements can maintain and develop valued landscape characteristics and how landscape management can be directed towards more sustainable outcomes (Selman, 2012; Wu, 2013). Landscape labelling is a new idea for a governance approach and holds the promise of rewarding landscape managers for providing and maintaining a bundle of ecosystem goods and services at the landscape level (Ghazoul, Garcia, and Kushalappa, 2009). Landscape labelling seeks to organise interaction processes, determine land use objectives, set standards, influence motivations, initiate or reduce conflicts, and resolve disputes among actors. However, until now, landscape labelling has been more of a vision than an established governance model as it is at an early stage of innovation. Based on experiences with landscape-related labelling approaches in Europe, this presentation aims to identify the potential and key principles of landscape labels as a governance approach to fostering integrated landscape management.

Our research questions are:
1. What characterises landscape labelling and how does it relate to other landscape-related labelling approaches in Europe?
2. What governance factors foster and hinder the establishment of landscape labels?
3. What are the implications for integrated landscape management?

This presentation combines conceptual thinking and empirical analysis of landscape labelling as a new governance approach. Landscape labelling combines ideas from integrated landscape management as a guiding objective, geographic indication for place-based anchorage, and payments for ecosystem services to foster particular land management practices. Building on these concepts, landscape labelling comprises three key characteristics: First, as a guiding objective, landscape labels seek to promote multifunctional land uses that support a range of ecosystem functions and services at the landscape level. Second, landscape labels are tied to a particular region where the aim is the product differentiation of an entire landscape, rather than of a particular product as a marketing tool (cf. Unseld et al., 2007). Third, landscape labels provide financial incentives to landscape managers for sustainable land management, such as to conserve biodiversity and to improve rural livelihoods and human well-being (Hart et al., 2014). In return, landscape labels encourage beneficiaries to invest in sustainable and integrated management practices.

Four cases form the basis of our analysis. We focus on landscape-related labelling approaches that include (at least some) elements of landscape labelling, such as regional brands in biosphere reserves in Germany, geographic indication in Spain, organic agriculture in France and a community forest in England. For each case, problem-centred interviews are performed with experts to explore their
knowledge of the socio-ecological context, activities, actors and outcomes. Although the cases differ in scope from the local, to the regional and national levels, many structural-institutional, actor-related and process-oriented conditions had similar effects. We identify the following factors that foster the establishment of labels and their use: integration of labels into institutional contexts, linkages to markets and consumer demands, and inter-regional coordination characterised by regular multi-actor information exchange and learning. In contrast, a lack of policy support, resources and entrepreneurship are considered a hindrance to the sustainable functioning of labels.

We argue that landscape labels are powerful identifiers that promote multifunctional land use and foster social, cultural and environmental landscape values. Landscape labelling highlights the uniqueness of a landscape and the need for its conservation by financing particular management practices. Rather than introducing just another label, it builds on existing integrated management objectives and related place-based and management-oriented labelling approaches to make better use of synergies. By re-configuring conceptual elements and governance strategies for integrated landscape management, geographic indication, and payment for ecosystem services, together with a focus on cultural landscape and heritage preservation, landscape labels may improve sustainable landscape management (Milder et al., 2013).

Instead of suggesting a blueprint for the establishment of landscape labels, we emphasise four key insights into the specific role of landscape labelling in integrated landscape management:

1) Landscape labels are boundary objects for integrated landscape management
2) Landscape labelling creates real world laboratories of change
3) Landscape labelling needs to be integrated into existing policy instruments and strategies
4) Landscape labelling depends on supportive governance structures and policy conditions

The high societal awareness of organic products, place-based authenticity and uniqueness may provide a window of opportunity for policy change (Kingdon, 1984). Such discourses should be used by decision-makers to frame new narratives that highlight the need for integrated landscape management as rural landscapes in Europe risk losing their role of providing multiple functions and services, and their source of regional identity.

References


Land use policy scenarios for native forest conservation in south-central Chile
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Land use and land-cover change (LULCC) has been identified as a major driver in global change. LULCC affects the processes of exchange between the earth surface and atmosphere. LULCC affects biogeochemical processes, such as carbon emission, biological productivity and biodiversity (Foley et al., 2005). Deforestation and native forest replacement continue to be the dominant global trend in terms of forest cover (Putz & Romero, 2014; Ritters et al., 1995). Since LULCC is mostly driven by human action, an effective conservation policy should attempt to modify human behavior. However, the impact of the conservation policy will depend on the interaction of the ecological, political and economical dynamics, in other words, the socio-ecological system (Lambin & Meyfroidt, 2010). The state and institutions are particularly important in regulating such interactions. For example, it is well known that countries that harbor the most important clusters of global biodiversity (FAO, 2014), are now open economies who export highly profitable commodities, such as beef, paper pulp, or palm oil, creating high opportunity cost for owners enrolled in conservation programs (Verburg et al., 2014). Thus, attractive conservation programs must address conservation costs and consider payments even beyond those suggested by opportunity costs (Cacho, Milne, Gonzalez, & Taconi, 2014). Chili is commonly presented as a successful case in terms of afforestation. Forestry plantations have increased from 330,000 in 1973 (Camus, 2006) to 2.43 million hectares in 2014 (INFOR, 2016, p.24). However, only three nonnative species account for 93.2 % of the area planted. The expansion of forestry plantations in Chili occurred alongside the liberalization of the economy and the implementation of a cost-sharing afforestation program by the military-led government (DL701 in 1974). The combination of such policies created a market structure that conferred higher land rents to forestry plantations (Niklitschek, 2007). A significant part of such expansion has been shown to be attributable to the cost-sharing subsidies included in the DL701 afforestation program (González, 2010). The financial returns on investments of non-native plantations are among the top three in the Americas (Cubbage et al., 2007). The relative higher economic returns of plantations put an extra pressure on lands under other competing land uses, such as native forest conservation, creating perverse incentives for native forest substitution.

In contrast, native forest area is still diminishing (Miranda, Altamirano, Cayuela, Pincheira, & Lara, 2015), despite the fact that Chilean native forest are part of the global hotspots of biodiversity conservation (Myers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000). Native forest also provides water during the dry Mediterranean summer in central Chile (Little, Lara, McPhee, & Urrutia, 2009). It is expected that dry summers in Chile will intensify as a result of anthropogenic local action and climate change (Cepal, 2009). In this context, forest conservation, requires further consideration due to the societal and ecological benefits of forests, which are not captured in current market transactions (Lara et al., 2009; Little et al., 2009; Nahuelhual, Carmona, Aguayo, & Echeverria, 2014).

In 1992, the proposal for a Native Forest Law represented the first attempt to conserve forest since democracy resumed in Chile. The Native Forest Law (NFL) passed in 2008 - after 16 years of Congressional discussion. The original draft proposed strong regulations over native forest replacement by either tree farms or agriculture, but the bill got into a gridlock for almost 10 years
(Arnold, 2003; Manuschevich & Beier, 2016). One of the proposals was a subsidy 4 times larger than what it is today ($640 usd/ha). While monetary payments and compensation were incorporated into the draft, the government’s budget commission established a cap of payments of $640 US dollar per hectare (or 10 U.T.M) (Biblioteca del Congreso Nacional de Chile, 2008). The NFL (passed in 2008) has lax land use regulation and provides a small subsidy for native forest management and conservation, which has resulted in a very low impact (Cruz, Cid, Rivas, Neira, & Ladron de Guevara, 2012) and has demonstrated to have a questionable feasibility for both conservation and preservation purposes (Bhrum, 2014; Levil, 2010).

In this paper, we assess the effect of alternative policy scenarios. We compare a business as usual scenario, this is if the current NFL is maintained as it is, against a scenario where the payment is 4 times larger, as it was advocated during the NFL discussion. The scenarios are developed for 2030. Our analysis combines a land use modeling framework called DYNA-CLUE with a land rent analysis. Following González (2010) we are using a Ricardian land rent model to estimate the impact in hectares of increasing the subsidy amount. The land cover of years 1997, 2007, 2014 available from the National Cadaster of Vegetation (CONAF, 1997, 2007, 2014) allowed us to obtain the dependent decision variable. A panel data approach is then used to estimate econometrically the determinants of land use. The econometric approach considers the spatial distribution of land uses and production costs. The panel data analysis allows to estimate the probability of allocation of alternative land-uses as determined by both land rents of alternative land uses and other biophysical and location attributed the parcel location. A strong assumption is that land use change is simulated as if all conditions in the study period (1997-2014) will prevail in the next period of time (2017-2030).

DYNA-CLUE is a modeling framework developed by Verburg and Overmars (2009) that allocates land uses based on suitability and land use restrictions, such as conversion among land uses. However, DYNA-CLUE requires as an input the area (hectares) that would be allocated to each land use. The land rent analysis provides the number of hectares given for each land use scenario that results from the counterfactual analysis.

Our analysis was conducted for the Araucaria region, located in south central Chile (38°54′00″S 72°40′00″O), which includes the coastal area, the central valley and part of the Andes mountains. The entire region was divided in three subareas, and several factors, such as elevation, slope, soil type, size of the land plot and indigenous ownership, were evaluated as predictor for each land use in order to estimate the suitability map for DYNA-CLUE.

We found that current land rent varies from $427 usd/ha/year in the best quality soils planted with wheat to $192 usd/ha/year in low quality soils planted with commercial plantations. Based on the logistic regression for DYNA-CLUE we found that areas owned by indigenous communities were less likely to have commercial plantations, and more likely to be in agricultural use. We also found that if native forest area increases, it will probably occur in the coastal area. Our results suggest that a onetime payment -as it is today- is ineffective, but a payment 4 times larger than it is today would help to protect native forest in poor soils. Nevertheless, the effectiveness of a onetime payment requires further study. Using InVEST (Kareiva et al., 2011) further steps involve the evaluation of each of the scenarios in terms of the ecosystem services each one would provide.

Our approach contributes to connecting different disciplines by understanding and addressing the social and environmental aspect of land use change, while proposing policy alternatives that could help to conserve native forest in Chile.
Population and Climate Change: Lowering Carbon Emissions through Family Planning
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1. Origins of Project
This project was commissioned and supervised by Roger Martin, then Chairman (now President) of Population Matters (PM), an environmental non-profit organization. It believes that halting population growth through voluntary family planning and women’s empowerment programmes is an essential and cost-effective, though in no way sufficient, condition for a biophysically sustainable planet. Its PopOffsets project addresses climate change by encouraging and distributing carbon offset donations for such programmes, thus reducing future energy demand and hence CO2 emissions with each unwanted birth prevented. PM always stresses that (strictly non-coercive) family planning is an essential complement to, but in no way a substitute for, the conventional approaches to climate change; and has many wider benefits, citing the UNICEF comment that “Family planning could do more good for more people at less cost than any other known technology”.

2. Purpose and Background of Project
The purpose of this project is to analyse in detail a previous model by Thomas Wire (LSE 2009), proposing a cost-benefit analysis of reducing carbon emissions by non-coercively reducing population growth between 2010 and 2050. His report ‘Fewer Emitters, Lower Emissions, Less Cost’, estimated that $6.46 invested in family planning would abate one ton of CO2 emissions (tCO2). Since his data is six years old, however, assumptions about the cost of contraceptives, population and CO2 emissions may not now be convincing. Thus his data needed updating; and a method was devised to improve his work and explain the large cost differences derived from different approaches.

3. Method
A cost/effect data analysis of spending on modern contraception methods was explored, aiming to reduce CO2 emissions from 2016 to 2050. For the data analysis, initial assumptions were made, and raw data collected mainly from UN Population Division and from the client. Five standardised spreadsheets were constructed, with variations in some of the key underlying assumptions which Thomas Wire had deployed.

4. Findings
There are thus in total five versions of calculation in this report. Recalculating Wire’s old data from 2010 to 2050 (version one), and including new data from 2016 to 2050 (version two), found only minor miscalculations in his previous work. Three new versions of method were then analysed. Version three, based on Wire’s method but with changed assumptions about CO2 emissions and the cost of meeting unmet contraceptive need, gave a result of $4.2/tCO2. Version four is based on version three but alters the population assumptions and gave a result of $4.31/tCO2. Version five, agreed as by far the most credible, is based on version four but takes account of life expectancy. It concluded that investing $1.11 in family planning abates one ton of CO2 emissions. This is strikingly less than any other renewable energy technology, including Geothermal, Sugar Cane, Reduced Deforestation, Switch Grass, Wind, Solar, Coal CCS New Build, Coal CCS Retrofit, Plug in Hybrids, Electric Vehicles, etc.

5. It is perhaps surprising that anyone is surprised by this. To take an extreme case, it is obvious, for instance, that a 5 cent condom successfully preventing an unwanted conception and birth abates, with effect from 9 months later, an entire lifetime of emissions with no maintenance or replacement cost, plus the total emissions of that never-existing person’s never-existing descendants in perpetuity (though this last factor is not included in the project calculations).

6. PopOffsets
PopOffsets, a carbon offset scheme run by Population Matters, is the only such project in the world that helps individuals and organisations offset their carbon emissions by investing in family planning and associated programmes in both developed and developing countries. It has its origins in Wire’s 2009 LSE report; and updating and clarifying the cost per carbon ton abated for each project funded
was important for its continuing success. Most of the projects it has so far supported produce radically lower costs per ton than mainstream schemes.

7. Approach Adopted
All versions are basically based on Thomas Wire’s method but with improvements to both the benefit model and the cost model. The benefits of this project are the amount of reduced CO2 emissions, while the cost is the money used to meet the unmet need for modern contraceptive services.

8. Within the ‘benefits’ section, in order to get the figure of how much CO2 emissions can be reduced, the number of avoided unintended births through satisfying the unmet need for modern contraception and the figure of CO2 emissions per capita are the key factors. This process is completed in a consistent method for each year from 2016 to 2050 through a spreadsheet model. CO2 emissions per capita in each country are estimated for all years to produce total emissions.

9. Within the ‘cost’ section, a spreadsheet model is used to calculate the total unmet need for modern contraception in different countries and the cost of meeting it, thus greatly decreasing the unintended birth rate and resultant emissions. Finally, a figure of how much financial contributions toward meeting the unmet need for modern contraception are needed to abate one ton of CO2 emissions can be calculated, by dividing the total reduced CO2 by the total cost.

10. Additional Benefits not included
It is obvious that, ceteris paribus, more people emit more carbon than fewer people. It is thus surprising that, except for China in 2009, no country as far as the author knows has raised population stabilisation or reduction at UNFCCC COPs as an essential condition in the long term both for climate stabilisation and for wider biophysical sustainability. This is particularly the case, given the numerous other ways in which investment in family planning and the associated programmes achieves a wide range of other benefits at no additional cost. Thus apart from abating a ton of CO2, the same dollar:

a) Improves mother and child health;
b) Improves food, water and energy security;
c) Empowers women;
d) Stimulates economic development;
e) Reduces deforestation, land erosion and environmental degradation;
f) Protects biodiversity;
g) Reduces civil unrest and conflict;
h) Reduces unemployment and exploitative labour;
i) Improves school attendance and attainment;
j) Saves many dollars in unneeded aid for infants and mothers;
k) And increases the impact of all other mitigation and adaptation measures.

No conventional investment in renewable energy or energy efficiency achieves any of these additional benefits.

Communicating peatland restoration complexity
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1. Introduction
The Earth’s ecosystems continue to be degraded at a pace that critically compromises their capacity to deliver services that are essential for human livelihood and well-being. Ecological restoration is having an increasingly central role in addressing this threat. For ecosystems restoration to be successful, restoration science and practice needs to be coupled with an understanding of its multiple socio-economic aspects, plus it needs to be socially desirable.

Undertaking socio-economic research and public engagement to support ecosystem restoration requires conveying complex information in a way that is accessible for a wider public. How to do so in
a way that the representation of ecosystems remains scientifically rigorous is a critical challenge. We take up this challenge using peatlands and Scotland as a case study (see Text Box) and developing a transdisciplinary process to articulate a description of the processes and outcomes of ecosystem restoration. The ultimate aim is to guide the development of tools for communication and elicitation of public views and preferences with regards to restoration to support policy-making.

Text Box. Peatland status and restoration agenda in Scotland

Peatlands cover over 400 million hectares of the Earth’s surface, i.e. over 3% (Joosten et al. 2009). They store a third of the world’s soil carbon (UNDP, 2012), which makes them the largest and the most space-effective carbon store of all terrestrial ecosystems (Yu et al. 2010). Climate change and land use and management, primarily agriculture and forestry following land drainage, is modifying the structure and function of these systems, potentially changing the global peatland greenhouse gas balance to a carbon source (Frolking et al. 2011). This threatens stocks of natural capital that have formed over millennia, undermining the adaptive capacity of peatland systems to climatic and other future changes (Dise, 2009).

Around 9-15% of Europe’s peatland areas are found in the UK of which more than 77% are located in Scotland (Bain et al. 2011; Bruneau and Johnson 2014). Peatlands cover more than 20% of Scotland’s land surface. Scottish peatlands mainly consist of blanket bog which is a globally rare habitat type. In the past, peatlands in Scotland were mainly seen as either a source of peat or as wastelands to be converted to other productive uses such as forestry or agriculture. As a consequence a large share of Scottish peatlands have been degraded to some extent leading to habitat degradation, release of greenhouse gases and problems with soil erosion and water regulation. More than two thirds of Scottish peatlands are damaged or degraded to some degree, and degradation is projected to continue if no action is taken (Bain et al. 2011).

In line with international trends, these concerns led to the development in 2012 of Peatland Action, a programme by which the Scottish Government allocated Scottish Natural Heritage (SNH) £5 million to deliver restoration and management of peatlands to maintain carbon storage and other services. This Peatland Action includes public awareness and appreciation of restoration benefits as one of its core aims.

2. Method

There is a gap between the typical outputs of ecological process-based models which demonstrate changes in ecological parameters and the representation of such changes in terms that the general public can perceive (McVittie et al. 2015). This translation is the cornerstone of ecosystem services-based approaches to inform environmental decision making (Martin-Ortega et al., 2015). To address this gap, we embarked in a transdisciplinary process involving input from three knowledge strands: natural sciences, social sciences and (peatland) management practice. The principle is that the complex and dynamic nature of environmental problems requires flexible decision-making, embracing a diversity of ‘knowledges’ and values (Reed, 2008).

The research process we applied was designed as consultative, rather than participatory transdisciplinarity, as defined by Mobjörk (2010), i.e. having actors from outside academia responding and reacting to the research conducted.

3. Results

As result of this process, we identified four challenges that apply to ecosystems restoration generally: (1) how to represent restoration outcomes; (2) how to establish a restoration reference; (3) how to cope with (varying) restoration time-lags and (4) how to define spatial units for restoration.

To address these challenges, we employed a mix of techniques and approaches (e.g. through the use of boundary objects) to develop three peatland categories associated with three different ecological status (good, intermediate and bad) with associated narratives and iconic representation of restoration benefits in terms of carbon sequestration, water quality and wildlife habitat. This allowed for a simple yet comprehensive representation of the underlying processes leading to restoration outcomes. We established spatial criterial and included public’s sensitivity to temporal restoration horizons.

We assessed the usefulness of the process and the tool we produced to address these challenges through: i) the public’s reaction to it (in focus groups and a survey); ii) natural scientists validation and
adoption and; iii) policy-makers/practitioners’ uptake of it. In all three accounts, our process demonstrated its usefulness.

4. Conclusions
The most promising conclusion of the process that we put in place is of an epistemological nature. While ecosystem services-based approaches have certainly enhanced the integration of academic disciplines as well as non-specialist knowledge, interdisciplinary (and even transdisciplinary) processes attempting to put them into practice have so far tended to follow one direction only: let us first understand the ecosystems and the services they provide, describe them, categorize them, quantify them, simplify them, etc. so that social sciences, the public or policy makers can understand them and operate with respect to them. Our process included mechanisms operating the other way round. The clearest case is that of the definition of spatial units for peatland restoration. For this particular aspect, we tested the possibility of inverting this conventional way and we started from what was simple enough for the public and worked our way back to relevant ecological parameters.

We do not claim that this reverted way should be the new general way forward, but it is probably the mix of approaches and epistemological directions which can cope with ecosystems complexity. This can be seen as fuzzy but at a moment in which restoration science is re-shaping itself (Hobbs et al. 2011, Roberts et al. 2009), our study suggests new avenues for approaching ecosystem restoration, in which fuzziness might be able to provide better answers.

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References

An analysis of recent cases in the EJAtlas involving deaths of environmental defenders
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The EJAtlas (www.ejatlas.org) covers all countries and many struggles by communities or other social
actors against negative environmental, health and socio-economic impacts from private or public projects or investments in 10 areas: nuclear, mineral ores and building minerals, waste management, biomass and land conflicts, fossil fuels and climate justice, water management, infrastructure and built environment, tourism recreation, biodiversity conservation conflicts and industrial and utilities conflicts. In each area the approach follows the commodities in question through different stages of the chain of value. For instance, for nuclear conflicts, compilation of conflict cases goes from uranium mining through nuclear power stations to final disposal of waste or to “fast breeder reactors” working with plutonium and cooled by sodium (as in Creys-Malville in France or Monju in Japan, both failed projects).

The EJAtlas collects “ecological distribution conflicts” (Martinez-Alier and O’Connor, 1996), that is, collective complaints arising from perceived injustices in the access to natural resources or in the burdens of pollution. The EJAtlas (which by June 2017 will have reached about 2100 cases) allows analyses focused on specific countries but also “transversal” analyses, for instance on particular commodities or companies like Chevron or Vale, or other types of actors such as indigenous groups, labour unions or religious groups, or particular issues like use of pesticides or metal smelting and many others.

In this paper I focus on one transversal issue, the use of repression and violence against “environmental defenders”, normally activists like Teresita Navecilla in Pantukan, Southern Mindanao, Philippines, killed in January 2016 because of her defense of her community against the King-King gold and copper mine, or Berta Cáceres killed in March 2016 in Honduras for her leadership against the hydroelectric project Agua Zarca. Other victims are not well known activists but villagers or urban dwellers who, when complaining against a coal mine or power plant, an oil palm plantation, a new infrastructure, a waste incinerator in a cement factory ... are killed in a demonstration, or arrested and killed by the police, or the army or private guards.

In the EJAtlas about 13 per cent of all conflicts cases collected involve this type of killings of one or more persons. The NGO Global Witness’ statistics for 2015 gave a total of 185 environmental defenders killed in that year, and by early 2017 the Global Witness will issue figures for 2016. One basic reason for this situation (which varies geographically according to the different countries’ political culture) is that the world industrial economy requires new supplies of raw materials from the “commodity extraction frontiers” (Moore, 2000) and also needs waste disposal sites. The economy is not circular; it is entropic (Georgescu-Roegen 1971). Even a non-growing industrial economy would require “fresh” supplies of energy and materials. The energy from the fossil fuels or biomass cannot be recycled and the materials are recycled to a very small extent (W. Haas et al 2015 – about 6% at world level in 2005).

Hence the growth of ecological distribution conflicts.

In some countries or regions and for some types of commodities ecological distribution conflicts are more subdued, and in other countries or regions and for other commodities they are more violent. In any case, the paper analyzes a well-defined and reliable sample of cases drawn from the EJAtlas. The methodology consists in taking the new conflict cases brought into the Atlas since January 2016 to May 2017 (the initial months of the ERC Advanced Grant project, “A global movement for environmental justice”, at ICTA UAB) in which deaths of environmental defenders appear. This is likely to be between 12 and 14 per cent of all such new cases which will be between 350 and 500, so that the sample with one or more deaths of environmental defenders will be 40 to 60 cases. In areas or for issues with few killings, perhaps some cases in the EJAtlas from more distant times are added to the sample.

The conflict cases from the EJAtlas (each with information filling 4 or 5 pages) are summarized in a table, with their main characteristics (geographical location, commodities in question, social actors involved (companies, governments, civil society), main forms of mobilization (from letters to the authorities, to litigation in court cases to blockades, street marches etc), the impacts and the outcomes. This information is publicly available, together with its main sources, in the EJAtlas database forms. These are conflicts that in the EJAtlas are classified as of “high intensity” (compared to medium or low intensity, or to latent conflicts), although not all “high intensity” conflicts results in deaths.

In this paper, we assume as a starting point that deaths of environmental defenders are more likely to occur when there is a large distance between the positions of the social actors favorable and against
the projects. Building on this plausible assumption, particular attention is placed on the “valuation languages” deployed by different actors, for instance sacredness of a territory (or simply a lake or a mountain) or other strong cultural values; indigenous territorial rights; ecological values; livelihood; demands for monetary compensation. The absence of trade-offs, and the reasons why such conflicts have a very violent outcome, are researched. So, the paper is at the same time an exploration of the reality of extreme violence in some ecological distribution conflicts, and also an essay on “incommensurability of values” (Martinez-Alier, Munda, O’Neill, 1998) (if this notion proves to be applicable). The dynamics of the conflicts before and after the killings is also be studied, i.e. what happens after the episode(s) of extreme violence are over, whether the violence helps or hinders the investment project in being carried out.

A smaller samples of cases (5 or 6 among the 40 to 60) is chosen to go deeper into the analysis of the assumed extreme distance between “valuation languages”, and also into the question of whether the killings alter the asymmetry of power and the ability to impose one particular valuation language (for instance, the respect for territorial rights and Convention 169 of ILO over monetary compensation offered for displacement and damages).

The paper brings together therefore ecological economics with political ecology.

Coordination of flood risk management and spatial planning and in five EU countries
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Coping with floods to achieve public safety appears to be increasingly difficult task all over the world and particularly in Europe. Despite the investments into flood preparedness, large floods still can result in human victims and generate severe, and increasing, material damages. One of the possible reasons for this is institutional and sectoral specialization of flood risk governance policies, resulting in a lack of consideration of environmental impacts and other policies. However, increasing flood risk in Europe demands effective interaction between different policy sectors. This raises questions about the very fundamental assumptions about flood risk management. One of such questionable presumptions is reliance on structural, engineered flood protection. Alternatively, a diversification of flood risk management strategies are proposed (Hegger et al. 2014) as a feasible and desirable option. Prevention (keeping people and wealth away from destructive water) is proposed as a strategy which can effectively prohibit development in flood prone areas. It can also mitigate flood risks through green urban infrastructure such as permeable pavements, sustainable urban drainage systems, among others. These issues are parts of spatial planning. Indeed, effective cooperation between flood risk management and spatial planning is required. However, on the one hand hydro-technical infrastructure can no longer protect people from flood, on the other hand, spatial planning is considered as only potentially effective. But although both flood risk management and spatial planning are considered as domains that looks holistically at water safety, these two sectoral policies still face several difficulties. Flood risk management has been recognized (Dieperink et al. 2014) as a process which can potentially increase flexibility and/or decrease uncertainty of flood management activities (Aerts et al. 2008) creating potential for diversification. At the same time, multiple interests are evident within spatial planning. As a ‘government policy’, including health, education, defence, etc., not only policy for land use change and physical development’ (Taylor 2010), flood risks should be incorporated among other priorities. Nevertheless, there are various barriers constraining coordination between flood risk management and spatial planning. How coordination of these two policy fields is organised
and implemented in practice is therefore an important issue. Since there is never one single solution to such complex problems, in this paper we analyse factors that either support or constrain effective coordination. Successful coordination of flood risk management and spatial planning is clearly related to country-specific circumstances. We analyse and compare the coordination of flood risk management and spatial planning in five EU countries: Belgium, England, France, The Netherlands and Poland. Several authors identify differences between countries, which struggle with coordination of flood risk management and spatial planning however they either focus on a small number of countries or on a single policy instrument (Pottier et al. 2005, Greiving and Fleischhauer 2012, Mueller 2013).

A focus on how coordination instruments of flood risk management and spatial planning work in practice in several countries and on comprehensive framework for analysing and explaining coordination is lacking in the existing literature. In other words, we still do not know what coordination instruments of flood risk management and spatial planning have been developed in order to overcome sectorial policies, and what circumstances provided basis for successful (or unsuccessful) coordination. Significant number of studies analyse barriers of coordination flood risk management to spatial planning (Bohm 2002, Howe 2004, Woltjer 2005, Samuels 2006, Carter 2007, Nadin 2007, Fleischhauer 2008). These studies suggest that barriers can be overcome by the processes of integration of flood risk management and spatial planning (e.g. Brown 2003, Kabat et al. 2005, Woltjer and Al 2007, Vigar 2009, Allmendinger 2009). Integration of environmental objectives within sectoral structures of governance involves three levels: coordination (i.e. the removal of contradictions); harmonization (i.e. realization of synergies); and prioritization (i.e. favouring environmental objectives, cf. Lafferty and Hovden 2003). In this paper we investigate the coordination of flood risk management and spatial planning. Thus, investigate how five EU countries remove drawbacks on coordination between flood risk management and spatial planning. In order to address both the empirical and the methodological knowledge gaps, two main questions will be addressed:

1. What coordination instruments of flood risk management and spatial planning have been developed in England, France, The Netherlands and Poland, and how they are implemented?
2. What circumstances provide a good basis for either successful and/or unsuccessful coordination?

Finally, by examining drivers, we derive an answer to the question: what constellation of factors results in most successful or unsuccessful coordination?

We distinguish four main analytical dimensions, influencing coordination of these two domains, namely: (i) mode of governance; (ii) framing; (iii) type of actors network; and (iv) problem ownership (Runhaar et al. 2014). They are instrumental in analysing how coordination instruments of the two policy fields developed and what configuration of these factors lead to its most successful coordination and how countries differ from each other in this respect.

We conclude our paper by providing insights for both policy-makers and scientists as to what type of coordination is mostly needed, where and why?

Co-creation of Learning along RRI in Management Education
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Via the policy agendas of Responsible Research and Innovation (RRI) this paper analyzes courses in management education in order to explore those learning processes the key participants (students and lecturers/tutors) are aware or not aware of during the co-creation of learning. By doing so we are engaging in the discourse on the responsible ways for knowledge production and distribution. We aim at providing a critical reflection of the practices of knowledge creation and learning processes in management education.

In this paper our role as educators is reflected upon in the process what we call the co-creation of learning. The authors of this paper share a common background: teaching and research at a university, by which they are taking active part in management education in Hungary. We have the fundamental
assumption that not only the professors but also the students are responsible for and play an active role in the learning being experienced and worked on in our courses. Following this assumption we developed a framework to understand how this process of co-creation is being interacted by the students and the lecturers/tutors. We use the latter term in our paper for moving toward co-creation also with this element of the terminology. On the other hand we stay away from labelling both parties as co-creators in order to have the opportunity to describe the interactions of them.

Background of the paper:
The authors of this paper are involved in EnRRICH, a H2020 project aiming at Enhancing RRI through Curricula in Higher Education. When identifying courses as promising practices of RRI in management education for EnRRICH we have pursued an intense reflection process on our courses. This process not only proved to be fruitful in applying RRI policy agendas and process requirements as a valuable and meaningful framework for reflection on the courses and our teaching practices alike, but also shed the light on intended/unintended, explicit/implicit nature of our teaching practices with regard to the RRI aspects.

As a result, we were actively looking for a framework that allows us to understand the learning processes, thus knowledge creation during our courses. Building on the educational and pedagogy literature we developed a matrix - a framework to capture those diverse processes students and tutors are either aware or not aware of. In this paper, both major streams above are introduced: we continue or analysis with the RRI in mind and in the framework of the aware-out of aware scheme.

Conceptualization:
In order to conceptualize both streams described above we briefly place RRI in the higher education context and introduce our understanding of awareness here.
In our work we entail RRI policy agendas and process requirements. While policy agendas cover topics responsible decision makers graduating from higher education need to be aware of, process requirements could be captured as competences these future decision makers shall acquire. (see e.g. Tassone and Epsink, 2016)
We might not be aware of all the knowledge we possess, there is the possibility of existing areas where we know something but are not aware of it. If this is true regarding our learning outcomes – the abstract, tacit knowledge and skills –, it might also be true regarding the learning processes: we might not notice our development on all the dimensions we grow while doing a task.
In this paper we focus on the concept of awareness, or the interpretation of consciousness as awareness. While reflecting on our teaching practice, one of our major findings was about awareness: tutors and/or students are not aware of all the learning processes and outcomes. Vast amount of the results of the learning processes take place without the actors of the processes noticing them. We realized that students develop their skills or knowledge sometimes without being aware of it, and also, us the tutors deliver messages, shape attitudes sometimes without being aware of those. The framework of awareness/out of awareness we introduce here can be a tool for realizing that we might teach more than we are aware of, and students develop more than they are noticing. This also reflects that both parties might go beyond the intended and/or positive learning; the knowledge required might have an unintended, negative direction as well, regardless of being aware or unaware of the learning process.
In our framework we categorize learning processes and outcomes on two dimensions: the actor (student and tutor) and the awareness of the process. It does not matter here, whether the intention or attention of the tutor is high or low.
Implicit learning is in most cases very productive (Brenner, 2012). The task of the tutor is then, instead of focusing on making everything explicit, creating an environment where this learning can happen with the highest probability. Such environments can be characterized as focusing on proactivity, critical reflectivity and creativity (Marsick and Watkins, 1990).
The assumptions behind the framework are enlisted here:
Focus on the student reflections - but not one-way learning process
In our framework we focus on the learning process of the student. We believe that learning is not a hierarchical one-way process, where the omnipotent teacher possesses all the knowledge and teaches
it to the learner. We see learning as a mutually enriching experience, where both sides learn. However, in this model we deal with the learning process of the student. From the complex set of mutual processes we capture the tutor’s influence on the knowledge, attitude and skills of the student. Another, parallel matrix could be drawn where the learning process and outcomes of the tutor are presented. As a first step, we develop this matrix of the framework keeping the option of enriching it with the other side in the future.

The time dimension and moving in and out of awareness
The items might move around in the cells of the matrix over time: a learning process being out of awareness can move into the focal awareness of the student after one or more reflecting discussions, the same holding true for learning outcomes. Simmons (2003) creates categories where both learning processes and learning outcomes can move into the awareness area before, during, and after learning, or never. (Simons, 2003)

(3) Power dynamics underlying learning
The RRI invites reflexivity, critical thinking and active responsibility, therefore power dynamics are in foreground, even if they are not made explicit. This is partly embedded in the role of tutor, partly in the institutional framework and partly in the assumptions around learning and relationships of the student. In the paper we will consider the different sources of personal power of the student and the tutor, and include them in the reflection on the awareness axis of the framework.

Discussion:
The proposed framework was used during course development to understand the underlying dynamics of the ongoing learning processes aiming to develop self-reflective, critical thinking, active and responsible citizens. In this final part of our abstract we are providing an illustrative set of the matrix.

Ethics, as one of the RRI policy agendas is applied here, to introduce how the learning processes around it might be captured in one (non-ethics) course. Our example of the course titled Decision Techniques offered to BA business students is highlighted in our framework: besides the explicit learning processes it brings the other, maybe deeper learning process to the surface which fall out of awareness of the tutor and/or students.

Both Student and Tutor aware
Applied moral philosophy (Ethical Prism as a decision technique) is introduced and practiced in class. Moral reflection is an embedded element of the weekly problem solving group work of the course members.

Student aware and Tutor out of awareness
Behaviour: Teacher as role model by providing a credible example

Student out of awareness and Tutor aware
Developing a more sensitive, enriched moral imagination while meeting morally intense topics in the problem solving group works.

Moral framework: norms introduced and followed in class are reflecting ethics suggested by the teacher, though not named as ethics or moral framework.

We have created reflections on the co-creation of learning in this and other courses by applying further RRI policy agendas and process requirements.

This was paralleled with qualitative data stemming from students’ reflections and learning diaries in order to explore how students experienced being in the course. The framework makes explicit that learning might be possible even when tutor and student are not aware of it simultaneously, and thus raises the question: what shall they do about it? Shall they try to decrease this region or not? One possibility is to compare what is brought by the different students into awareness and thus realise which contents are out of awareness for others and co-create tools through which they can share it.

Utilizing RRI policy agendas and process requirements for this reflective exercise reveals how various keys of RRI are similar and different with regard to the awareness of the learning processes.

References
Transformative Science – Changing the World or Changing Ourselves?

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The conference call identifies that “Today’s challenges require true engagement and novel solutions from ecological economics. Academic and practitioner communities must enact meaningful participative and mutually empowering activities across disciplines and different knowledge systems”. The conference call also identifies the need 20 years on from the founding of the European Society for Ecological Economics (ESEE) “to now reflect on our achievements and impacts”. This paper brings to that process insights on research relationships gained from twenty-five years of working in climate, land use, sustainability and policy support for the implementation of the Common Agricultural Policy. While the forms of analysis are distinct from Ecological Economics, they may nevertheless provide useful insights. The specific instances of transformative science undertaken have followed a trajectory that can retrospectively be defined as starting from computer-based decision support; then progressing through “soft-systems”, integrated assessment, interdisciplinary analysis (combining modelling and social science methods), deliberative inclusive processes and has ultimately become the practice of transdisciplinary science for policy. The paper thus seeks to synthesise the insights from the authors experience and community of practice and seeks to engage with the deliberations and reflections within Ecological Economics. The authors conclude that in continuing to seek to change the world, it is they and their practice that has been changed.

In reflecting on achievements and impact of transformation science, definitional and measurement challenges abound. Measuring-what-you-value rather than the reverse is the obvious starting point. Yet unknown initial conditions, intervening factors, lack of transparency and chance all complicate the assessment of cause and effect and make attribution far from certain. For public-policy oriented research, the authors have found utility in progressively working from simpler to more challenging levels of impact – issue awareness, capacity for analysis, connectivity, cooperation, conceptual and instrumental change. Combined with a clear understanding of the roles and responsibilities of research partners (academic and otherwise), stakeholders, advisers, interest groups and publics this has provided a framework for the conduct and evaluation of transformative transdisciplinary research. More recent experiences highlight that in some cases acknowledgement of conceptual change or new knowledge may be less likely than instrumental change (conventionally seen as more difficult to achieve).

Another helpful insight has been the sequence of phases typically encountered with “movements” within science. The expectations phases for technologies (and other innovations) follow a sequence of unbelief, euphoria, disappointment and abandonment or maturity. While they can vary in the time between their peaks and troughs and in the heights and depths they reach, they are identifiable across many endeavours. Of particular concern to the authors from their experience with computer based tools has been the dangers of overselling, under-delivery (boosting the amplitudes) and lack of clear evaluation that can mean we fail to close the reflexive learning loop to exploit gains made before moving on to catch the next “innovation wave”.

In studying the use and usefulness of computer-based tools a persistent gap between the expectations of those who built them and those expected to use them was apparent. Where tools dealt with tasks that were numerically complex yet required little judgement (calculators) or required the marshalling of materials (record keepers) they consistently proved more popular than the more “useful” flexible simulators. Early responses were increases in sophistication and ever-tighter specifications extracted from clients. Yet the key assumption of the existence of an information deficit was flawed. The decision making niche was already filled and science based tools were seeking to displace incumbent experts whose standing depended on their ability to be seen to make judgment-based decisions and whose ability could be superior for localised instances or in the (not infrequent) absence of high quality data. Use and impact depended on modifying research-based tools and processes such that they were situated within the socially defined processes of decision (or policymaking). This requires the interests, skillsets and time resources to invest in learning the lexicon, knowing and being known by the actors, understanding the networks of relationships, the relative degrees of influence and the limits to action. The process also requires the participation in the formal and informal forums where decisions are made (as far as one is permitted). Full commitment to such an endeavour is transformative not only for the way in which the tools and methods are used but also potentially blurs the lines between researcher, advocate and functionary. This process of compromise clearly needs to be carefully and reflexively undertaken especially where an arguably undesirable status quo may be buttressed.

Three well-known pillars of policy science are the need for salience, credibility and legitimacy. The need for salience is clear if there is to be any expectation of impact (the research must generate something insightful). Yet for policy-led transformative science, there will be phases of opening up and closing down, evaluation and disinterest. This implies the need for significant flexibility (individually and institutionally) and the need to make good use of foresight to have the capacity in place that can deliver when needed. Yet even with foresight, the impact of individual initiatives, may depend as much on serendipity as planning. In this regard, a strategy that has multiple smaller projects in play with plans for rapid reinforcement and exploitation of success may fare better than monolithic leviathans. For transformative science, there is of course the need to address multi-stakeholder, value-laden and contested issues. Here salience has the added challenge that there needs to be a degree of agreement on the shape of the problem. The tools and outputs of transformative science can have crucial role as boundary objects, which simultaneously provide something to argue through, being real yet not personal, but also serving to ground, and in some case confront, the rhetoric of lobby groups. For credibility, peer review still provides underpinning rigour (augmented by open evaluation). Yet credibility crucially depends on the ability of the researcher to be able, in key fora, to communicate the outputs in ways that are comprehensible to ensure they cannot be peremptorily dismissed. Legitimacy requires an awareness of political realities, careful maintenance of independence and perhaps more frequent use of ethics committees by non-social scientists. Yet unless the process is controlled by researchers there can be limits to the degree to which the wider legitimacy of a process can be influenced other than non-participation.

Transformative science, as noted in our opening remarks, has the potential through its conduct also to be qualitatively transformative for the scientist or researcher. Many of the certainties and implied or explicit hierarchies of science can, when taken too far, can be weaknesses for transformative science (e.g. curiosity-led over directed, basic over strategic, theory over empiricism, objective over subjective, deductive over inductive, quantitative over qualitative, independence over engagement). It is important to recognise that, within organisations committed to transformational science, systems of reward and recognition need to be tailored to encourage not only innovation but also cooperation, flexibility and adaptation. Organisations need to encourage and maintain capability and capacity for interdisciplinarity, integration and inclusion but none of these is a panacea and each can be conducted badly. Therefore, such research should be scrutinised to the same degree as, and expected to meet the same standards of rigour as, disciplinary science. To do otherwise is to relegate transformative science to a second tier when societal need for such endeavours has not been greater.
Why do private individuals pay for ecosystem services?
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The concept of payments for ecosystem services (PES) has been discussed extensively over the past few years (Sattler & Matzdorf, 2013), with a focus on definitions and typologies, important institutional settings and design aspects as well as impacts of PES on landscapes and people on the supplier side (e.g. Hahn et al., 2015; de Vries & Hanley, 2016; Sorice & Donlan, 2015). Up until now though, there has been insufficient research about the institutions and people financing those ecosystem services (ES) and biodiversity management approaches in general and particularly little is known about non-governmental financiers, who voluntarily pay for ES. So far, the often-embraced hope of gaining more financial support for conservation from private businesses and individuals by implementing the ES-concept and establishing markets (Goldman & Tallis, 2009; Bull et al., 2016) has not been sufficiently fulfilled in reality.

Within the framework of the project “AgoraNatura” (www.agora-natura.de) we are intensively looking at the demand side of PES. The research and implementation project is realised by researchers and practitioners from different disciplines who aim to raise additional money for nature conservation through developing a science-based online marketplace for ecosystem services and biodiversity in Germany. Projects based on the idea of voluntary payments for a well-defined ecosystem service or biodiversity goal, mainly located within agricultural landscapes, are to be developed and funded via the marketplace. On the supplier side, the platform creates an opportunity for farmers, landcare associations and environmental organizations, who aim to enhance ES and biodiversity on their land, whereas on the demand side businesses and private individuals can conveniently search for and fund specific projects according to their preferences.

The presented study particularly focuses on the demand from private individuals in Germany. Currently, there are only few examples where “ordinary” people voluntarily pay for ES (Matzdorf et al., 2014). Very little is known about those private financiers, the motives behind their financial engagement as well as their intentions to do so again in the future. There are some studies that measured the “willingness-to-pay” for certain ES or biodiversity goals. But as those always have to be interpreted against the background of the well-known intention-behaviour gap, Barber et al. call for studies that collect actual behavioural data (Barber et al., 2014). Therefore, our research focuses on the following questions: Who are the people that pay for nature conservation, what are their central motives and the influencing variables that affect their behaviour? How do people react to the ES concept, on the idea of voluntary payments for ES and on the idea of an online marketplace for ES and biodiversity?

To answer those questions we decided for an interdisciplinary, multi-method research design combining
1. Systematic reviews of empirical studies dealing with the behaviour of private individuals in i) ES-markets, esp. the market for voluntary carbon offsets, ii) donations markets, focussing on donations for nature conservation projects (classical or by crowdfunding) and iii) “green” markets, where private individuals pay a price premium for „green“ products or services;
2. an explorative survey with private individuals during the German “Week of the Environment 2016”;
3. Qualitative interviews with people who have paid voluntarily for ES- and biodiversity-projects in Germany.

To 1) To review existing research on the behaviour of private individuals in the three selected markets we systematically searched in scholarly as well as full-text driven databases for relevant empirical studies from different disciplines, esp. (behavioural) economics, environmental psychology and sociology. Full-text reviews were done separately for each market, using a shared coding system to
allow individual analysis and framing of results as well as a qualitative comparison of identified motives and influencing variables between the different markets.

To 2) The survey conducted was a multi-stage examination, designed to initially determine whether the ES-term itself (in German: “Ökosystemleistungen”) is known by non-academic but nonetheless nature-affine people. This was done by a simple “Yes-or-No” choice game. Moreover, we conducted brief interviews with more than 150 people in order to investigate the participants’ thoughts and connotations related to the ES- and PES concept. Lastly, nearly all of the participants filled in a written questionnaire in order to gather further data, such as the interviewees’ current involvement in nature conservation activities, as well as their expectations and preferences regarding the planned online marketplace.

To 3) The qualitative, semi-structured interviews were designed to analyse the motives and factors in detail, which drive a voluntary payment for ES by private individuals. Furthermore, the interviews aim to find out, whether the financial contribution of the past has an impact on the person’s future financial support of nature conservation projects.

Based on the presented results of our research we will develop a first draft to classify the target group of people paying for nature conservation based on the motives and influencing factors that affect their behaviour in different markets and provide first hypothesis about motives and preferences of people paying explicitly for ES and biodiversity.

References:

Climate risks beyond adaptation: Balancing principles of distributional and compensatory justice for identifying the space for Loss and Damage
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The Warsaw Loss and Damage Mechanism holds high appeal for transforming both adaptation and mitigation debates and delivering needed finance for climate risk management. Yet, negotiations under the UNFCCC are caught in between the red lines of those demanding climate justice (understood
as compensation for increases in extreme event risk and impacts due to slow-onset processes) raised by vulnerable developing countries, and the unwillingness of industrialised parties to consider Loss & Damage outside of an adaptation framework. We are suggesting an actionable way forward for the deliberations based on the concept of climate risk management and notions of distributional and compensatory justice. The approach involves in a short-medium term, needs-based perspective, support for risk management beyond countries ability to absorb risk; in a medium-longer term liability-based perspective, it upholds a consideration for liabilities attributable to climate change. The deliberations can be integrated towards a principled framework for identifying the space for Loss and Damage composed of curative and prospective measures. Prospective measures have seen attention already, mostly focussed on climate insurance with a need to broader to comprehensive climate risk management. Curative action is less clearly defined, while more contested. Among others, support for a climate displacement facility could qualify here. Common to both sets of measures is a need for committing to finance instruments to support the genuine implementation of Loss and Damage Mechanism. We contextualize our discussions with relevant examples.

Governance of natural landscapes: challenges and success factors for landscape management in the Netherlands
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The field of landscape management has changed in recent years under influence of societal changes. Formerly, the management of Dutch natural landscapes was organised in a centralised and hierarchical manner: governmental institutions developed new policies, others executed them. The national government was, for example, responsible for developing national policy that formed a framework for municipalities. Subsequently, the Dutch Forestry Commission and other nature and landscape organisations would execute these policies. In this process for example volunteers and local farmers would be involved, again in a very hierarchical way. This policy structure is referred to as government, whereas the modern day landscape management shows more characteristics of governance. Governance is understood in this paper as a decentralised and cooperative way of working, in which multiple actors are involved in both creating and executing policies. Both public and private organisations and volunteers work together in networks with a focus on a landscape project or policy issue. In this non-hierarchical structure parties share responsibilities, instead of confirming to a preset policy. It should be noted, however, that the degree to which governance configurations are (de-)centralised and (in-)formal can vary significantly. The key challenge is to establish governance configurations that are fit for their purpose in the context in which they are applied. The aim of this paper is to present lessons learned about the challenges and success factors for a process to create shared responsibility for landscape management.

It seems that hierarchical ways of working may not be the most effective way to deal with complex problems such as climate change adaptation or loss of biodiversity (Marion, 2008; Schneider and Somers, 2006). Since public support for landscape policies decreased as well, new governance structures have emerged on different levels and in different contexts. These solutions require a multi-disciplinary approach with a shared responsibility in order to be successful. This creates an interdependency amongst partners due to the distribution of expertise, finances, power, and manpower across various actors. As a result roles are shifting, accountability becomes blurry and new competencies are necessary. Governments and nature organisations need to anticipate to the shifting of roles and build up the required competencies.

Governance structures at different levels
Governance takes shape at both the local and the regional level in the management of natural landscapes. Rooted in government structures, volunteers are involved in maintaining natural areas at a local level. In the past years these initiatives have grown to become self-supporting groups with new
ideas and needs. Besides the evolution of these volunteer groups, different forms of governance have developed on other levels as well. On the one hand nature conservation organisations are becoming partners in local social initiatives. At the regional level, on the other hand, mainly professional organisations such as municipalities, water boards and nature conservation organisations cooperate. They sometimes also involve semi-volunteer organisations to represent the interest of farmers for example. In this paper, we will describe the lessons for landscape management that are learned from two cases in the Netherlands that are currently being studied:

1. Regional coalition Vechtdal, a case that has been selected to illustrate governance at a regional level.
2. Communities of Natuurmonumenten: a case that has been selected to illustrate governance at a local level.

Core to governance structures is self-organisation. When analysing governance processes to create shared responsibility for landscape management, one needs to take into account the interaction between partners (Rhodes, 2000), the balance between accountability and authority (Hajes & Wagenaar, 2003) and the importance of ‘soft values’ such as trust and consensus (Van Tatenhove & Leroy, 1995) which is created while facilitating and coordinating a network. A framework for transition governance (Rijke et al., 2012) will be applied to analyse to which extent the required ingredients for sustainable landscape management are present in the cases. They are used to explain the differences in the two cases as well. From this comparative analysis we draw lessons for landscape management in the Netherlands. Finally, we relate our findings to other research findings about governance of social-ecological systems.

Case 1: Regional Coalition Vechtdal
Since 1994, the Agricultural Nature Conservation Association ‘Ommemarke’ has developed local initiatives to take care of the agricultural landscape. Due to policy changes aiming to strengthen local participation, their responsibilities have however become more formal. As a result of that, the Regional Coalition Vechtdal (Gebedscoalitie Vechtdal) was founded at the start of 2016. Cooperation with professional organisations such as municipalities, the regional river adaptation programme (Ruimte voor de Vecht) and nature conservation organisations is key in this initiative. These organisations are at the same time keen on cooperating with farmer organisations as they depend on these mediating organisations when they need farmer support for their policies. A shared interest in the management of the rural landscape is clear. The path to cooperating, however, not so much, which makes them struggle with facilitating this initiative.

Case 2: Communities of Natuurmonumenten
For decades the Dutch Society for preservation of nature monuments (Natuurmonumenten) has involved volunteers in the management and maintenance of nature reserves under their responsibility. By forming a new strategic direction, the organisation hopes to adapt to societal changes in a more sustainable way by managing nature together instead of for people. Natuurmonumenten now uses different ways of cooperating with other parties and citizens at a local level, and mostly focused at their own nature reserves. So called communities are a way to give social initiatives and other organisations room to explore opportunities in the reserves. They not only focus on improving the quality of the physical environment, but also on that of the social relationships in the area. The challenges they face are balancing the power that is related to land ownership and the aim to share responsibilities and support initiatives from ‘others’. Natuurmonumenten realises that to a certain extent it is also dependent on other parties to unfold conservation activities.

Preliminary findings
The research thus far enables us to identify at least three important factors that influence the success of governance projects at different levels. First of all, the cases confirm our initial assumption that the role and status of governmental agencies and nature organisations clearly changes under influence of these societal changes. They are an equal partner in the cooperation, which challenges the predictable hierarchical relationship that comes with land ownership. It does, however, also offer opportunities, since being part of the cooperation causes non-involved parties to treat nature organisations in a less opposing way. Governments, but also citizens, may be more willing to adopt plans that are supported by a wider group of people. Secondly, the way the cooperation is set up is of crucial importance. The
initiating organisation needs to be well rooted in the region in order to identify the right partners. The way the goals and values of all partners need to be weighed, sustaining a non-hierarchical relationship. The makeup and size of the group, as well as the lead and its qualities are essential. Lastly, developing governance projects in this quickly-changing society requires an awareness of learning processes and the facilitation of group learning. The group itself, as well as the participating organisations and individuals need awareness of this.

References

Ecosystem Services and the Well-being: What do the concepts mean for marginalized forest-dependent communities?
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Introduction
Numerous recent studies emphasise the growing importance of environmental quality and ecosystem services (ES) provision for human wellbeing (MEA, 2005; Happy Planet Index, 2012; Knight and Rosa, 2013). Some studies show that different groups of people benefit from ecosystems in different ways and perceive different kinds of the “final” goods and services, differently. A number of articles, e.g. published within the COST Actions of TOBEWELL and SENSFOR (Sarkki et al, 2016a; Sarkki et al, 2016b), provided evidence that the link between ecosystem services and human wellbeing is complex and difficult to quantify (Villamagna and Giesecke, 2014); the realisation of non-material values of ecosystems could promote more sustainable human behaviours (Ericson et al, 2014); our dependence on cultural ecosystem services will likely increase in time, while human’s dependence on provisioning ecosystem services tends to decrease (Plieninger et al, 2013). It was also shown that human well-being is affected by changes in the composition and functioning of ecosystems and by the resultant flow of their services; while the ecosystem services are affected by human behaviours, including, at times, by unsustainable use of natural assets to meet short-term, economic objectives. Therefore, and largely because of the complexity of socio-ecological systems and the observed causality between the ecosystem services provision and human wellbeing, it is necessary to improve understanding of the two concepts and their inter-linkages. Further research is needed to examine a range of social, economic and environmental interactions and the dynamics and cross scale issues that have multiple outcomes (Nijnik and Miller, 2014). Specifically, there is a lack of understanding of the flows of ecosystem services that contribute most to the well-being of forest-dependent communities in
different localities (Nijnik and Melnykovych, 2016; Melnykovych and Soloviy, 2014), and our research seeks to add to bridging this knowledge gap.

Material and Method

The main research objectives are: to contribute to the ecological economics’ theory by developing knowledge of how forest-dependent communities perceive their well-being and what kind of benefits provided by natural ecosystems are considered to be of primary importance; through an improved understanding of the real value of ecosystem services for forest-dependent communities to assist the decision makers to enhance the implementation of local, sustainable development initiatives; and promote the delivery of innovative knowledge to appropriate stakeholder groups.

The research applies a mixed method approach, which integrates qualitative (face-to-face interviews with n=150 representatives of forest-dependent communities in the Ukrainian Carpathians’ region of Staryi Sambir) and quantitative (Principal Component Analysis and statistics) data collection and analyses. Subjective and objective investigation was carried out by consulting three categories of respondents: i) business representatives; ii) forestry specialists; and iii) local community leaders. The main criterion for respondents’ selection was their sufficient level of competence, which was evaluated using the following parameters: i) employment requiring special training in the field and maintenance of the working positions in corresponding organizations; ii) stakeholders’ residence within the case study region; iii) awareness of the situation and active social position (Melnykovych and Soloviy, 2014).

Results

Natural-assets-dependent communities use ecosystems intensively because they depend on ecosystem services. Eco-friendly policy decisions and appropriate stakeholder attitudes towards the ecosystem resilience tend to bring long term benefits; whilst unsustainable behaviours may result in short-term benefits, but have negative impacts on the ecosystems, in the long-run. Representatives of forest-dependent communities in the Ukraine’s Carpathians consider forest as the most important habitat benefiting their lives. Forest is important for the delivery of ecosystem services, and in particular of soil protection, water regime regulation, outdoor recreation, and cultural heritage conservation. The results show that the economic, environmental, social, cultural (e.g., sense of place) and aesthetic functions of forest contribute considerably to the well-being of forest-dependent communities. Community members reported that forest is very important as a natural phenomenon (69.4% of respondents), a source of non-timber forest products (41.7%), a recreation area (32.6%), and a source of commercial timber and firewood (29.4% and 18.0% of respondents, accordingly). More than two-thirds of respondents highlighted the importance of forest protection. The results have confirmed the hypothesis about the high importance of forest ecosystem services for local communities in the study area. The findings also imply that forest-dependent communities have low income levels, poorly developed entrepreneurship, low level of employment, illegal labor migration, and there is a decline of the population. Illegal logging is among the main threats to forest ecosystems. The results highlighted the importance of implementing innovative, sustainable forest management practices and community-based strategies as well as socially innovative initiatives to contribute to the well-being and strengthen the resilience of socio-ecological systems.

Discussion and concluding remarks accepted

We applied a combination of qualitative and quantitative techniques, and have improved our understanding of the social, economic, and political institutions, and of local examples of social innovations linking the ecosystem services provision to the enhancement of human wellbeing. Findings imply that the well-being assessment should include not only officially recognized objective indicators (e.g. to measure levels of employment or migration), but also the co-constructed with stakeholders indicators (reflecting the dynamics) in order to assess how local communities respond to changes and how they create socially innovative opportunities to improve the well-being and build their resilience. Members of the communities residing in the study area are ready and open for being included more actively in the decision-making processes and public consultations. They express interest to contribute to the designing and implementing of policy measures addressing sustainability in the provision of ecosystems services and raising of human well-being. However, the priority day-to-day objectives of local residents are to find additional sources of income because the high rate of unemployment and
low level of entrepreneurships are common in the region (e.g. these were reported among the main reasons of illegal logging). Thus, important questions that merit attention include: i) how to foster the resilience of ecosystems and meet the communities’ sustainable development goals, and ii) how to properly balance the long-term sustainability considerations with the short-term priorities of local people to satisfy their daily needs. To conclude, the way forward is foreseen through the establishment of an appropriate institutional framework and the promotion of social innovations, especially with regard to multifunctional forestry, which will likely be more attractive to people as it can provide additional benefits and promote sustainable development in the region.

Selected references

**Design principles for democratic, commons-based polycentric governance of energy systems in the UK**

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This paper presents a set of ‘design principles’ for the governance of a sustainable energy system, inspired by Elinor Ostrom’s design principles for common pool resource management. A sustainable energy system is conceived as being democratic, commons-based and polycentric. The design principles were developed with reference to Ostrom’s (1990) design principles for common pool resource management and McGinnis’ (2016) conceptualisation of polycentric governance, and reviewed against a number of other frameworks. They were then tested in relation to case studies of energy transition at a variety of spatial scales in the UK. The design principles were refined following this detailed analysis, and recommendations were made for action by local actors, in policy, by consultants such as the sponsoring company, and further academic development.

A sustainable energy system is conceptualised here as being commons-based, democratic and polycentric. There is a growing literature exploring polycentric governance of energy systems, including a research agenda set out by Goldthau (2014). At the same time, there is an emerging global movement for energy democracy, with discussions led by the international Trade Unions for Energy
Democracy, the Rosa Luxemburg Foundation, and the Transnational Institute amongst others. This is grounded in a concept of energy as a commons or public good, supported by the natural monopoly characteristics of much energy infrastructure, and the ultimate land base that is required for primary energy resources.

This study builds on previous theoretical work analysing the commons characteristics of energy infrastructure. This considers both the intrinsic characteristics of energy infrastructure in terms economic categories of excludability and subtractability, natural monopoly characteristics, relationship to global commons and externalities; and the political discourse of commons and public ownership. It also builds on an analysis of the UK energy system as polycentric, based on McGinnis’ six characteristics of a polycentric governance system: multiple centres of decision making; overlapping jurisdictions; mutual adjustment; dynamic institutional relationships; emergent order and scale economies; and his description of common problems of polycentric governance: structural inequities; incremental bias; high complexity; deep structural fissures; coordination failure and lack of normative clarity.

The use of heuristic lists of principles to inform sustainable development work is well established. Taking a starting point of considering polycentric governance in the UK energy system, positive principles were developed in response to McGinnis’ characteristics and common problems of polycentric governance systems. These were refined with reference to Ostrom’s design principles for common pool resource management. They were also compared with other well-established frameworks or heuristics for a sustainable society. This included egalitarian humanist approaches of Manfred Max-Neel’s (1992) fundamental human needs; Ruth Levitas’ (2013) utopia as ontology which describes the kind of human nature we would like our culture to nurture; and the New Economics Foundation’s Common Agenda work (Berry, 2015) which identifies the commonalities between diverse campaigners working towards a new economy that challenges the neoliberal hegemony; as well as the systemic ecological approaches of permaculture ethics and design principles, which are based in ecological design for food growing but have been used in many other contexts; and Donella Meadows’ 12 levers (1999) for identifying the most powerful places for intervening in systems.

The design principles were then tested and refined in relation to case studies from local initiatives for a UK sustainable energy transition, asking the following questions:

- To what extent are these design principles already present or not present in current local energy activities and the national UK energy system?
- To what extent do the absence or presence of these design principles lead to strengths or weaknesses in observed UK energy system activities?
- How does the current trajectory move towards or away from these design principles?
- Do these design principles need to be modified or rejected in light of analysis of the case studies?

The research is sponsored and based in the sustainability team of an engineering consultancy, and as such the following question was also asked:

- What are the implications for commercial sustainability consultancy of going towards these design principles?

The case studies included two studies of neighbourhood smart electricity demand management, developing a community business model (Melville & Cooke, 2013), and testing community incentives at the substation level (Centre for Sustainable Energy, 2015); a study of the relationship between the local authority and community energy initiatives in the city of Bristol, building political commitment for a 100% renewable energy based region in Cornwall (Melville, Hampshire, & Davies, 2016), and understanding how the rules of the UK energy system affect the potential for innovation towards local energy markets. The design principles were refined following this detailed analysis. Recommendations were developed for action by UK sustainable energy stakeholders and activists at all levels; for energy policy and for further academic research. Additionally, recommendations and potential actions were developed for the role that an engineering and sustainability consultancy, such as the company
sponsoring this research, can take both in terms of work for clients, and in terms of shaping the market within which they work. Recommendations refer to the need to value coordination activities in a polycentric system; the importance of supporting innovation, including institutional, socially and environmentally oriented innovation rather than purely profit-oriented innovation; the value of democratic mechanisms of both exit and voice in energy systems; and the need for institutions to support collaboration and cooperation, not just competition.

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Peace, war and ecology: Is the military an issue for climate change?
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In this paper we review the links between military spending and climate change in order to understand, from the point of view of peace research, how worldwide military activity is an issue for environmental security.
Global climate change has so many potential consequences that concerns have surfaced in the public debate about its security implications. It is true that there are important links between the military and climate change and many scholars argue that it is a security issue (Barnett 2003; Nordås and Gleditsch 2015; Salehyan et al. 2008). They predict it will lead to an increase in armed conflict because of resource scarcity and competition and mass migration. Whether the military, as the organization responsible for national security, is the solution to such threats, is not clear. On the contrary, the military seems to be a problem rather than a solution to environmental insecurity for several reasons that we explore in this paper.
Indeed, the carbon emissions of the military as a whole are a key factor in global warming. Over the past decades, not only have carbon emissions increased, so have military expenditures. SIPRI estimates that global military spending was US $1092 billion in 1995 and rose to US$ 1760 billion in 2015 (constant prices), which means a 61,2% increase (Stockholm International Peace Research Institute 2016). From the ecological point of view, military spending, as the first stage of the military economic cycle, generates structural violence—that is social inequality and dissatisfaction of human basic needs, and involves a huge environmental impacts.
Concerning the environmental impact, which is the main focus of this research, there are at least two reasons that permit to clarify the link on the military and the global climate change. Firstly, expensive weapons systems—such as fighter jets, battleships, fighting vehicles, destroyers, and tanks—are extremely energy inefficient, and huge oil consumers. The ecological effects of the military activity include wetland degradation, water pollution, deforestation, and weapons contaminating agricultural land. In fact, it has been proved that worldwide military activity is the major emitter of greenhouse gases (Archer 2013).

Secondly, military expenditure displaces spending on environmental and social goals, creating an important opportunity cost of investing money to mitigate and adapt to climate change. There is a need to redefine security from military roles to human security in order to reallocate properly the defense resources since no army can fight climate change.

Action has been involved to stress the negative influence of military for its generation of social costs, and more recently the environmental impact has been made more visible (Lorincz 2014). Historically, calls for reducing military expenditures were present in all expressions of pacifist thought. Under the peace dividends concept—that is, the economic benefit of a decrease in defense spending, disarmament has had a long history of debates and proposals. The disarmament body of research belongs to the pacifist economic spheres, which focuses on the idea of opportunity cost of military spending and how reducing defense budgets can be a great opportunity to get resources to allocate to social policies and human security.

The method we use in this research is the discursive analysis, built on the literature, using most of the literature from the interaction of peace studies and ecological economics, and the data available. The paper is structured as follows: We present a short introduction outlining the objective of the research and several characteristics of the military rapid evolution in the past decades. Section 2 is devoted to present the direct impact of the military on the global climatic change. The opportunity cost underlined in the military expenses is further explored in section 3. Finally, we present a conclusion and discussion section. The paper concludes that, in the light on current research and data, in order to limit greenhouse gas emissions, a rapid demilitarization action is a necessary condition. This could be seen as an utopian path, but as Uruguayan writer Galeano wrote “[…] What, then, is the purpose of utopia? It is to cause us to advance.”

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Agri-environmental payments for ecosystem services: Institutional design, interplay, and development
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The paper analyses institutional aspects of governmental agri-environmental payments for ecosystem services (PES) in developed countries. In recent years, PES have been increasingly acknowledged as useful governance solutions for resource management. Researchers as well as practitioners have been
engaged in the approach. In the public policy context, on the one hand, PES is based on the academic ecosystem service (ES) concept that has entered the policy arena, while, on the other hand, previously designed agri-environmental schemes, influence the developing definition of PES. These juxtaposed tendencies are not independent from each other. Both tendencies are part of a continuous process of defining and specifying PES. Correspondingly, this paper analyses the design and performance of existing agri-environmental payment schemes that are increasingly defined as PES even if they are not focused on clearly defined ES. In a next step, the paper examines the influence of the ES concept on the institutional framing and design of such payments schemes, in order to integrate the research literature, propose new relationships among ideas, and highlight directions for future inquiry. Based on institutional economics ideas, the conceptual analysis is structured in terms of institutional design, performance, and interplay.

The key findings indicate certain design rule sets that can be crucial for environmentally effective agri-environmental PES. Here, for example combinations of targeting one specific environmental goal and/or areas, feasibility of application for land users, and information and advice may be especially important. In addition also whole farm approaches can imply environmental effectiveness. The existing agri-environmental payment schemes interact with the institutional arrangements in place, especially property rights. The payments may be used to foster compliance with regulations or to induce changes in informal or formal rules. Potential crowding-in and crowding-out effects are outlined, for example, changes in rule acceptance or in assumptions about use rights. Furthermore, agri-environmental payments can help to ensure the fulfilment of overall national environmental goals and may interact vertically and horizontally with other policies. Therefore, cross-sectoral and cross-level cooperation as well as vertical integration are required and new institutions may emerge. Finally, payments may combine environmental and social goals. When used to reduce inconsistencies and/or generate justification, such payments are often poorly targeted, and the resulting ES provision is strongly affected by other factors, such as price fluctuations in commodity markets or other policies fostering actions.

In terms of ES framing, the paper reveals that, so far, ES based design principles have hardly been fully included in existing agri-environmental policies but that the integration is proceeding. For example in EU and US, the ES concept is increasingly assumed to merge with existing governmental agri-environmental payment schemes, placing ES at the center to explain and legitimize financial support for agricultural sector. The ES concept has a large influence on actors’ perceptions, preferences, and values. It can improve ecosystem-related resource understanding and the consideration of ES trade-offs of different decisions and actions. Implementing ES in agri-environmental policies, especially agri-environmental payments schemes, will, on the one hand, require broad cross-sectoral and cross-level cooperation but, on the other hand, will facilitate the latter. The paper assumes that ES-based agri-environmental payment schemes could especially foster targeting of and collaborating between the environmental and agricultural sectors.

Finally, the paper inter alia shows that agri-environmental PES are essential elements of a contemporary developed country’s environmental policy mix. Effective targeting and integration of agri-environmental PES is important, for example in terms of the EU water policy. The decision of when to use input- or output-based payments shall be carefully considered. Moreover, to create and achieve a sound mix of agri-environmental PES with environmental regulations and income support policies, the property rights situation, the reference point for application of the provider-gets and beneficiary-pays principles, and any deviations therefrom should be made transparent. For sound payment integration, different actors must collaborate on basis of common denominators, which may be based on the ES concept. Correspondingly, the paper discusses the potential of ES to enhance communication among actors and provide new impulses for cross-sectoral and cross-level cooperation in existing agri-environmental payment implementation. The paper further argues that regarding agri-environmental payments, systematic ES definition and quantification may offer the opportunity to enhance targeting, even if this is a very complex procedure. Economic valuation and monetarization of ES, in turn, are not necessary, and the application must be carefully considered.
The circular economy has rather recently become prominent in a number of European strategies and programs to enhance resource productivity and resource security (e.g. the EU action plan, European Commission, 2015, 2014, 2011; EEA, 2016, 2015). In China, the circular economy has been set on the political agenda already since the beginning of the 21st century, triggered by the recycling laws in Germany and Japan in the 1990s and the recognition of the high economic and environmental risks of China's heavy resource exploitation (Mathews – Tan, 2016).

The concept of the circular economy aims at minimizing resource use which concerns both the use of the environment as a sink for waste materials of industrial production and consumption processes as well as the use of primary raw materials in the production of goods and services (Pearce - Turner, 1990, Ellen Macarthur Foundation, 2013a, b). The basic idea presumes that in a world with finite resources and planetary boundaries (Steffen et al., 2015) only production processes which are conducted in a material cycle can be regarded as sustainable. Without being used in a cycle, resources will be used up in the foreseeable future and the available sinks for waste will be exhausted. The recycling of waste products and the reuse of secondary raw materials as well as the cascading use of materials with the aim of avoiding or greatly reducing waste and emissions play an important role in enhancing resource efficiency, mitigating climate change and shifting away from the current dominant linear economic model of “take, make, dispose”. There are two loops to be closed: one loop that fosters reuse and extend service life through repair, remanufacture, upgrades and retrofits, and one loop that turns old goods into new resources by recycling the materials into secondary resources (Stahel, 2016).

The present study contributes to the assessment of the second, the recycling loop, by quantifying the energy-economic impacts of recycling selected materials and wastes in Austria as a case study, addressing key figures such as the sectoral and aggregated gross value added, the employment and the greenhouse gas emissions saved. So far, these contributions have not been quantified for Austria and have therefore remained vague. Although the Austrian recycling industry is part of the statistics on the “Environmental Goods and Services Sector” (EGSS, Statistik Austria), the contribution of the recycling sector to employment and value added is not accounted for separately. The recycling of waste and the use of secondary raw materials in the economic cycle have also not been made a performance indicator in the national monitoring scheme of the Austrian Sustainability Strategy (BMLFUW, 2015) despite the fact that recycling as a secondary source of raw materials is a key point in innovation-oriented raw material discourses (SRU, 2016).

On the basis of the selected substance groups of iron and steel, aluminum, paper and glass, the overall economic effects for the year 2014 are calculated as an example of circularity using a model-based approach. In total, we account for the effects of the substitution of primary raw materials by secondary raw materials in the Austrian production sector, the economic effects of recycling, i.e. the collection, sorting and recycling of waste to secondary raw materials, and the trade in secondary raw materials. Assessments with regard to the environmentally relevant benefits in terms of global greenhouse gas emissions saved of recycling are accomplishing the analysis.

The method used for the analysis of the energy-economic impacts of recycling is the WIFO.DYNK (Dynamic New Keynesian) model. WIFO.DYNK is a dynamic macroeconomic, one-region and multi-sector model. The core of the model is based on supply and use tables that depict the inter-linkages of 62 industrial sectors. The model was significantly extended with data on recycling processes and relevant technologies. This includes the integration of data on primary and secondary production processes, in particular the shares (by value) of resource and energy inputs in production that were based on material flow and price data. The study is considered to be original (at least for Austria) since it has linked physical quantities (material flows) and monetary values (prices) for selected groups of substances through an interdisciplinary research approach. By generating material group-specific data
from combining physical quantities and monetary values the approach generated new data for the macroeconomic analysis which would not have been available solely on the basis of information from input-output analysis, this approach has proven to be successful in the macroeconomic analysis. The analysis shows that the recycling of the selected substance groups has made a clearly economic contribution. The overall effects of all groups of substances amount to 0.52 percent of GDP or 1.7 billion €. The labour market effects account for 14,759 employments or 0.38 percent of the total labour force (self-employed and non-self-employed, detailed results by substance groups are presented in the paper). The biggest economic effect results from the recycling of metals, followed by paper. The recycling of glass has a comparatively low economic impact, since both small volumes and low prices are involved and a large portion of primary raw materials is mined domestically, which has a compensating effect on the economic benefits of recycling (resource-specific results will be presented).

In general, the economic effects of recycling are all the more pronounced the more an economy is dependent on raw material imports and the higher the price of imported raw materials is. This is best reflected in the area of metals as the main economic driving force in the recycling industry. Here, relatively high prices prevail and Austria has a net import position for these raw materials. The recycling of locally collected and processed scrap metals already contributes significantly to the substitution of primary raw material imports (of e.g. aluminium), creating additional employment and added value through recycling activities and downstream income effects, also in the production sector. In our analysis we differentiate between direct and indirect economic effects in production sectors and downstream branches of industries which account for about 57% of total value added, and induced effects that arise upstream due to income growth and consumer demand which account on average for 43% of the value added throughout the different substance groups.

The relevant greenhouse gas emissions savings for the recycling of the investigated substance groups and material flows were calculated on the basis of emissions factors that take indirect emissions into account. The highest emissions savings are achieved for metal recycling, i.e. for iron and steel recycling (4.5 million t CO2e) and aluminum recycling (2.7 million t CO2e), followed by paper recycling (0.7 million t CO2e). In total, the recycling of the substances under investigation enabled a contribution to global mitigation of 7.9 million t CO2e in 2014.

It can be expected that the recycling industry, which is only at the beginning of its development in some areas despite its relatively long tradition, will have great potential for development in the future both economically and ecologically. The potential will stem from an increasing scarcity of primary and secondary raw materials on the global market and associated price surge in raw materials that tend to economically favour the recycling economy, as well as from a steadily growing stream of waste that will feed on long-lived capital stocks (e.g. urban mining). However, one also has to acknowledge a rebound from induced income rise and correlated consumer spending on energy use that the present study quantifies on a sectoral basis.

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Various environmental footprint concepts have been developed and applied in sustainability research over the past two decades (see, e.g., Hoekstra and Wiedmann 2014 for a literature review). However, in case of resource-related footprint indicators, most publications remained restricted to ex post analyses until now. Referring to the multitude of published ex post assessments of international material flows by means of Multi-Regional Input-Output (MRIO) databases (see, e.g., Bruckner et al. 2012, Wiebe et al. 2012, Wiedmann et al. 2015 or Wood et al. 2015 for some selective recent applications in this regard) we might at least annotate that scientific evidence of the prospects for future resource consumption remained rather limited by now (but, see e.g., European Commission 2014 or Schandl et al. 2016 for recent examples in this regard).

This is somewhat amazing as the sustainability research community as well as international decision makers do indeed share the conviction that, akin to the challenges of climate policy, a great transition will be needed in order to decouple human wellbeing from resource use over the next decades (European Commission 2011, Hoekstra and Wiedmann 2014, UNEP 2011, UNEP 2014). Our paper is therefore intended to advance this branch of research by a presentation of key scenario insights from MRIO-based ex ante simulation studies.

To this, we discuss the outcomes of recent GINFORS applications. GINFORS is an environmentally extended dynamic economic simulation model. The current GINFORS version, which is based on the WIOD dataset (Dietzenbacher et al. 2013, Timmer et al. 2015), has been re-engineered over the last couple of years and facilitates simulation studies with a detailed mapping of 38 national economies and a rest of world region until the year 2050. The model is soundly rooted on an endogenous mapping of detailed national economic structures and international economic interrelationships due to globalized trade patterns. Income effects resulting from (i.a.) diversified investment expenditures, induced efficiency improvements or sustained shifts in consumption patterns are explicitly modelled. Hence, each simulation run accounts for potential macroeconomic rebound effects (Sorrell and Dimitropoulos 2008, Sorell et al. 2009) in a variety of ways.

Concerning environmental questions, the modelling of the economic system is consistently interlinked with subsystems that explain energy use, electricity production, air emissions and material extractions in physical terms. Concerning the later, GINFORS is also able to map quantitative indicators of material...
extractions embedded in regional consumption activities over global supply chains. Current GINFORS applications therefore feature medium to long term projections of national material footprint indicators like Raw Material Consumption (RMC).

Our presentation focuses on the future prospects of international CO2-emissions and abiotic material consumption patterns. To this, we highlight key findings from four quantitative scenario assessments: A “Business-As-Usual” scenario, assuming only modest progress of environmental policy measures within the EU in absence of any further developments of climate and resource policy measures in Non-EU countries. A “Global Cooperation” scenario, assuming the establishment of globally harmonized economic and regulatory policy instruments in order to advance decarbonisation developments and to foster the transition towards a resource-efficient global economy. An “EU Goes Ahead” scenario, with the EU advancing the development of a low-carbon, resource-efficient economy through strong EU-level economic and regulatory policy instruments in absence of any further developments of climate and resource policy measures in Non-EU countries. And a “Civil Society Leads” scenario, where European citizens/consumers and businesses push resource-efficiency and decarbonisation trends through voluntary changes in preferences and behaviour.

Our results indicate that humanity has to strive for global implementations of ambitious climate and resource policy measures. Otherwise, planetary boundaries will be offended by far. In case of European Member States this development would also be accompanied by dampened economic growth, less acceptable social conditions and growing risks for financial markets. Further key policy lessons which can be inferred from our findings can be summarized as follows: 1) An attainment of ambitious global environmental targets does not have to be accompanied by net economic costs. Instead, positive income and employment effects might be induced by coordinated policy actions. But this requires an international agreement on a comprehensive policy mix, which contains information instruments, economic instruments and regulations. 2) If global agreements cannot be realized there remains the option EU Goes Ahead. The EU is able to attain own environmental targets even in absence of comparable global environmental policy approaches. In addition, the EU would economically benefit from first mover advantages. 3) Structural change of consumption patterns accompanied by reductions of total consumption levels initiating from intrinsic behavioural change can exhibit substantial impacts on resource use. If these developments were accompanied by increased shares of part time employment contracts a zero growth economy would generate additional jobs.

Acknowledgements

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Social and solidarity economy initiatives in peripheralized rural areas - A perspective from Central and Eastern Europe

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Rural areas are often peripheralized through socio-political processes. Peripheralization manifests differently though in different national contexts, such as in Hungary and Germany, the two countries where this research is being conducted. In addition to economic and infrastructural shrinking, which characterizes middle-sized cities or rural areas dominantly in Eastern Germany, people (often of Roma ethnic origin) get socially and spatially marginalized in small settlements in Northeast or Southwest Hungary. In these differently peripheralized rural areas agency is not necessarily powerless though. There are not-for-profit, bottom-up initiatives, we can also call them social and solidarity economy (SSE) initiatives that aim to oppose peripheralization, such as socio-spatial marginalization (segregation and ghettoization, see e.g. Nagy et al. 2015, Váradi and Virág 2015), shrinking infrastructure (decreasing availability of local shops, bars, local schools, kindergartens, GPs, see e.g. Naumann, and Reichert-Schick 2013), economic shrinking (increasing difficulties to find jobs locally, long-term unemployment, see e.g. Leibert 2013).

I am interested in SSE initiatives of peripheralized rural areas and the role they can play in a more sustainable rural development. To better understand how SSE initiatives may oppose, reproduce or resist peripheralization and to what kind of development they may contribute, I am applying a substantive/ diverse economic approach (Polanyi 1971 a and b, Coraggio et al. 2015). After Polanyi (1971 b) I aim to understand the initiatives through three different institutional arrangements: symmetrical organization (reciprocity), central points (redistribution) and market exchange. On a socio-economic level I am interested whether socio-political processes of peripheralization, which determine the context in which SSE initiatives emerge, have an influence on the „resource mix”
(market, non-market or non-monetary) of the initiatives. On a political level I am interested in the capacity of the initiatives for democratization/emancipation. Based on the economic, cultural and institutional contexts, bottom-up, not-for-profit initiatives in peripheralized rural areas have access to different kind of resources (market, public funding, subsidies from private foundations or symmetrical relationships in communities). These resources are available to a different extent in those differently peripheralized areas. In contexts affected by different processes of peripheralization, economic integration may occur through different institutional arrangements (symmetrical organizations (reciprocity), central points (redistribution) and market systems) as well. Next to analyzing the relationship between socio-political peripheralization and the “resource mix” of SSE initiatives, I am interested in the capacity of SSE initiatives for democratization. Do key actors of SSE initiatives have a philanthropic or a democratic solidarity approach (see eg. Coraggio et al. 2015)? On an empirical level my main question is: How actors of SSE initiatives define their challenges and strategies to cope with those challenges in differently peripheralized contexts? With ethnographic methods (semi-structured interviews with actors of case study bottom-up initiatives, participant observation and document analysis) I am looking at five case study SSE initiatives, two from Eastern Germany and three from Hungary from areas affected by processes of peripheralization.

(Preliminary) results/main findings: Existing institutional arrangements (reciprocity, redistribution, market exchange) within peripheralized rural areas influence where the emphasis is put in the “resource mix” of SSE initiatives (market, non-market and non-monetary). In villages, where the local community is strong, needs are satisfied through symmetrical organizations (reciprocity). Emerging SSE initiatives in these villages build on existing communities in their strategies and therefore non-monetary (reciprocity) resources might dominate in their “resource mixes”. In villages, where symmetrical organizations do not exist, SSE initiatives choose to build their strategies and “resource mixes” either on market-based income or grants/subsidies (redistribution). SSE initiatives have different capacities for democratization, based on their solidarity approach (democratic/philanthropic). Those bottom-up, not-for-profit initiatives, which strategies’ are dominated by philanthropic solidarity have limited capacity for empowerment and might reproduce certain processes of peripheralization. Those SSE initiatives which strategies’ are dominated by democratic solidarity may have more potential for empowerment and emancipation and therefore more potential for opposing processes of peripheralization.

On one hand the different manifestations of socio-political peripheralization influence what might be considered as main challenges within SSE initiatives. On the other hand existing structures (patterns of integration) within peripheralized rural areas determine the resources and influence the strategies of not-for-profit, bottom-up initiatives. The strategy of SSE initiatives is also influenced by their key actors’ solidarity approach (which is either dominantly democratic or dominantly philanthropic).

Key references
Applying contingent valuation to investigate green ICT consumption preferences based on the US representative data

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This stated preferences study contributes to a better understanding of public support for designing policies aimed toward replacing potentially hazardous conventional popular consumer electronics, such as cell phone, with slightly more expensive but environmentally benign, green electronics. The research had two objectives. First, to understand the determinants of U.S. households' willingness to pay more for a green cell phone (i.e., cell phone that does not contain potentially hazardous materials) compared to a conventional phone presently in common use. Second, to estimate the value that consumers place on the improvement of environmental quality associated with a hypothetical switch from conventional cell phones to green cell phones. An economic method of contingent valuation was applied to analyze the generalizable sample based on survey data of American households. Estimated models included both internal (general beliefs with respect to the environment, attitudes toward recycling small electronics, and pro-environmental behavior in the past 12 months) and external (socio-economic and demographic characteristics) variables. The findings suggest that respondents' WTP is not solely based on a rational financial reasoning. Significant factors associated with WTP for green cell phones included general awareness of environmental issues, attitudes toward recycling small household electronics, and pro-environmental behavior. Larger households and those with greater educational attainment were more likely to be willing to pay a premium on green cell phone. Conversely, younger to middle age people and middle-income families do not seem to value green cell phones. Estimates of the WTP showed that people are likely to be willing to pay on average between $5.63 (after accounting for uncertainty) and $29.55 (under full certainty) more to purchase a green cell phone over a conventional cell phone with same functionalities. Even the lower value of $5.63 is substantial given that consumers can often get free devices if they commit to a specific-length contract with a service provider. The estimated amount consumers are willing to pay quantifies public welfare derived from eliminating the risk of future environmental harm potentially caused by discarded conventional cell phones. A conservative approach of estimating the aggregate WTP based on the lower threshold parameter helps illustrate the total amount of the value that consumers placed on environmental improvement associated with a switch from a conventional to a green cell phone. Based on the lower value, the aggregated sum of WTP estimated in this study is approximately $662 million for every 18 months. If instead the estimate of $29.55 from the complete certainty model is used, the corresponding aggregate amount is $2.8 billion for every 18 months. To put this in a perspective, the aggregated value of public's WTP to prevent another oil spill similar to 1989 Exxon Valdez in the state
of Alaska was estimated at $11.5 billion. The study offers implications for the industry and policy makers. Computed ranges of WTP provide a better idea for electronics industry of how much more innovative green phones could command in the marketplace compared to conventional devices. For public policy, two recommendations can be drawn from this research. First, findings clearly indicate that U.S. households are willing to support financially greener ICT products. This suggests that an introduction and implementation of a comprehensive U.S. national regulatory framework intended to improve product design by limiting the use of potentially toxic materials in consumer electronics can rely on public support. Second, educating the youth about benefits of proper e-waste processing to elicit positive attitudes towards electronics recycling, increasing public awareness of general environmental issues to help promote pre-environmental norms, and incentivizing pro-environmental behavior can help transform perceptions and increase public support of federal policies on reducing and limiting toxic materials in consumer electronics.

Oil palm conflicts across time and spaces in Latin America
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Oil palm has rapidly expanded in Latin America as a result of the 2000s commodity boom, new demands for resources from newer hubs of global capital and related energy/fuel security ventures (Borras et al. 2012). Such expansions have increased and created environmental and agrarian conflicts over resource use and access; and labour conditions. Oil palm production has been linked with conflicts over land access, forest conservation, water contamination, and over working conditions for wage labourers (Borras et al 2012, Geber et al 2011). Recent studies on oil palm conflicts have, however, been mainly pursued through single cases studies (Johnson, 2012; Mingorría et al 2014) missing in this way a comparison of mechanisms at play and the role of spaces and context in shaping oil palm related conflicts across regions and countries. Moreover, the few comparative analyses of oil palm plantations cases are mostly related to other crops (e.g., soya) or different kind of tree plantations (e.g., eucalyptus) (Gerber 2011, FAO 2012, Borras et al 2012). However, in this presentation we focus only on oil palm plantations conflicts in order to understand their own complexities. We analyse and compare six case studies located in Latino America: Colombia, Ecuador, Peru, Mexico, Guatemala, and Honduras through the creation of a comparative matrix. We discuss about the nature of the conflict as related to: 1) the mechanism of the accelerate oil palm expansion; 2) the negative environmental, social and economic implications that generate conflicts; and the multiple forms of reactions (e.g., protest). Finally, we expose the main limitations of this comparative matrix approach.

The oil palm industry in Guatemala, Honduras, México, Ecuador and Colombia: There has been an accelerated expansion of the oil palm industry in Latin American countries since 2000 (FAO 2014). While Indonesia y Malaysia are the most important global palm oil suppliers, Latin America has emerged now as the region with the greatest potential for the expansion of this crop (Deininger et al 2011). The boom of oil plantations coincided with an increase in the demand of biofuels (Sayer et al 2012). The expansion has continued despite the drop in their prices (FAO 2014) due to: 1) the multifunctional and flexible commercial destination of the palm oil commodity, the oil palm productivity, the increasing demands from emerging countries such as China or India; and, 2) the government and international institutions discourses which promote the oil palm plantations as the solution to the multiple crises (Alonso-Fradejas et al 2016). This expansion has already led to widespread and major and social and environmental impacts through multiple mechanisms. As examples, the oil palm has been expanding by renting, buying the land but also through planting by
local social groups (in form of cooperatives or individual smallholders) (Mingorría et al 2014, Edelman and León 2013). In Colombia and Guatemala, oil palm expansion has often prevented local communities from accessing to land and other natural resources and they have reduced the soil fertility and increased water pollution and create negative labour conditions (Marin-Burgos 2014, Mingorría 2016). In Mexico, engagement in production by smallholders has led to social differentiation (Castellanos-Navarrete 2015) and in Peru and Ecuador the accelerated expansion of plantations has led to deforestation (Danmert 2015). Different groups (such as NGOs, peasant organizations, workers, local communities, landless, women) react or respond to these impacts in defence of territory (Alonso-Fradejas 2015) or in some cases, local population are acquiesce or incorporate to the oil palm production system (Castellanos-Navarrete 2015).

Methodological proposal:
Based on Marx (1967) work and the studies of Hall et al (2011) and Hall et al (2015) in relation to conflicts of access and exclusion over land, and the forms of resistance, acquiescence or incorporation from land grabbing dynamics, we proposed a matrix to compare five cases of oil palm conflicts allocated in Latin America.

Mechanism of expansion Implications Reactions
Land Land tenure and uses Access and exclusion Resistance
Acquiescence
Incorporation
Labour Organization Access and exclusion Resistance
forces Labour division Acquiescence
Forms of remuneration Incorporation
Capital Financing methods Access and exclusion Resistance
Acquiescence
Incorporation

References:

Interpreting the ‘exemplary role’ of energy-saving buildings in everyday life

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Throughout the field of social research and some applied disciplines there is an increasing acknowledgement of buildings as socially transformative artefacts. Nevertheless, some policy and research domains that are typically guided by positivist epistemologies and techno-economic framings tend to disregard this powerful social role. Such is the case of EU policies, whose technocratic policymaking has been related to processes of depolitization in energy and environmental matters. A sign of new interest for the meaning of buildings is illustrated by the EU 2010 Directive on Energy Performance of Buildings which recognizes their ‘exemplary role’ in so far as they are expected to lead by example in the dissemination of energy-saving principles. Through this paper, we intend to make a conceptual, methodological, empirical and policy contribution to contemporary debates concerning the role of buildings in energy-saving discourse. Inspired by the work of Henri Lefebvre, amongst others, we develop the case that buildings are not only part of an energy-saving story, but a necessary contribution to its coherence for transforming social actors’ meanings and, thus, values and practices.

Invoking an interpretive stance, whereby buildings are conceptualized as carriers of meanings (i.e. artefacts), we investigate the discursive tensions in building appraisal through the empirical setting of Barcelona, as we seek to shine new light on the stories of energy-saving buildings from an ‘exemplary’ policy perspective. Our research design involves case study analysis of four buildings celebrated for their energy-saving credentials: 1) Endesa headquarters, an energy corporation (whose buildings have acquired energy-saving ‘excellent’ ratings), 2) La Fabrica del Sol, a municipally-owned sustainability museum (deploying advanced renewable technologies), 3) Media-ICT, public-company offices (a flagship of Barcelona 22@ technology district), and 4) Efficient Block, government-led refurbishment (intended as a replicable model of energy-saving best practice). The fieldwork, conducted between 2015 and 2016, included extended periods of participant observation and interviews (n=133). The interviews included pre-arranged interviews with organization representatives and sectoral experts, along with on-street interviews with building users and non-users. This research design enabled to contrast the elite representations of energy saving buildings with the perception of ‘policy relevant actors’, i.e. those ‘making meaning’ of energy saving through artefacts, thus contributing to understand the power mechanisms and socially transformative processes in exemplary buildings.

Four core findings are generated from our research. Firstly, we reveal the dominance of ‘elite’ techno-economic framings of exemplary buildings, occurring within and across policy and organizational decision-making spaces. Secondly, we found that ‘everyday’ framings of buildings are a materialization of policy narratives, thus enabling the perception and scrutiny of incoherencies by social actors. In turn, thirdly we argue that the techno-economic dominance implies that social actors’ claims for coherence
(building-policy narrative) are marginalized, and furthermore excluded from political debate. Finally, we find that the mismatch between elite and everyday framings challenges the legitimacy and the credibility of energy-saving values and policies, including that of ‘exemplary’ energy-saving buildings. The key message of our paper is that buildings perform a fundamental role in (re)producing energy-saving values and practices. Hence, we affirm that neglecting this role – which we find to be common policy practice – can hinder the potential for social transformation. From this perspective, reappraising and reinterpreting the meaning of buildings becomes an opportunity for repoliticizing energy-saving discourse, and to questioning whether technological solutions and economic decision-making are able to generate coherent narratives across policy artefacts – thus creating new spaces of engagement and governance for energy-saving practice. However, including expert and everyday claims on exemplary energy saving building definition in policies, by enabling the scrutiny public and corporate organizations, appears contrary to the interests of the elites dominating energy saving policies, discourse and leading the deployment of energy saving practices.

Financing renewable energy investments by phasing out of fossil fuels subsidies: the eIRIN Stock-Flow Consistent dynamic model
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The recent COP22 climate conference held in Marrakesh in November 2016 called for the urgent need to mobilize finance in the low-carbon transition to limit global temperature increases to as close to 1.5 degrees C. In order to reach this goal, three types of measures are being discussed by international financial institutions, development banks and NGOs: green fiscal measures (e.g., the introduction of a carbon tax), targeted monetary policies (such as green bonds), and the end of market distortions represented by governments’ fossil fuels subsidies. Yet, there is great uncertainty about the effects of phasing out of fossil fuels subsidies from one side, and the increase in renewable energy incentives on the other, on macro-economic and financial stability. In particular, their distributive effects on economic growth, employment, credit market stability and inequality are still unknown. In this paper, we propose a further development of the eIRIN Stock-Flow Consistent dynamic model (Monasterolo and Raberto, 2016) as a tool to simulate the phasing out of fossil fuels subsidies (modelled as tax rebates to energy companies) and the introduction of public incentives for the production of renewable energy (solar and wind). Two types of green public incentives are modelled: green fiscal incentives for investments and production of renewable energy (such as in the US system), or green sovereign bonds. We then display their effects on firms’ investments, employment, wages and skills, credit market and economic growth.

Rooted in a balance sheet approach, the Stock-Flow Consistent model is characterized by heterogeneous classes of sectors-based agents that interact through a set of markets and import a share of Raw Materials and energy from the Foreign sector. As a difference from traditional System Dynamics models, as well as from Agent-Based models, eIRIN is populated by heterogeneous sectors (e.g., green/brown utility companies, green/brown capital goods producers, and households divided into workers and capitalists) characterized by a representative agent with an own behavioural and investment function. The production function is based on a Leontief technology with no substitution of the four production factors (Labour, Capital, Raw Materials and Energy) to explicit GDP energy and resource intensity. A full energy sector is introduced and shaped on the structure of the GCAM Integrated Assessment Model’s energy dimension, and characterized by different mining companies, brown and green utility companies and capital goods products.

Simulations show that maintaining fossil fuels energy subsidies accures market distortions, with negative effects on employment, capital accumulation and reinvestment in the economy, and tax-rate levels. Instead, increasing subsidies to renewable energy through green monetary policies in the form
of green sovereign bonds, under the conditions of low growth and low interest rates in an energy-import oriented domestic economy, would benefit the real economy and contribute to financial stability with lower unemployment, higher capital accumulation and internal aggregate demand, and higher bank’s liquidity and deposits. Under the same conditions, green fiscal policies have higher distributive effects in terms of wealth concentration and inequality by decreasing households’ purchasing power.

Macroeconomic risks and responses for a degrowing economy: a scenario analysis.
Antoine P Monserand

“The goal of sustainable degrowth is not to degrow GDP. GDP will inevitably decline as an outcome of sustainable degrowth, but the question is whether this can happen in a socially and environmentally sustainable way.” (Kallis, 2011)

In this article, we want to give some elements of response to this vast question by assessing the macroeconomic risks and conditions of feasibility for degrowth, as these are important elements conditioning the adhesion of citizens to the project and social peace while implementing it. Since the call made by Jackson (2009) for a new ecological macroeconomic theory, a variety of interesting works have been conducted regarding the macroeconomics of low or zero growth (e.g. Jackson and Victor, 2016; Cahen-Fourot and Lavoie, 2016; Lange, 2016) or modelling the economy embedded in a larger environmental system (e.g. Berg et al., 2015; Naqvi, 2015; Dafermos et al., 2017 amongst others). Very few however have treated explicitly with negative GDP growth rates, except the scenario analysis of Victor (2012) and Briens (2015) which draw macroeconomic paths of degrowth for the Canadian and French economies respectively, plus some coming work by Christoph Gran on Germany on one side, and by Simone d’Alessandro and Giovanni Bernardo on the other side. Fontana and Sawyer (2016) have explored analytically the consequences of having three different (possibly negative) growth rates simultaneously (that of capital stock, of labour resource and of depletion of natural capital) and proposed some policy options to manage these rates and make them converge according to policy objectives.

We build on this recent literature and further investigate the possible macroeconomic risks associated with a voluntary, demand-led decline in aggregate output which would be the result of a variety of degrowth policies and behavioural changes that we do not intend to detail here. In such a scenario, massive unemployment would be looming and should be tackled through policies that are different from those promoting employment by promoting output growth – be it via austerity or expansionary measures. Working time reduction is a policy candidate for this (Kallis et al., 2013; Zwickl et al., 2016), therefore we analyse its macroeconomic effects under various ways and means of implementing, especially regarding the wage policy accompanying it. In a context of declining aggregate demand, deflationary pressures might appear. This can cause a surge in real debts, public and private, and lead to a debt-deflation spiral (Fisher, 1933), which we certainly want to avoid. Dealing with this issue without resorting to pro-growth policies, and if possible without stringent price regulation, is a challenge. The speed of degrowth compared to the depreciation rate of capital is a key parameter in this dynamics.

In order to analyse this while fully taking into account the interdependencies in the economy we construct a dynamic monetary stock-flow consistent model using the Godley and Lavoie (2007) theoretical framework, showing a number of post-Keynesian features such as endogenous credit money, flexible utilization rates, exogenous interest rates and cost-plus pricing, in a way similar to Lavoie and Godley (2001). We study several scenarios of declining aggregate demand under various hypothesis and policy responses: without specific policies, but with different relative rates of output degrowth compared to the rate of capital depreciation (sc. 1 and 1bis); with various investment responses from the private sector (sc. 2 and 2bis) and with working time reduction, accompanied or
not by an increase in hourly wage (sc. 3 and 3bis). For each of these scenarios, we scrutinise the dynamics of several key variables such as real and nominal output (de)growth rates, the accumulation and capacity utilisation rates, wage and profit shares, (un)employment and inflation rates, the profit rate, debt ratios and investment and consumption (de)growth rates.

The article is organized as follows: section 1 reviews the recent macroeconomic models used for degrowth scenario analysis, section 2 presents our model, section 3 proposes numerical simulations under the different scenarios detailed above, we then discuss these results in section 4 and conclude in section 5. As of today, the simulations have not been conducted yet so we cannot expose the results now but will have it done by the date of paper submission.

Conclusion
With this article we intend to contribute to the reflections on the macroeconomics of degrowth, at the recently growing junction between ecological economics and post-Keynesian economics, in a formalised framework allowing to better assess the consequences of policies that have been long advocated for in the degrowth literature (such as working time reduction or measures aiming at decreasing overall consumption). The stock-flow consistent model constructed here allows us to fully take into account the repercussions of the simulated policies on a number of key macroeconomic variables, which may give new insights on how to manage what Odum and Odum (2001) called a “prosperous way down”.

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Biodiversity into agricultural public policy: green or sustainable?

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The future of agriculture constitutes a major challenge to the achievement of sustainable development. There are new perspectives on greening (focusing on ecological objectives) and sustainability (combining both ecological and social goals). Academic papers rather study the ecological efficiency of agricultural public policies, while real public policies, such as in the European Common Agricultural Policy, examine both ecological and social considerations. The objective of this paper is to consider ecological, economic and social objectives within the design of agricultural public policies. We develop a bioeconomic spatially-explicit model that articulates bird community dynamics and representative farmers selecting land uses according public policy incentives. It is specialized and calibrated at a regional scale for France through national databases. We compare optimal public policy scenarios built on different objectives. We show that, when the biodiversity objectives are either very limited or very demanding, grassland subsidies are the best instruments from both green and sustainable points of view. However for medium objectives, reducing crops subsidies is the cheapest way to green the CAP, while subsidies on grasslands are the only strategy from a sustainability perspective. Our work highlights new trade-offs related to policy implementation, such as social acceptance or technical difficulties, and the spatial equity of performance among regions.

Pesticide use: application behavior, patterns and their determinants

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Background & motivation

Current European agricultural policy is concerned with pesticide use reduction - reduction targets are i.e. defined in National Action Plans. These policies more specifically aim to reduce risks for the environment and human health due to pesticide use. Policy goals can be achieved by a shift from potentially risky to less risky products or non-chemical plant protection strategies, or by a reduction of used quantities. By reducing negative external effects of pesticide use such shifts can be welfare maximizing (Waterfield and Zilberman, 2012). Specific policy measures implemented include pesticide taxation (see Böcker and Finger, 2016 for an overview) or the promotion of alternative production systems (e.g. in France: République Française 2015), alternative plant protection measures (e.g. biocontrol), schooling or extension services.

Policy measures can focus on extensive or super-extensive margins (e.g. crop choice and choice of production technologies, e.g. substituting intensive by extensive crops) and intensive margins (i.e. reducing pesticide use intensity/risks for a particular crop and technology). The focus on extensive margins might lead to pronounced changes in agricultural production and therefore infer problems of leakage, meaning a substitution of low intensity (domestic) products by high intensity (foreign) products. In contrast, intensive margin adjustments might be achieved without losses in production, if a substitution to strategies which are less risky for the environment and human health is achieved. The current literature reveals large potentials for such adjustments as it points out a strong subjective...
component in pesticide applications: Andert et al. (2015) and Lechenet et al. (2016) show that the high observed variability of pesticide treatment intensities can only partly be explained by agronomic-, climate-, farm- and regional variables. Gaba et al. (2016) show that application behavior (i.e. timing, products chosen, intensities chosen, combination with other management strategies) strongly matters for the effectiveness of applications of farmers. They call for a deeper investigation of application behavior. Identifying groups of decision makers with similar patterns of pesticide use and determinants of decision making is therefore a necessary first step to tailor policies and target further research.

Research questions
This leads to the following research questions:
1. To what extent do farmers show flexibility in pesticide application behavior and how does this behavior differ among farmers?
2. In how far can groups of farmers with similar application patterns be identified and how can these groups be characterized?
3. Which are possible determinants for the above identified patterns of pesticide application?

Data & Methods
To gain insights in the occurrence of different pesticide application behavior and analyze its impact on absolute levels of application intensity, we link indicators of pesticide use (absolute levels) to an index of observed pesticide application behavior, on a micro (farm) level. The data used for the analysis is provided by the Swiss Central Evaluation of Agri-Environmental Indicators (CA-AEI) and is combined with bookkeeping data (for further details see Spycher et al. (2013) and Hoop and Schmid (2015)). The dataset consists of an unbalanced panel of 70 Swiss farmers reporting on their plot wise pesticide use from 2009 to 2013. The data is highly detailed and includes observations for multiple outputs as well as different types of pesticides per farmer, each year and provides annual information on spatial and farm characteristics. To calculate pesticide use indicators, CA-AEI data is merged with information on fate, toxicity and formulation of products from the Pesticide Properties Database (Lewis et al., 2016) and information on recommended standard application dosages from the Swiss pesticide register (BLW, 2012). To depict pesticide use we compute two different indicators. First the treatment frequency indicator (TFI), which is commonly used to assess the intensity of pesticide use, relating application to recommended standard dosages. Second, the Load Index (LI, see Miljøministeriet, 2012) that additionally takes into consideration potential (product-specific) effects on environment and human health, and therefore adds an important policy relevant dimension to the analysis. To analyze pesticide application behavior, a dissimilarity index (DI), depicting spatial flexibility of farmers in application routines is created. To compute this index, first TFI and LI are computed year wise per product and plot. In a second step, the dissimilarity of pesticide applications between plots, in a given year, is computed for each farmer using distance measures. Distance measures are for example heavily used in ecology to assess and compare biological diversity and are therefore well developed (Jost et al, 2011). We here choose Euclidean distance (weighing absolute quantities more) and the altered Gower distance (with q=2, weighing variation in proportions and absolute numbers equally) and compute average dissimilarity per year using centroids (Anderson et al., 2006). Results are tested for robustness w.r.t. different number of plots per farmer with Kruskal-Wallis tests. To identify groups of farmers with similar patterns of behavior a cluster analysis (K-Means algorithm, hierarchical ward clustering) with one pesticide use indicator and the dissimilarity index as components is performed per crop. Multinomial logit models with the before determined group affiliation as a dependent variable are then run to identify determinants of application patterns. As explanatory variables, economic, farm-specific, farmers- and climate variables are used.

Results & Discussion
First results confirm findings in literature regarding a high heterogeneity in pesticide treatment intensities (TFI indicator), as well as potential riskiness for the environment and human health of used pesticides (LI indicator). Additionally, to heterogeneity in median application levels, we also find
heterogeneity in the extent farmers vary treatment intensity over the years. We further find the dissimilarity index to be strongly heterogeneous between farmers over the analyzed years, pointing towards heterogeneity in application behavior. Bringing together the indicators of absolute pesticide application levels (TFI, LI) and the indicator for application behavior (DI) we identify three different application patterns. First focusing on the use of fungicides and insecticides in potato production (the most intensive arable crop with respect to pesticide use in Swiss agriculture) and the TFI indicator, we identify three different application patterns. First low variation, low-intensity applicants, second high variation, average-intensity applicants and third low variation, high-intensity applicants. We discuss application behavior of the groups and relate them to findings of Ramseier et al. (2016), who report on the use of damage thresholds and prognosis systems for pesticide applications in Switzerland. Expected results of the regression analysis will reveal socio-economic determinants of the described patterns in application behavior, while controlling for farm-, climatic- and weather conditions. This will allow to give targeted recommendations for the design of pesticide policies and directions for further research. Analysis will further be extended to pesticide use in winter wheat (the most abundant crop in Switzerland) and in a second step, specifically consider potential risks of used pesticides to the environment and human health (LI indicator).

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Multifunction forest in multiple jurisdictions: governing forest and biodiversity conservation at national park, sub-national and village scales
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Forest serves different functions of production and conservation at different scales. Under a decentralized forest management in the public sector, multiple jurisdictions are in place in terms of vertical relations (between layers of governmental levels, for instance) and horizontal relations (among entities or actors at a same scale, for instance) creating a multitude of interactions and institutional arrangements (e.g. Dalmazone, 2002; Trung et al, 2015). Problems arise when these interactions and arrangements are compartmentalized and disintegrated whereas otherwise are called for, as illustrated by the case of forest conservation in one of the world’s most important tropical forest and biodiversity country. In Indonesia, for an illustration, all forests under a national park status are managed by the national government, which often inhabited by villages with ownership rights over forest resources in the national park, and surrounded by villages with community forestry managed by the provincial government. All entities and actors mentioned here are confined by jurisdictions and institutional arrangements that their jurisdictions at different scale imply, hindering some possibilities for integrated approach and practices to sustainably manage forest ecosystems.

The paper develops a notion of sustainable forest management as an appropriate conceptual framework to address the issue of multifunction forest in multiple jurisdictions. This framework emphasizes the importance of scale, division of mandate as a consequence of such scaling, and interaction in the public sector that occurs within and among different scales in governing conservation in tropical forest that serves different functions (such as limited production and conservation purposes). As such, the paper brings insights from conservation biology, public economics, and social forestry, and seeks to synthesize these insights with specific policy context of multi-scale forest and biodiversity conservation in Indonesia. This paper embraces national park, sub-national, and village levels undertaking conservation measures that, given the public goods nature of Indonesia’s forest ecosystem and biodiversity, are of international importance. This should provide a context for assessment of global, national, and local processes.

The framework used in this paper entails three conceptual elements. The first conceptual element is related to responsibility assignments in a decentralized forest management which structures responsibilities in the public sector to different governmental layers and public entities for forest and biodiversity conservation measures. The second conceptual element relates to social forestry through which different forest utilization arrangements takes place along the frontier of conservation areas and may affect, both in synergistic or adverse manners, the integrity of forests with high conservation value. Third conceptual element is village governance in which village emerges as critical governing unit with decision making power and resources to perform conservation measures within, at the border, and outside of conservation areas.

With such conceptual framework, the paper then reviews four emerging areas for forest and biodiversity conservation in Indonesia: first, delegation of national and sub-national (province) responsibilities to lower layer in performing forest-relevant ecological public functions; second, conservation forest management unit; third, forest allocation for social forestry; and fourth, village for conservation. These emerging areas are expected to enable discussions on policy options to integrate forest and biodiversity conservation across scale. Discussions that provide entry points to assess possibilities for a kind of governance that is likely to facilitate integrated management of multifunction forests in multiple jurisdictions through mixed yet coherent policy approaches (cf. Ring and Barton, 2015).

The paper suggests three entry points with policy viability. First, the establishment of conservation forest management unit for national park (Kesatuan Pengelolaan Kehutanan-Konservasi or KPHK). Second, allocation of forest area for social forestry objectives. Three, facilitating village for
conservation applicable for both villages with use rights over state forest and villages governed by indigenous community with forest ownership rights. The paper then discusses the possibilities and limitations of respective entry points with the help of analytical elements elaborated in the conceptual framework.

In addition to assessing policy viability, which is the main interest of the study, a section of the paper is dedicated for theoretical reflection. Ostrom (2005) suggests that polycentric governance, in which multiple jurisdictions are in place, is needed to regularize human-environment interactions. In this paper, interactions between public sectors and forest ecosystems, and among multiple public sectors across scales and their associated responsibilities for forest ecosystem management are being discussed. Reflecting the approach upon the context and discussions in the study, this paper argues for instance that while such polycentric governance is required for forest conservation across jurisdictions (Nagendra and Ostrom, 2012) and that the interactions among autonomous entities, public or otherwise, share hybrid arrangements (Me’nard, 2004), the diversity of such arrangements may not necessarily reflect what is characterized by a polycentric governance approach.

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The limits of the ecosystem services paradigm and the search for alternative ways of conceiving human-nature relations
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Since the publication of the Millennium Ecosystem Assessment in 2005, the term "ecosystem services" (ES) has consolidated its influence as a guiding concept in the fields of environmental assessment, policy and governance worldwide. The speed of dissemination of the ecosystem services paradigm in academic and policy circles has been very impressive. In a matter of few years, it has consolidated its position as the mainstream framework for conceptualizing human-nature relations. It is time however to assess its analytical appropriateness and scope. The objectives of this paper are twofold: (i) to discuss the limitations of the analytical features characterizing the paradigm, and (ii) to propose the foundations of a more comprehensive approach to understand human-nature interactions, based on the notion of "relational models". The paper discusses to what extent the particular way of looking at human-nature relations underlying the ecosystem services paradigm provides appropriate analytical tools that can actually advance our understanding of the drivers of socio-environmental transformations and the design of policy options to deal with them. It also discusses and elaborate on an alternative paradigm. The ecosystem services approach has been definitively successful is renovating the discourse of environmentalism, mobilizing new resources and creating channels of
dialogue with the private sector, and between different academic fields. This has allowed environmental issues to regain an important position in the global policy agenda. However, due to internal inconsistencies, despite its great communication power, the ecosystem services framework can be deemed as analytically problematic. When seen as a accounting system, the ecosystem services framework suffers from different types of inconsistencies, that I have classified into three main categories: (a) Relational inconsistencies, which refer to problems with the classification of ES and the relations between the classification categories. I argue that the category "supporting services" is particularly problematic, since they refer to critical processes influencing services within other categories of classification, such as ‘provisioning’ or ‘cultural’, but also the maintenance of the ecosystems themselves. The fact that ecosystems are self-regulated (creating the conditions for their own existence) makes double-counting in ecosystem services accounting unavoidable. Part of the problem is that the ES framework mixes up ‘benefits’ (outcomes) and ‘processes’. (b) Scope inconsistencies, which refer to the fact that the ES framework disregards ‘ecosystem disservices’. However, such disservices are pervasive and influence significantly human societies. (c) Lastly, ontological inconsistencies refer to the problems of the assumption that the great diversity of dimensions characterizing human culture and their interactions with ecosystems can be somehow reduced to the notion of ‘services’, and therefore fit within an utilitarian interpretation of human-nature relations. In this regard, the category "cultural ecosystem services" seems particularly problematic, since not all domains of human culture are compatible with such utilitarian interpretation. As an alternative paradigm, following Fiske (1992), I argue that human relations (including relations with nature) can be explained by a combination of certain universal elements. The proposition is that the elements are universal, but the ways in which they are used to frame social relations are contextual. Each of these fundamental forms represents a distinct type of representation, used for interpreting experience and guiding action in a particular social context. Each of them has its own expectations, customs and normative conventions. That is, its own "grammar", which is not transferable to any other model. A further proposition is that even though trade-offs of values within one relational model usually do not represent a major problem, trade-offs between relational models are often are seen as impermissible (since there is not relational metric for comparison), resulting in moral dilemmas or taboos. Trade-offs between distinct relational models usually threaten social relationships and society. Even though this theory was developed for social relations, its basic principles can also be applied to human-nature relations. I propose four fundamental "relational models" framing human-nature relations: Utility, affinity, beauty, threat and domination. The ‘utility’ category basically refers to a utilitarian and calculative vision of ecosystems (based upon cost-benefit ratios). The ‘beauty’ model refers to relations founded on an aesthetic experience. The “threat” model refers to negative feelings towards ecosystems, based on fear. The last category (domination) has as a core element the notion of human superiority and the entitlement of human societies to occupy the (land or marine) space. This model is not necessarily driven by utilitarian calculations but rather by a strong preference for intervened spaces and an obsession for ‘occupation’. The paper describes and elaborates further the "grammars" of these models and relate them to different modes of influencing social decision making.

Socio-ecological feedbacks in tropical deforestation and land-use intensification - an agent-based modeling approach
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Deforestation in the tropics - with vast consequences for the ecosystem and climate - is mainly driven by subsequent land use. Land-use decisions take not only into account environmental dynamics and economic constraints but are also highly influenced by social processes. In this study, we introduce a simple agent-based model to explore the interplay of deforestation and the intensification of land use...
in the Brazilian Amazon taking environmental, economic and social dynamics into account. We present a comprehensive analysis of the model and discuss conditions that foster sustainable land use.

Extended Abstract

Modes of management and technology play a crucial role for agricultural productivity. In areas where land is easily available and accessible, poor production technologies can lead to excessive use of land. Here, the adoption of new technologies is crucial to use already converted land more intensively and ease pressures on ecologically valuable areas. However, the adoption of very intensive agricultural technologies can also come at environmental costs. It is thus crucial to spread, adopt and utilize agricultural technology that is both productive and sustainable over long time scales. We take the Brazilian Amazon as a prominent example region to explore the interplay of land-use decisions with environmental and economic dynamics in the process of land-use intensification and frontier expansion.

Deforestation in the Brazilian Amazon is mainly driven by the expansion of pasture land for extensive cattle ranching to satisfy increasing domestic and international demands. Pasture run-down and following land abandonment further increase the pressure on other potential pasture land and often result in the expansion of deforestation frontiers into pristine forests. Large areas of the Amazon that were formerly deforested and used as pastures are now covered with secondary vegetation (Perz and Skole, 2003a; 2003b). The literature discusses various reasons for the run-down of pastures: limitations in phosphorus and nitrogen (Serrao, 1979; Myers and Robbins, 1991), weed invasion, pests, compaction, and erosion (Landers, 2007).

Intensification of livestock production, especially better pasture management, can slow pasture run-down, increase yields and thus potentially reduce deforestation. There are a already variety of government programs aiming at the adoption of yield-increasing technology (Cohn, 2011). Given that there are huge data gaps regarding the environmental and economic dynamics and the resulting biomass flows through the livestock system, the implementation of policies may result in unintended consequences. This also makes the comparison of the effectiveness of different management techniques, technologies and policies difficult. Therefore, the effectiveness and possible outcomes of policies to foster intensification are highly debated in the literature. Some authors deny that intensification policies are a viable option to spare forests as long as they are not a scarce resource (Kaimowitz and Angelsen, 2008) while others insist that intensification has an effect if only supported by the right policies (Cohn, 2014). As Latawiec et al. (2014) show, the answer to this question depends on the large extend on the political and environmental circumstances of land-use intensification.

The aim of this study is to present a concise modeling approach that enables to gain insight into these dynamics and explore the following questions: What are the trade-offs between intensified and extensive land uses and what are leverage points to bring the system from one state to the other? How do social imitation processes interplay with economic considerations? Under which circumstances can intensification reduce deforestation and pressure on forests?

We use an agent-based modeling approach to study these questions. Agent-based models (ABMs) have been widely applied to describe coupled socio-ecological systems (Schlüter et al., 2012). In the context of land-use science, ABMs were mostly developed for small study regions, taking into account local specificities and fitting behavioral patterns to data acquired in the field (Parker et al., 2008). This model however aims at applying at regional scales and for this purpose abstracts from many local specificities. The collection of agents in the model may be viewed as a statistical sample of real-world agents, and thus allows to take into account agent heterogeneity that other approaches may not be able to capture.

The proposed model consists of a collection of agents that represent cattle ranchers. They interact with the local environment via decisions to convert forest into pasture land and manage this pasture. Deforestation and land abandonment is traced by simple land-cover succession equations, which keep track of land areas with different land cover. Ecological dynamics consider the evolution of pasture productivity depending on pasture management and deforestation and tree regrowth.
Agent decisions are modeled as heuristic strategies. Decisions depend on economic constraints and consider whether the agent adopts an extensive or intensive strategy. Here, the extensive strategy corresponds to traditional cattle ranching with fallow periods and slash-and-burn fertilization and the intensive strategy describes input intensive cattle ranching, e.g., with industrial fertilizers and improved pasture seeding. We assume that the decision to adopt a certain production strategy only depends on the agent’s own success and the comparison with the neighbors through imitation. This reflects the observation that technology adoption in agriculture is not only based on economic considerations and social contacts between economic agents play an important role, e.g., through the spreading of information and imitation of successful practices (Berger, 2001; Maertens and Barrett, 2012). The choice of the production strategy is therefore modeled as a social process: Agents are located on a geometric network representing neighborhood and acquaintance relations and imitate the successful strategies of their neighbors.

Our model results suggest that intensification can even accelerate deforestation if there are no anti-deforestation policies in place. We will expand these results and give an outlook at possible extensions of the model and applications to issues such as compliance with Brazil’s Forest Code and feedbacks from changes in climate and ecosystem transitions to savanna.

References
1. Context, motivation and research questions

During the 1970s and 1980s in Costa Rica, Nicaragua, Honduras, Ecuador and Philippines, the Standard Fruit Company (now Dole Food Company) intensively used Dibromochloropropane (DBCP) in the banana plantations. The DBCP—also known as Nemagon or Fumazone as marketing brands—was a chemically produced by Dow Chemical and Shell Oil Company in 1951, the aim was to kill worms, which attack the roots of the banana plants. This nematicide, was used around the world and in other monocultures such as pineapples and sugarcane but there is not enough data to incorporate them into this comparative research.

In these five countries, the banana workers (mostly landless peasants and migrants from other rural areas) had direct exposure to the chemical and only after years of exposure, they realize serious health damage. Most of them were unable to conceive children and they complained affectations in the respiratory system, skin allergies and others temporally health damage (Boix, 2007; Rankin, 2014; Thrupp, 1991). Furthermore, after months of uncertainty, people began to observe in their communities an increasing number of premature abortions, birth defects or congenital anomalies arguing together -community and doctors- that something abnormal was happening. However, Standard Fruit Company provided no data or information about the damages that the chemical produced in health. Knowledge about the impact in the number and motility of sperm, accounting for infertility and other possible damages were already proved by Dr. Torkelson in 1961 (Torkelson, 1961). Nevertheless, “despite the alarming findings, Shell and Dow managers decided not to do further testing and continued marketing plans” (Thrupp, 1991: 741). People realized that the chemical was the cause after years of exposure but damage was irreversible and still being nowadays. In this sense, the control over knowledge, information and technology by the manufacturers and by the bananas producer-companies played a role in damaging these thousands of victims in the past and nowadays. This paper describes and compares the struggles unfolding in each country claiming for justice. A timeline of events by each country explaining from the beginning of application of DBCP to effective prohibition is one of the outcomes of this paper. The Environmental Protection Agency (EPA) restricted its use in 1979; and it was banned in the United States and Costa Rica in 1979, followed by Philippines in 1980 and Nicaragua 1993.

The comparison is done in terms of mobilizing forms (judicial activism (in national and international courts), street protests, networking and for instance the birth of social movements across Central America). And, the outcomes (legislative changes, victory/ failure in court decisions, institutional changes, compensation for monetary value of lost health.) helping to answer the following research questions: Why after years of struggle and resistance thousands of banana-workers have not reached justice?, What does justice means in these cases where human-health damage is irreversible? Finally, as nowadays many agro-toxics with a high level of uncertainty of the impact in health are used around the world, a reflection about, why did these cases not set a precedent in the methods for production of monocultures?

After years of research, sterilization of workers was scientifically proven (Slutsky, 1999) and based on these argument Central American workers sued against the Standard Fruit Company, Shell Oil Company and Dow Chemical in 1993 (Siegel et al, 1999); some of them received an economic
compensation, others are still waiting and many others died without any compensation. According with the medical explanation, “DBCP enters the bloodstream when it is absorbed through the skin and through the lungs. When deposited by the blood cells in the testes, it damages and destroys the spermatogenic cells (for reasons not fully understood). Over time, this results in atrophy of the cells that produce the sperm and reduces the numbers and motility of sperm, accounting for infertility”. (Thrupp; 1991:737). However, other impacts that lay knowledge discovered are not taken into account. Psychological damages and specific impacts in women are disregarded; they are not even part of the debate. In my opinion, there’s a lack of justice that should be revise in order to set a precedent to understand the dynamics of the chemical industry and monocultures around the world. The DBCP cases around is an example in how the power and control over knowledge is used (and hidden) in order to increase the economic benefits of an industry (banana industry in this case) and the injustice is identified only years after.

2. Literatures and contribution

This paper proposes a debate on the value of human health in different countries, using similar episodes (DBCP contamination in banana plantations causing thousands of male sterility cases) in five tropical conflicts around the world and in different geographical settings (America and Asia). The paper raises very practical issues of environmental injustice, liability in national and international context, corporate social responsibility, economic valuation of damage to human health, cost shifting. Up to now only single-country scholarly studies have been done, e.g. in Costa Rica (Thrupp, 1991, Sass, 2000, Mora 2012) and Nicaragua (Mora, 2012) but a systematic comparison across countries in these topics is lacking. This paper compares the variables listed below (Table 1), drawing conclusions relevant for ecological economics, political ecology and studies of health justice. The intangible damage and the slow violence (Nixon, 2011) against these communities is an opportunity to re-think about environmental justice and specifically health justice.

3. Methods used

The method used is the case study and a comparative analysis between five cases around the world in which Standard Fruit Company used DBCP in their banana plantations. In addition, in which, health damage was notified and proven by the communities in processes of “popular epidemiology” added by scientific experts (Brown, 1992; 1993). I use the EJATlas entries on DBCP cases in the five countries (I filled by myself), to compare their differences and similarities. The paper revises secondary sources (newspapers, peer reviewed papers). I also carried out interviews with affected people in and I provide an analysis of qualitative and quantitative variable as shown in Table 1.

Table 1. Variables of comparison

Qualitative variables

Name of the companies implied
effects of the DBCP scientifically proven
Effects of the DBCP according with the popular knowledge
Application method (injection/irrigation/other)
Forms of mobilizations
Outcomes

Quantitative variables

Number of workers affected (approx.)
Dates when DBCP was used
Dates when people realize damage in health
Quantity of the chemical used
The challenge of science-policy interfacing in the European context and EKLIPSE’s approach to it

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Policy development in the environmental sector requires credible, timely, available and relevant scientific knowledge. In particular this is the case for knowledge on biodiversity and ecosystem services in times of accelerating losses. While there are still major gaps and needs in terms of data coverage and accessibility (Wetzel et al. 2015), monitoring and indicator development (Geijzendorffer et al. 2015) and understanding of the linkages between biodiversity, ecosystem services and human well-being (Balvanera et al. 2014), major initiatives have been established at the global level to address this challenge. They include the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) as a new global science-policy interface (SPI).

In the European Union there has been a long standing discussion over how to better organise the science-policy interface (SPI) on environmental issues in general and on biodiversity and ecosystem services in particular (Tinch et al. 2015). In 2006, the EU Biodiversity Strategy for 2010 called for “a support mechanism on biodiversity expertise”. Recently, such claims for improving knowledge-informed policy making have gained further momentum. For example, the 7th Environmental Action Plan (7th EAP), highlights the need to “improve the knowledge and evidence base for Union environment policy”.

These claims are based on the perception that environmental policy and decision-making was not adequately informed by existing knowledge, or that the processes to make such knowledge available to policy- and decision-makers were unstructured or missing.

At the same time, it is widely acknowledged that issues regarding biodiversity and ecosystem services are complex and often depend on a multitude of drivers, pressures and societal responses, requiring a broad array of knowledge from different stakeholders to understand and address them (Young et al. 2014)

Although a number of approaches to synthesize scientific findings on specific issues are well established (e.g., (Dicks et al. 2014, Pullin et al. 2016), the complexity of the issues related to biodiversity and ecosystem services and the different kinds of questions that need to be addressed require a better articulation and mutual understanding between knowledge producers (including scientists) and knowledge users (including policy-makers). Moreover, scientific evidence may not always be strong enough to directly derive conclusions and recommendations of high certainty. As a consequence, there is a need for complementary approaches of knowledge synthesis that are flexible enough to meet the needs of knowledge users to inform decisions in difficult policy and societal contexts. In this context, working at synthesizing or co-constructing knowledge by associating scientists and other actors can increase the effectiveness of the interfacing activity between science, policy and society, going further than the usual mere translation of knowledge from providers to requesters, described as the classical linear-model of policy advice (Funtowicz und Ravetz 1994, Pielke 2007).

In recent years, Europe has seen major developments improving the knowledge base on biodiversity and ecosystem services. The European Environment Agency has set up the Biodiversity Information System for Europe (BISE). In addition, much scientific research and network development has been funded through the EU’s Framework Programmes (Matei et al. 2011). Although time-bound projects and networks are often unable to provide effective policy support (Nesshöver et al. 2013), they represent, together with other existing networks such as learned societies, a diverse community of knowledge holders (Nesshöver et al. 2014) and constitute the starting point when trying to improve the role of scientific (and other) expertise for better informed decision-making in Europe.

To address the challenge of improving the SPI on biodiversity and ecosystem services in the European Union and to support the development of IPBES the European Platform for Biodiversity Research
Strategy (EPBRS) coined the Network of Knowledge concept of “bringing together existing organisations and processes in a flexible, responsive and broad-based way […] helping to focus the support of science and scientists on the needs of those setting policy and taking decisions” through “temporary, ad hoc associations of diverse organisations to assemble and communicate knowledge adapted to the needs of clients” (EPBRS 2009).

Such a Network of Knowledge approach would explicitly address the specific situation in Europe, which has a broad and diverse landscape of knowledge holders across academia and other domains, who work and act at multiple levels, from the local, sub-national and national level, where most biodiversity relevant decisions are taken, to the European level, where major framework decisions like the Nature Directives or the Common Agriculture Policy are formulated (Nesshöver et al. 2016b). Such a Network of Knowledge working at multiple spatial scales, would also be flexible in terms of the scales and scope of addressed topics and could act as a regional complement to international bodies like IPBES that are currently lacking any sub-global structures (Beck et al. 2014).

This Network of Knowledge approach was recently developed for Europe in the BiodiversityKnowledge project (see Special Issue in Biodiversity and Conservation: (Nesshöver et al. 2016a)) and is now being implemented in a pilot phase in the EKLIPSE project (www.eklipse-mechanism.eu).

The talk will summarize the above mentioned challenges and lay out the elements with which the EKLIPSE approach aims at improving the current SPI situation in Europe on biodiversity and ecosystem services.

The approach that EKLIPSE develops has three main elements:
• Make use of the existing networks of knowledge holders from all fields of biodiversity and ecosystem services research (and beyond) and build a Network of Networks
• Establish a process to address decision-makers’ questions by synthesizing available knowledge
• Use horizon scanning and other techniques to identify research needs for the EU and other funders

All of these elements use established ways of communication and interactions (meetings, expert groups, online tools, mechanism website) and will combine them with less common approaches (methods of knowledge synthesis, online discussion formats and Science cafes) to make activities participatory, transparent, relevant and credible.

We will report from the first experiences of the EKLIPSE project since early 2016, outline the challenges but also the chances that arise, for example via open calls for requests, open calls of expertise, a broad toolbox of synthesis methods, and last not least a clear and transparent ethical infrastructures as foundation (Tremblay et al. 2016).

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Macro-economic and dynamic energy-economy-environment modelling: transition scenarios towards a low carbon economy
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Interaction between economy and environment, as understood by ecological economics, points out the subordination of the former to the limits imposed by the latter. This way, there is a growing concern about resource scarcity and climate change. Transition towards sustainability has emerged in the recent decades with a broadening body of literature (Markaard et al., 2012). The central role of energy in sustainability transitions (Fischer-Kowalski, 2011) has led the focus towards energy systems modelling. Energy related economy-environment models can be top-down, bottom-up or hybrid, according to the focus on the macroeconomic perspective, competition between energy technologies respectively and integration between both approaches, respectively (Hourcade et al. 2006). Efforts in economy-environment modelling have been done in the last decades, regarding different points of view. Oftenly, conventional models tend to assume a supply-side approach with a neoclassical production function and market-clearing optimization through general or partial equilibrium (Sterman et al. 2012). However, optimization reveals as an unrealistic approach to model complex, dynamic systems in which feedbacks and time matter (Capellán-Pérez 2016). Therefore, desequilibrium better fits with reality and System Dynamics (SD) appears as one of the most proper modelling techniques. The limits to growth (Meadows et al. 1972) is considered the milestone of economy-environment SD models that are continuously improving. SD is a methodology able to capture feedbacks between variables and the dynamic, intertwined, non-linear relations between variables. Furthermore, demand-driven models –unlike supply-side models- are usually sustained in post-keynesian economics assuming desequilibrium, meaning non-clearing markets, demand-led growth and supply constraints (Lavoie 2014; Taylor, Rezai, and Foley 2016). Nevertheless, the majority of demand-driven models account with a sequential structure instead of the feedback-rich structure of SD models. In addition, there is a lack of economic sectoral disaggregation which does not allow models
to capture the relevance of economic structure in energy-environment-economy interactions (De Haan 2001; James et al., 1978). For instance, we can expect different results from the current economic structure than those obtained after a transition where agriculture increases its weight. Finally, most of the SD energy-economy-environment models usually do not provide feedbacks from the energy to the economic system. Our objective is to overcome these limitations throughout an energy-economy-environment model SD-based, hybrid, economic-sectorally disaggregated, demand-driven and economy feedbacked. This can be seen as a contribution to the now emerging field of ecological macroeconomics (Rezai and Stagl 2016).

In this paper, we focus on the economy module of a wider model (MEDEAS) with a timeframe that extends until 2050. MEDEAS is modelled in SD and is structured in six interdependent modules (economy, energy, materials, climate, land use and social). i/ The Economy module core relies on i/ a demand function; ii/ Input-Output Tables (IOTs) and iii/ energy intensities. Our objective is to integrate and endogeneize demand –driven economic dynamics based on IOA and feedbacks, in order to overcome the limitations of energy-economy-environment models that rely on optimization, neoclassic production function and a sequential structure.

Sectoral desaggregation is possible thanks to WIOD database, providing a 35 sector-by-sector worldwide IOTs and environmental accounts (Dietzenbacher et al. 2013; M. Timer 2012). WIOD provide multi-regional IOTs from 1995 to 2011 that account with 40 countries plus an additional Rest of the World region. IOA is a framework where changes in final demand triggers direct and indirects effects –according to the matrix of technical coefficients (A matrix)- on sectoral intermediate consumptions (Miller and Blair 2009). Final demand evolution in MEDEAS comes from an econometric equation which relates sectoral annual final demand variation with evolution of population (exogenously provided to the model), income, cross demand between relevant sectors and lagged demand (endogenously provided by the module). This way, the model endogeneize the final demand trend which, in addition, can be modified by demand management policies. Environmental accounts allows to extend this analysis to final energy consumption, assigning the respective energy intensities of each sector by final energy types. According to the A matrix, sectoral monetary requirements are obtained and then, through the energy intensities, the final energy requirements of the economy. Finally, feedback between energy and economy is provided by the net energy supply, thus energy requirements are only met if it is sufficient.

Here we discuss some of the main challenges to overcome the difficulties associated to the module approach and structure. First of all, endogenous integration of IOTs in a SD model in order to catch structural changes in the A matrix is the main contribution to the energy-economy-environment modelling. These changes shall evolve due to the adaptive transition towards different energy systems, focusing on the transition towards sustainability. Secondly, the selection of the most relevant independent variables to construct the final demand function, taking into consideration non-stationarity of certain time series. Lastly, in order to achieve a real hybrid model is necessary to state the substitution criteria among energy sources when scarcity appears as well as between priority sectors.

Finally, as a result of the model implementation, the economic impacts of low carbon transition pathways will be assessed regarding sectoral evolution of monetary and energy demand, production structural change (throughout IOTs) and possible links with other socio-economic variables. Results will be provided under different scenarios and assumptions, in order to explore transition pathways towards sustainability. The inclusion of an economy module with the characteristics stated before, will allow to reach more realistic results than previous works. Non-clearing markets lead to actual rather than “desired” results under a previously defined non-realistic hypothesis. In addition, throughout a hybrid approach, a wider picture of the energy-economy system can be provided. Disaggregation by economic sectors and IOA allow the model to take into consideration economy structure in order to capture the different performance of economy when changes in the A matrix take place. Lastly, by making economic growth endogenous (due to energy scarcity and demand management policies), economy shall constraint the whole system in a more realistic way than usual exogenous growing demand.

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There is a growing concern that climate change is likely to have severe effects on the stability of the financial system. So far, most analyses have concentrated on the potential effects of climate change on the asset prices of fossil fuel companies and the performance of the insurance sector. Much less attention has been paid to the impact of climate change on financial stability as a result of its economic damages. This impact is non-trivial and equally important. First, the increase in temperature and the economic catastrophes caused by climate change could reduce the profitability of firms and could deteriorate their financial position. Accordingly, debt defaults could arise which would lead to systemic bank losses. Second, lower firm profitability combined with global warming-related damages can affect the confidence of investors, inducing a rise in liquidity preference and a fire sale of the financial assets issued by the corporate sector.
In this paper, we develop an ecological macroeconomic model that sheds light on these financial stability effects of climate change. The model builds on the stock-flow-fund model of Dafermos et al. (2017) which relies on a novel synthesis of the stock-flow consistent approach of Godley and Lavoie (2007) with the flow-fund model of Georgescu-Roegen (1971, ch. 9; 1979; 1984). The model is calibrated using global data and simulations are presented which illustrate the effects of climate change on the financial system.

Dietz et al. (2016) have recently investigated quantitatively certain implications of climate change for the financial sector. They use a standard Integrated Assessment model (IAM) and the climate value at risk (VAR) framework. Assuming that climate change can reduce the dividend payments of firms and, hence, the price of financial assets, they provide various estimates about the climate-induced loss in the value of financial assets. Our study moves beyond their analysis in three different ways. First, by relying on the stock-flow consistent approach, we portray explicitly the balance sheets and the financial flows in the financial sector. This allows us to model the climate-induced fragility that can be caused in the financial structures of firms and banks, a feature which is absent in Dietz et al. (2016). Second, we utilise a multiple financial asset portfolio choice framework which permits an explicit analysis of the climate-induced effects on the demand of financial assets in a world of fundamental uncertainty. This allows us to capture the implications of a fire sale of certain financial assets. This is not explicitly considered in the model of Dietz et al. (2016) in which climate damages do not have diversified effects on different financial assets. Third, the financial system in our model has a non-neutral impact on economic activity: credit availability and the price of financial assets affect economic growth and employment. Accordingly, the interactions between economic performance and financial (in)stability are explicitly taken into account. This is crucial since the feedback economic effects of bank losses and asset price deflation can exacerbate climate-induced financial instability (see Batten et al., 2016). Dietz et al. (2016) utilise a neoclassical growth framework where long-run growth is independent of the financial structure of firms and banks. This leaves little room for the analysis of the macroeconomic implications of climate-induced financial problems.

Our simulation results illustrate that in a business as usual scenario climate change is likely to have important adverse effects on the default of firms, the leverage of banks and the price of financial assets. These effects are more pronounced towards the end of the 21st century and the beginning of the 22nd century. Remarkably, this climate-induced financial instability causes problems in the financing of green investment disrupting the transition to a low-carbon and more ecologically efficient economy.

An additional contribution of this paper is that it examines how monetary policy could reduce the risks imposed on the financial system by climate change. Drawing on the recent discussions about the potential use of monetary policy in tackling climate change (see e.g. Murphy and Hines, 2010; Werner, 2012; NEF, 2013; Rozenberg et al., 2013; Amin et al., 2014; Barkawi and Monnin, 2015; Campiglio, 2016), we examine the extent to which a global green quantitative easing (QE) programme could ameliorate the financial distress caused by climate change. This programme involves the purchase of green corporate bonds. Our simulations show that the implementation of a green QE programme can reduce climate-induced financial instability and restrict global warming. However, green QE does not turn out to be by itself capable of preventing a substantial reduction in atmospheric temperature. Even with an optimistic assumption about the sensitivity of green investment to the divergence between the green bond yield and the conventional bond yield, global warming is still quite severe. Hence, many other types of environmental policies and institutional transformations need to be implemented in conjunction with a green QE programme in order to keep atmospheric temperature close to 2 degrees Celsius and prevent climate-induced financial instability.

References
INTRODUCTION
This paper uses future scenarios developed in Svenfelt et al (2016) and develops the agricultural sector in each scenario. The scenarios in Svenfelt et al (2016) describe a Sweden in which GDP growth is no longer a policy goal. Instead, success is measured using four sustainability goals, all of which are fulfilled in the four scenarios. This is a practical interpretation of what a degrowth society could be like, following the definition of by Demaria et al (2013) that degrowth on the one hand means a reduced throughput of material and energy, and on the other hand a shift of focus in a society’s aims and ways to organize.

The aim of this paper is to explore farmers’ perceptions of challenges and possibilities for the agricultural sector in Sweden with two future scenarios: Local self-sufficiency and Automation for quality of life, that both fulfil four sustainability goals with different measures. Backcasting is a method for broadening our minds, not forecasting the future. The scenarios are not predictions, they are not probable or preferable, but they are to be seen as “what if” scenarios, to broaden our minds and start thinking about which changes in society that would be needed in order to reach the scenarios.

This paper starts with an evaluation of possible consequences that the four sustainability goals could have for the agricultural sector. Future images of the agricultural sector in the two scenarios Local self-sufficiency and Automation for quality of life are then developed, based on focus group discussions with farmers. We then discuss common as well as scenario specific challenges and possibilities for

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agriculture.

THE SUSTAINABILITY GOALS AND THEIR CONSEQUENCES FOR AGRICULTURE

The research project has developed four sustainability goals, of which two have an environmental focus (addressing the environmental limits in Raworth’s (2012) Doughnut economics framework) and two a social focus (the social foundation in the Doughnut framework (ibid)). The goals and possible implications for the agricultural sector are outlined below.

Goal 1, climate: “Sweden’s consumption may not contribute to more than 0.82 tons CO2 equivalents per capita and year. Furthermore, Sweden does not use fossil material in production processes or as fuels.” (Fauré et al., forthcoming)

This goal consists of one consumption based and one production based indicator. Food consumption represented approximately 20 per cent of an average Swede’s emissions of greenhouse gases in 2003, or slightly more than 2 tons CO2 equivalents (Swedish EPA, 2008, p. 33). If agriculture had the same share of emissions in 2050, it would mean 164 kg CO2 equivalents per person. The share is however possibly larger in the future scenarios, since there is an absolute lower limit of food need. However, even with a larger share, agricultural production would need to sequester much more carbon (and/or emit less) than today to reach the goal.

Regarding the production based indicator, fossil fuel, JTI (2010) calculate that the Swedish agricultural sector uses approximately 3.11 TWh energy directly, plus around 3.64 TWh indirectly (i.e. 6.75 TWh). Of the indirect energy, 2.31 TWh is the use of chemical fertilizers. 35 per cent of the consumed food is imported (SBA 2012 & 2015), why the total energy use attributed to Swedish food consumption should be around 9.11 TWh in 2016, if the same level and proportions are used in foreign agricultural production. Most of this energy is fossil today (JTI, 2010), implying that the goal requires very different energy solutions from today.

Goal 2, land use: “The land available for each Swedish resident’s consumption may not exceed the global biocapacity. With a global population of 9.7 billion people in 2050, this would be 1.24 global hectares per person.” (Fauré et al., forthcoming)

The total land area in Sweden is 41 million hectares. But that does not imply that the Swedish territory can cater for 33 million inhabitants (41 million hectares divided by 1.24 per person), since not all land is usable. Up to 4 million hectares of agricultural land have been cultivated in Sweden (around 1920) and 2 million hectares of pastures (around 1870). Sweden is scarcely populated, with slightly more than 9 million inhabitants in 2016. Hence, in the sustainable future of 2050 the agricultural sector could either produce much more than the population has the “right” to consume (according to the 1.24 hectares per person rule) and export the surplus, or through allowing for a large immigration have a much larger population, perhaps 25 million inhabitants, and produce food for them.

Goal 3, power, influence and participation: “All Swedish residents must be entitled to influence and participate in political decisions and choices affecting their lives. This must not be limited by e.g. gender, sexual orientation, ethnicity, religious views, age, disabilities or income.” (Fauré et al., forthcoming)

This goal implies having some type of democratic process or involvement to affect how food is produced, agreeing on regulations for food production. The processes would probably differ between the scenarios. In the Local self-sufficiency scenario it might mean that everyone is obliged to participate in growing the food they eat.

Goal 4, prosperity and security: “All Swedish residents must have access to resources that can create possibilities for housing, education, and social security as well as opportunities to achieve good health. These resources will be divided justly.” (Fauré et al., forthcoming)

On an individual level, this means that all Swedish residents must have access to enough and nutritious food. On the national level, it means secure and stable access to food for all residents. This goal could one the reason why it is not possible to close down the Swedish agricultural sector and import all food in any of the scenarios.

TWO IMAGES OF FUTURE SWEDISH AGRICULTURE: LOCAL SELF-SUFFICIENCY AND AUTOMATION FOR QUALITY OF LIFE
This section is based on the interactions and discussions in four focus groups with farmers. Local self-sufficiency: A localized society where the Swedish citizens are spread out in small societies or villages over large parts of the country. Most people work part or full time in the agricultural sector. Most daily consumption is done using local currencies. Automation for quality of life: Robots and machines do most of the work in society, paid labor comprises of on average ten hours per week. There is a basic income for all Swedish citizens. Food production is also automated in large scale facilities. “Super foods” have been developed, ensuring nutritious food for all.

Making Finland an exemplary region in nutrient recycling – Is funding development project the way?
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This case study explores how framework program and its development projects functions as a transition maker towards nutrient recycling (NR) practices in a context of fertilizing in Finland. Nutrient recycling is much discussed and developed field at the moment, especially since Finland aims to become an exemplary region in practicing NR. Nutrient recycling is one of the spearheads in the movement towards Circular Economy (CE) in Finland (Sitra 2015). In general level, CE means shift away from linear “take-make-use-dispose” economy to more circular one (Jurgilevich et al 2015, 2). CE thinking has gained growing prominence in Finland last three years, since several influential actors have showed enthusiasm towards CE thinking in their speeches, but it should be noted if CE is to break through, grassroot level needs to develop and adopt CE practices. (For example: Sitra 2014 & Sitra 2016)

Starting point of the enthusiasm towards NR is Baltic Sea Action Summit (2010), where Finnish government promised to take intensive measures for making the state water quality of the Finnish Archipelago Sea good by 2020. In addition, to transform Finland to an exemplary region in a field of NR (Ministry of the Environment 2015). This commitment led to startup of so called RAKI program (Programme to promote the recycling of nutrients and to improve the status of the Archipelago Sea 2012–2015) in the Ministry of Environment. RAKI program has founded 52 development project, which aims to further NR technologies and practices. (Ministry of the Environment 2014, 2) My research focuses on how RAKI program and its development projects work as a transition maker in the context of fertilizing.

Research problem takes shape from the question how transition is driven by funding project which develop technologies and new practices. More specifically, how set of single projects, which have very specific theme, objectives, work methods and schedule, together add up to the transition, even though projects could be seen as a potentially very discontinuous and complex way to drive transition forward. I will investigate this problem with one research question:
- What kind of change this type of framework program and its development projects produces in the context transforming fertilizing practices to be nutrient recycling based?

Before going through my conceptual framework for analyzing RAKI program and its projects I will shortly go through what NR entails. Currently dominant fertilizing system is based on unsustainable artificial fertilizers and system functions in open ended and linear manner. NR thinking aims to close the loop. First of all, Agriculture is critical field for nutrient recycling since it consumes practically all the nutrient recycling products. At the moment manure, sewage, sludge, water, side flows from industries and some plants are seen as raw material for recycled nutrient products. This connects wide range different fields and actors to emerging markets of nutrient recycling, for example wastewater treatment sector, energy production, food and forestry industries, waste management and of course, agriculture. What is noteworthy connection of these different fields and industries happens in quite
local scale. Since objective is to practice fertilizing more sustainable way, movement towards NR is concrete case of co-evolution of technological, social and ecological systems. As a tool for analyzing how RAKI program adds up to transition of fertilizing practices, I will use Strategic Niche Management (SNM) (Markard et al 2012) and project proliferation discussions, which is part of governance discourse (Sjöblom 2009). SNM is a subdiscussion in (sustainability) transition framework (Markard et al 2012). Central concept in SNM is niche has been defined as a protected space where innovations are nurtured and experimented in co-evolution with technology, user practices and regulatory structures (Schot and Geels 2008, 583), for example government subsidized demonstration project (Geels 2011, 27). According to Heiskanen et al (2015, 347) underlying assumption in the SNM approach is that active shaping of the technological niches could enhance the growth of new sustainable technologies. SNM discourse has pointed out creation of visions and expectations, building up diverse actor network around niche innovation, and learning processes as essential processes how niche innovation could be made successful (Geels 2011, 27—28). The objective of mixing project proliferation discussions with SNM is to broader SNM research from niche-internal processes to include more outward-oriented analysis (Raven et al 2016, 178).

Practically, in all sectors of society use of project type of development work has increased, and that has its effects. Projects are seen as symbols for efficiency, innovation and adaptability. Ideally projects are tools which efficiently find solution in a flexible manner, even in unforeseen situations and provide means of co-operation, policy coherence and public participation (Sjöblom & Godenhjelm 2009, 174, 176). Projects can vertically “trickle down” global or national regulatory framework and objectives to be implemented to local level (Andersson et al 2006, 95). This could function other way around, actors in a grassroots level could, for example, provide information to administration through the project or in best case have fruitful dialogue. Horizontally aim is to commit semi-public and private institutions in policy process and this way eliminate contradictions and tensions between different policies (Andersson et al 2006, 94—95). As a disadvantage of this development Andersson et al. (2006, 93) claims following: “main consequence of these developments is an increasing complexity within the politico-administrative system both in terms of the administrative procedures and the relationships between involved actors”. Another practical issue with project proliferation is how well the knowledge transfers between non-permanent (project organization) and permanent structures (administration, for example). In worst case project lives as long as there funding, results are gathered in a report which is forgotten in the archives (Andersson 2009, 195).

So far I have analyzed programs background, guiding and assessment dossiers, and 23 final reports of projects. In addition, I have interviewed the responsible officials of the RAKI programme in Ministry of Environment. Tentative findings point out RAKI program, and the NR movement as a whole, has been successful. RAKI program has gained sequel called RAKI II, NR has been lifted as a top initiative of current government and projects have produces promising and useful results. Analysis of the project also conformed the importance of expectations, networking and learning as processes that give niche innovation momentum. Clearly NR is a complex field, and developing it through project add more complexity and possible discontinuity to it, but still major change has started build its foundations. Though, there is a long road ahead before Finland can call itself an exemplary region in NR.

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More than 180 Parties of the United Nations Framework Convention on Climate Change (UNFCCC) met in Paris from 30 November to 12 December 2015 to negotiate a new global and legally binding deal for addressing climate change mitigation. The pact represents a fundamental milestone in a political process, which has seen little tangible progress over a long period of international climate negotiations. It has culminated in the first truly global international treaty bringing together all countries into a common cause so that a low carbon, resilient and sustainable future may be feasible. Recognising the historical, current and future responsibilities of the Parties, it involves a global long-term action plan committed to keep global warming well below 2°C and make efforts to limit the temperature increase to 1.5°C.

The Paris Agreement, as it became known, was entered into force earlier than expected on 4 November 2016. It will become effective from 2020 when approximately 105 Parties, accounting for more than 55% of the total global Greenhouse Gas (GHG) emissions, have deposited their instruments for the agreement ratification.

The document establishes the climate goals and the framework for international climate action but does not specify the details in depth. Most of the specifications have been postponed now until 2017 and 2018, as decided during the first conference session of the Paris Agreement in Marrakesh (COP22). For example, a decision on the rules governing market and non-market mechanisms that have been
set up under Article 6 (which provides the opportunity to expand the reach of carbon pricing) still have to be negotiated over the next years.

Combating climate change requires effective international cooperation along with the use of strategic policy instruments such as command-and-control (regulatory) but also market-based policies. Carbon trading has emerged as the preferable policy instrument to achieve greenhouse gases (GHG) reduction in many developed countries and developing countries have also started to consider it. Although not explicitly referenced as a market-based approach, the provisions introduced by Article 6 allow the use of international market mechanisms to comply with the Nationally Determined Contributions (NDCs). These NDCs have been prepared for each Party in order to publicly communicate the future trajectory of emissions and the domestic mitigation measures for achieving them. IETA (2016) indicates that the level of commitment declared by 91 Parties is conditioned on access to international markets. It considers also a mechanism to contribute to mitigation, and to support sustainable development (as opposed to CDM in the Kyoto Protocol) along with a framework for non-market approaches.

In the Paris Agreement, market provisions are accommodated into a framework based on a top-down voluntary cooperation that is generated by the exchange of Internationally Transferred Mitigation Outcomes (ITMO) between the Parties. In this context, the avoidance of double counting is essential for both a robust system of accounting and environmental integrity.

According to the cooperative approach, transfers may be conducted by linking carbon trading schemes or other national climate policies. In addition, other types of cooperation related to the existing elements of Article 6 can be adopted, such as clustered carbon market clubs, or even a more centralised approach via UNFCCC. Ultimately, engaging in voluntary cooperation is expected to increase mitigation ambition as well as promoting sustainable development.

There is increasing evidence from published literature of the opportunities for the adoption of market instruments in the climate policy agenda, particularly in relation to the linkage of carbon trading schemes. Linkage refers to policies designed to allow regional carbon regulations to interact in order to reduce or eliminate differences in the marginal cost of abatement between regions or countries. Linking cap-and-trade schemes is expected to create larger international markets and hence opportunities for coordinating efforts across jurisdictions.

Linkage of climate policies may take place in multiple ways. In a two-way linkage under the Paris Agreement, for instance, country A would have a net gain of units in relation to its national allocation plan and country B a net reduction (with an overall reduction in emissions). The ITMO would be created in country B due to its additional mitigation efforts under its NDC. On the other hand, country A would receive allowances from B. The financial flows would go from A, the buyer of units, to B, which invested in emissions abatement. Both countries benefit from the linkage: from the cost savings of emission reductions to the funds generated to re-invest in more reductions. To succeed in political, economic and environmental terms, the linked system has to reflect some degree of harmonisation, which includes an appropriate design of the scheme’s main features.

The more the interest in implementing carbon trading mechanisms grows, the more linkages are expected to emerge. Thus, whilst not providing rules for an international carbon price, the Paris Agreement made progress in terms of creating the foundation for expanding the reach of market-based mechanisms. In the light of Article 6 of the Paris Agreement and the cooperative approach, this paper aims to discuss the implications of adopting the aforementioned instruments, especially through the linkage of carbon trading schemes, for complying with the NDCs.

The study involves analysing how the cooperative approach might be accommodated and its effects on the flow of ITMO’s through analysis of the impact of factors such as carbon price, allocation method and emission reduction targets. This is looked at from three different linkage perspectives: a developed system – such as the EUETS, a proposed system for a developing country (i.e. Brazil) and finally, a linkage scenario between the two. Estimations presented show how the cooperative approach would operate so that we can understand if a linkage policy would be the strategy for helping both linked jurisdictions to achieve the NDCs and a low carbon economy.
We use the Economic Projection and Policy Analysis (EPPA) model in its most recent version, the EPPA6. It is a computable general equilibrium model able to project long run scenarios of world economic development and emissions along with the evaluation of the economic impact of proposed mitigation policies, welfare and equity measures.

EPPA6 is a dynamic recursive model that provides a representation of the global economy (Paltsev et al., 2005), which includes the regions here investigated (European Union and Brazil). This version is based on the social accounting matrices from the Global Trade Analysis Project Version 8 (GTAP 8) database, with a benchmark year of 2007 (Narayanan et al., 2012). The data is aggregated into 18 regions, 14 sectors and 14 technologies for generating both renewable energy or low emissions. It also incorporates additional data sources on energy use (IEA, 2012a), energy consumption (IEA, 2012b), CO2 emissions related to cement production (Boden et al., 2010) and CO2 emissions related to land use change (Riahi et al., 2007).

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Take back the fish! Re-introducing fish as a local food source on the Faroe Islands: a policy recommendation

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The world’s oceanic ecosystems are currently under severe pressure, mainly attributable either to overfishing or climate change. Ultimately, the forces challenging the marine environment can be identified as the same forces that challenge the terrestrial environment, namely the general process of industrial capitalism; cheap access to fossil power, and growth oriented political/economic strategies.

In this paper we explore how insights from ecological economics and related fields might contribute to facilitating social change and a sustainable transformation in the Faroe Islands, a small island nation with a large ocean territory, whose national economy has been dominated almost exclusively by industrial fisheries during the past half century.

Ocean resources and coastal fisheries have historically been of crucial importance both to Faroese trade and to the local subsistence economy, but as has been the case in many other regions of the world, large industrial vessels have replaced small-scale fisheries as fishing rights have been centralized with fewer and larger actors. At the same time the size of catches within Faroese waters has increased
dramatically. As fishing stocks are diminishing while the national economy remains heavily dependent on large catches, national debates are raging over adequate policies to address this eco-political paradox, currently in connection with the proposed reform of the Faroese Act of Fisheries from 1994. For the past two decades the distribution of Faroese fishing licenses has been characterised by the so-called grand-fathering principle, meaning that fishing licenses on an annual basis have been distributed to those vessels that were allocated catch-licenses in 1995, simultaneously ensuring these vessels a new ten year period of fishing license each year. The pelagic fishing licenses have been allocated according to an ITQ system, whereas the demersal fishing licenses have been allocated according to the so-called “fishing days system” (a scheme characterised by an attempt to keep an optimal balance between fishing effort and fish mortality, expressed in numbers of fishing days).

However, in 2007 a fundamental change in the Faroese Act of Fisheries was introduced, which stipulates that as from the first of January 2018 all current catch-licenses will expire. Since then, the question of what will happen in 2018 has triggered a debate between those in favour of a rent-seeking scheme where fishing licenses will be sold on an auction, and on the other hand those against a rent-seeking scheme.

Not surprisingly those against the rent-seeking scheme consist primarily of vessel owners and other people with strong affiliation to and/or direct economic dependence on the fisheries sector, while those in favour of a rent-seeking scheme are guided and motivated by an economic logic, that constructs Faroese people as owners of the Faroese ocean territory.

In this paper however, we explore and offer an alternative policy recommendation grounded in Faroese human/cultural ecology. Recognizing that market mechanisms are not adequate when it comes to crucial issues such as preventing overexploitation of natural resources and ensuring food security, we recommend the implementation of a policy that will ensure that all Faroese inhabitants be given direct access to their marine resources, and that such access should not, in this case, be sanctioned by general market mechanisms. In other words, all Faroese inhabitants should be given the option to receive a weekly allowance of fresh unprocessed fish, without having to pay money for it. With this we also aim to shift the debate on the reform of the Act of Fisheries from focusing solely on the distribution of the economic exchange value of fish, to a focus on fish as a historically and culturally significant local food source that all inhabitants of the Faroe Islands should have access to.

The policy that we recommend could affect Faroese socio-economic metabolism in a number of ways. It could contribute to Faroese food security by giving all Faroese inhabitants access to a local unprocessed protein-rich food source. Additionally, it could contribute to a re-localisation of the Faroese food system, diminishing Faroese dependence on global food imports and introducing the idea of access to nutritious and culturally appropriate food as a human right, thereby preventing food poverty and echoing principles of the food sovereignty movement.

Finally, we recognize that the viability of such policy-making largely depends on whether it resonates with existing cultural meanings and values in society. Based on previous work on the changing meanings and practices of fishing in Faroese environmental history, as well as the ongoing and long-standing Faroese tradition of pilot whaling, locally known as grindadráp – a practice and alternative economic system that has sustained Faroese metabolism for centuries – we argue that the cultural institutions which policies such as the one we are suggesting could be based on, are already in place in the Faroes. These institutions, which do not involve monetary transactions continue to ensure that all Faroese inhabitants are entitled to shares of the pilot whale catch for instance, and we argue that modern policy making would benefit from drawing inspiration from these alternative and diverse economies.

Ultimately by stressing and re-evoking the non-monetary meaning and significance that fish has historically had to Faroese metabolism and survival, and which can still be identified in traditional economic practices such as pilot whaling, we hope to inspire and contribute to the facilitation of a culturally meaningful sustainability transformation of the Faroese fisheries.
This session is not a session where scientific papers are discussed but rather wants to motivate the participant to reflect personally on the issue of individual and social vulnerability and its links to personal inner and outer change. Therefore a scientific abstract is not appropriate. Find instead some ideas about the short input (5 minutes) I will give at that session.

What are intra-personal conflicts?

As sustainability transition researchers, most of us hold pretty high environmental values, just like many of the people we are working with in the field. Yet all of us probably know these situations in our daily lives where we have different options, one of which is more environmentally friendly or socially just than the other, for example deciding on whether to fly to a conference or to go by train; or whether to search for organic food or to take the next best option around the corner.

Often, these kinds of inner (or intrapersonal) conflicts are accompanied by unpleasant emotions, like guilt, anger, or anxiety. In the worst case, they may hinder people who want to live more sustainably from doing so.

We define intra-personal conflicts not as discrepancies between what is and what ought to be, but between conflicting motivations. So we are talking about conflicts that arise when neither your abilities nor external opportunities prevent you from behaving sustainably or doing a certain thing. What prevents you is a conflict between incompatible motivations, which have their roots in specific needs or values.

A lot of conflict coping strategies exist, mainly rooted in the psychological literature, where problem-focused coping and emotion-focused coping is differentiated. One method addressing those conflicts by looking into the underlying needs and values of a certain conflict and by finding other strategies to meet those needs was developed by the author and her colleague Felix Rauschmayer (Omann and Rauschmayer 2011; Rauschmayer and Omann 2015) called THANCS. THANCS (Thriving for Awareness for Non-Conflicting Strategies) is a group process consisting of four steps, which allows the participants to deal with tensions that arise in trying to pursue a sustainable lifestyle.

Vulnerability, time issue, spaces of resonance:

Coping strategies can reduce the conflicts, and in some rare cases can delete them. However an uneasy feeling might stay and the coping mechanisms are only second or third best solutions. This is not necessarily a bad thing. If those strategies lead to a thorough individual reflection of the conflict and its roots, it might show the individual his/her preferences, belief systems or values and also show him/her vulnerability aspects of his/her personality. Those aspects might be leverage points for a real inner change, a change which transforms beliefs and values and thus allow a sustainable outer change, a change of behaviour and acting.

Addressing the conflicts, without necessarily solving them, makes us get in touch with our deeper levels of perception and see potential ways out of the wrong-versus-right duality of understanding. The exploration of conflicts could potentially guide the way to the culture of co-operation, co-creation and co-recreation much needed for a great transformation. We will explore this hypothesis further in the session at the conference.

Another hypothesis we want to discuss is the concept of vulnerability, and the crucial role it plays in spaces for experiencing resonance, resonance with ourselves, with other human beings or even with nature and objects. Being in resonance is an important virtue we need to develop and keep for facing the challenges humanity finds itself in a context of life acceleration as Rosa argues in his book (Rosa, 2015).

References:


Carbon and material footprint of public welfare services in Finland from the perspective of households
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Consumption-based carbon accounting has become an important method in evaluating the carbon footprints of cities and city residents (Lenzen et al. 2006; Baiocchi et al. 2010; Heinonen et al. 2013; Minx et al. 2013; Nässén et al. 2015). Thus far, the consumption-based carbon studies have focused on private consumption. However, the public spending forms a significant share of the overall consumption in the economy, but are offered as “free” goods and services for the residents. Especially, in the Nordic welfare states, the public spending may cause a significant supplementary carbon load on top of the private consumption-based carbon footprints. The purpose of the study is to examine the role of public welfare services in composing the carbon and material footprints of Finnish households. The study depicts how the use of public welfare services depends on the structure and socioeconomic characteristics of the households. Furthermore, the study depicts how the addition of public welfare services impacts the carbon and material footprints of Finnish households. Without the public welfare services, the consumption-based carbon and material footprints of welfare states are underestimated compared to countries, in which public services play less of a role.

The main research material is the Finnish Household Budget Survey 2012 and its supplement that includes the economic value of welfare services for Finnish households (Statistics Finland 2012). Both datasets are provided by the Statistics Finland. The public welfare services are allocated for Finnish households based on register information, interviews and administrative unit cost information. For example, based on school registers, the costs of education are allocated for people who are registered in schools (high schools, vocational schools, universities etc. separately). The used unit costs are vocation and faculty specific, but regional differences are not taken into account. The costs of basic education are allocated for all 7 to 15 year-olds according to the compulsory education age. Similarly, costs of health care and social services are allocated for households based on register information about the use of these services. Some details have been asked by interviews, for example the use of student health care services and education services for unemployment. The used unit costs for health and social services are national averages.

The dataset described above includes only the operational costs, not the investments on public welfare services. Thus, in the study, the investments on public welfare services in 2012 are assessed separately with regional and national accounts provided by the Statistics Finland (2016a, 2016b). While the economic value of public welfare service investments is lower than the operational costs annually, the environmental impacts are weighted due to the higher greenhouse gas (GHG) and total material requirements intensities (per euro).

The GHG emissions and total material requirements are assessed with a hybrid life cycle assessment (LCA) model based on the environmentally extended economic input-output (EE IO) model of the Finnish economy, called ENVIMAT (Seppälä et al. 2011). Hybrid LCAs generally combine EE IO analysis and process LCA data. The carbon footprint model that is used in the study includes process LCA data on housing energy and motor fuels. Ottelin et al. (2015) describe the details of the model.

The impacts of socioeconomic variables and household structure on carbon and material footprints of
welfare services are studied with multivariable regression analysis. The tested variables include income, household size, education level, occupation, age of the respondent and ages of children. Highly correlating variables are tested with separate models.

On average, public welfare services compose ca. 22% of household expenditure, 17% of consumption-based carbon footprint and 13% of consumption-based material footprint in Finland. The carbon and material footprints of welfare services increase with decreasing income, but this does not change the pattern that total carbon and material footprints decrease strongly with decreasing income. The paper demonstrates that the generally low-carbon public welfare services cause a small, but not negligible, part of carbon footprints of Finnish households. The result is similar for total material requirements. The addition of public welfare services increases especially the carbon and material footprints of young adults and families with children, because of public education services.

Public childcare services increase the footprints of families with children as well. Senior households have the highest carbon and material footprints of public health services.

The sustainability of public procurements has been under development in Finland recently (Finnish Environment Institute 2016). Decarbonising the welfare state is a broader goal in many developed countries (While et al. 2010; Gough & Meadowcroft 2011; Bailey 2015). Public welfare services play an important role as components of environmentally and socially sustainable modern welfare state. While the direct environmental impacts of public welfare services do not seem very dramatic compared to total consumption-based environmental footprints, it should be noted that aside their direct impact, environmentally sustainable public services serve as encouraging examples for consumers and companies.

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Governance of ecosystems and responsibility for the provision of natural insurance
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Ecosystems can buffer against sudden adverse events or incremental deterioration and losses, and thereby provide insurance value (Baumgärtner, 2007). Insurance value can be generated for example by vegetation cover reducing floods and nutrient runoff, or diverse tree species and age structure reducing forest pest outbreaks. However, because of externalities and ill-defined property rights as well as the resulting high transaction costs, the buffering capacity of ecosystems is poorly captured in risk and cost-benefit calculations of private actors and thus provided in sub-optimal amounts. Addressing the situation is a challenge for governance: rules, structures and processes will need to be established for incorporating the insurance values of ecosystem services to risk and cost–benefit calculations of actors making decisions on their provision. Developing new governance arrangements should not start from scratch, but rather build on existing practices and institutions (Primmer et al., 2015).

We suggest that the notions of protection and insurance, exogeneity and endogeneity of risks, and feasibility and non-feasibility of markets for risk help map the landscape of governing the provision of insurance value and challenges in it, and help indicate some of the key features of the institutional solutions in different parts of the governance landscape. We will explain below how.

It is possible to distinguish between protection – measures that reduce the likelihood that an adverse event occurs – and insurance – measures that reduce the magnitude of the damage caused by an adverse event (Pascual et al., 2015). For example, the establishment and management of a natural flood plain for reducing the likelihood of a severe flooding event provides (natural) protection. This kind of ‘natural insurance’ (Quaas and Baumgärtner, 2008) is provided in turn for example by urban green space, which reduces the adverse consequences of a heat wave. We suggest that the insurance value of ecosystem services can be considered to encompass both the protection and insurance components. It is manifested as the reduction of the risk premium a risk-averse agent would be willing to sacrifice to fully eliminate the risk (Baumgärtner, 2007).

Ecosystems can help buffer both against endogenous and exogenous risks through provision of insurance value. Endogenous risks are experienced by the owner or the manager of the area. Making use of natural insurance, a forest-owner or a farmer growing diverse species and varieties to control pests would make use of ecosystem services. These actions can be termed self-protection or self-insurance (Pascual et al., 2015). Exogenous risks are ones that exposed agents cannot themselves manage. An example is riverine flooding: land management and actions in the upper catchment could control the flood risk experienced in the downstream communities. We suggest that endogenous and exogenous risks present quite different governance challenges and demand correspondingly different governance solutions, and will detail these arguments in the full paper.
The management of natural insurance is often governed through sustainability principles and precautionary responsibilities. For example, gradually accumulating losses of nutrients or biodiversity are governed through best management guidelines and sustainability criteria designed and controlled by e.g. governments, certification systems or professional associations. Endogenous risks could be governed by agents themselves, in case they identified the insurance value. Rarely, however, is insurance value a major justification for sustainable management practices. Governing insurance value is slightly more explicit when governments place ecosystem management responsibilities on agents, e.g. by regulating water levels and flows or buffers strips, and by urban zoning or permits for commercial activities.

It is commonplace to refer to markets in discussions on the governance of ecosystem service provision. Feasibility and non-feasibility of markets for insurance value of ecosystem services is partly a matter of transaction costs (Paavola, 2007). Markets can emerge when transaction costs are low: this requires low cost information, uncomplicated forms of transactions, and some frequency of transactions. This is seldom the case with ecosystem services: their delineation and measurement is often arduous; they rarely have readily available market prices, contracting solutions for them are often complex and specifically crafted for the situation or context at hand, and the volume of transactions is often relatively small. This means that market-based solutions can be crafted for the easier parts of the governance landscape where the transaction costs are the lowest. In situations, where risks are large, stakeholders many and transaction costs higher, tailored negotiations would be more likely than off the shelf-solutions.

A prerequisite for the design of new market-based or other governance arrangements is an understanding of the actors who might be parties to transactions or targets of new regulation, i.e. the beneficiaries and providers. The beneficiaries of natural insurance can be the (potential) flood victims downstream or the neighbouring landowners who could suffer from pest infestations. Depending on the existing governance arrangements, the beneficiaries can hold rights to claim protection and insurance, or the landowners might be assigned management and precautionary responsibilities. Many times, however, the beneficiaries and providers are not clearly identifiable. The benefits remain public good-like positive externalities. This is why natural insurance cannot be conceptualised or developed without explicitly considering the rights and responsibilities of beneficiaries and providers. We map existing and required governance arrangements, by paying attention to the notions of protection and insurance as well as the allocation of rights and responsibilities of risk management.

Drawing on theoretical and considerations of these dimensions and illustrative risk examples, we examine the exogeneity and endogeneity of different insurance value functions of ecosystems and provide an initial evaluation of the feasibility of markets and other institutional solutions in governing risk management.

We elaborate on these conceptual arguments and their implications in the full paper, and tease out their combined implications. We also exemplify and detail our arguments by exploring two case examples of the provision of insurance value of ecosystem services. The first case examines the role of land use decisions upstream and downstream for the mitigation of urban flood risk. The second case examines the role of the maintenance and enhancement of biodiversity to avoid and mitigate the impacts of forest pests. In the case analyses, which draw on secondary material, we bring the conceptual reasoning to bear on the institutional settings, to tease out context specific insights for governance.

We conclude that investing in insurance value of ecosystems can be an attractive choice for landowners, cities or businesses relying on the buffering capacity of ecosystems, if the returns on the investment are tangible. But such choices require an understanding of insurance value and suitable governance arrangements. Market-based solutions such as PES schemes will help addressing the provision of protection and insurance against certain risks, while environmental regulation and public provision will be needed to buffer against other risks. We highlight how viable governance strategies need to be developed in a bottom-up way in consultation with providers and beneficiaries, in order to address the relevant aspects of involved socio-ecological systems in governance responses.
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Renewable energy development as a driver for regional economy’s greening
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Abstract
The article presents the results of original research, conducted to define most effective way to green regional economy under lack of energy. Potential of renewable energy resources, such as solar and wind energy, and biomass energy was estimated for some regions of Russia and Kazakhstan. The most effective way for regional development, which contributes both to reducing the GRP carbon intensity and environmental problems solution, is the recycling of agricultural waste with biogas production.

Keywords: renewable energy, biogas station, GRP carbon intensity

Introduction
The key role of renewable energy in sustainable development of regions is globally recognized, however, its implementation in Russia and CIS is inhibited due to sufficiency of hydrocarbon resources. In this regard, studies on renewable energy effectiveness are crucial to find solutions of environmental problems on regional level and to promote principles of a green growth. Perspectives of renewable energy use we investigated through the case studies of the most developed regions of Russia and Kazakhstan. The study aimed to assess environmental and economical effectiveness of different kind of renewable energy sources and also to identify their role in strategic development of the regions.

Methodology of Research
As it is shown in a number of recent scientific works – both theoretical and applied – renewable energy use can be considered from point of view of not only environmental effectiveness, but also economical one [1, 2]. This research was conducted using a variety of sources, such as scientific articles, statistical data, reports of industrial companies and agricultural farms, cartographic materials, space images and materials of own field researches. To assess a potential of solar and wind energies in the area we have analyzed the database of NASA [4]. The conclusion on renewable energy sources efficiency was based on calculating of GRP carbon intensity in cases of traditional and alternative energy systems.

Results
Regions of CIS’s countries are extremely different by their natural conditions, total areas, density of population and a level of economic development. Despite a “green” growth was proclaimed as a key trend in our economies modernization, the institutional preconditions for transition to a “green” economy are very weak in almost all regions. That’s why the natural conditions along with political will of the regional administrations are often a key incentives for renewable energy implementation. Belgorod and Kostanay regions considered in the study play an important role in national economies.
For example, Belgorod region is only 0.2% of the total area of the country, however, it ranks 26th in the list of 85 Russian regions. The main sectors of regional economy are mining industry, developing on the resources of the world’s richest Kursk magnetic anomaly, as well as agriculture, based on extremely rich humus soils – chernozem. The regional economy is characterized by a lack of domestic energy production: the region produces only 6.3% of the required volume, and the rest comes from the neighbouring regions where two Nuclear Power Plants (Kurskaya and Novovoronejskaya) are located. The current regional development has caused several environmental problems, such as air pollution from thermal power plants and transport in industrial cities (Stary Oskol and Gubkin cities), contamination of local rivers by agricultural waste, etc. Together with a shortage of energy they form a main challenge for future regional development. Kostanay region is quite similar by its type of economic development.

To evaluate perspectives of renewable energy development in these regions we have analyzed their natural prerequisites, such as the wind speed and the amount of solar energy. The areas has sufficient resources to generate energy through these renewable sources: the amount of solar radiation varies within its boundaries near 1200 kWh/m² per year, which is comparable with the southern regions of Russia, where such stations are widely used. Wind resources are less promising in Belgorod region, but much prospective in Kostanay region. Anyway, wind resources of both regions are available to produce energy.

The next step was the analysis of statistical data to calculate the volume of organic waste biomass generated in the agricultural sectors. Taking into account that renewable energy at all and biomass energy particularly is most often local by its nature [3], we concluded that the biomass resources have the greatest potential as a renewable energy source in the research areas. To prove this idea we considered a possibility to produce energy through bio-waste recycling on example of individual farms. Being the agricultural regions, Belgorod and Kostanay areas have great potentials for use and recycling agricultural production wastes, and especially livestock, for energy purposes. Such facilities are already in operation in some farms of the regions. Taking into account the share of Belgorod region in pork production (now exceeds 28% of the total in Russia), it could be a suitable decision to increase energy efficiency and to reduce traditional fuel consumption. The total amount of waste from farms in the Belgorod region is about 12.5 mln. tons of high-calorie mass per year. Taking into account the different moisture, this volume is enough for biogas production in the amount of about 250 thousand m³ per year.

Reducing energy intensity of the regional economy is one of the main criterion of energy efficiency at the way towards green economy. Recycling of all animal waste at the biogas stations in Belgorod region will let to produce about 2 bln. kW·h per year. Even if from 25 to 50 % of this energy goes to cover the demand of the plant, the total output of electricity will be about 1 bln. kW·h per year or enough to cover the electricity needs in all the farms of the region (721,1 million kW-h). At the same time the total GRP energy consumption, while maintaining the volume of production, will decline on 4,2% (from 24 to 23 kWh per 1000 RR). Development of biogas production will also contribute to improvement of quality of live through creation of new working places (for ~ 25 persons at every biogas station); small business development (transportation, construction materials) and municipal budget increase, etc. The same results we have also for perspectives to develop biogas production in Kostanay region of Kazakhstan.

Conclusions
The assessment of biogas production potential in the regions has showed that it can be considered as the most effective way to reduce fossil fuels consumption and to cover energy demand at the agricultural sector. Development of renewable energy will also contribute to environmental problems solution and raising the standard of living of the local population.
Indigenous traditional ecological knowledge and tropical forest conservation. A spatial analysis among Tsimane’ Amerindians (Bolivian Amazon)

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Major concerns for global environmental change are the rapid rate at which biodiversity is being lost along with cultural and linguistic diversity loss, both in the face of similar human-induced pressures such as agricultural expansion, logging, and large-scale infrastructure development, which are particularly worrying in tropical regions. Researchers have noted a significant spatial overlap between areas of high biological diversity and areas of high cultural and linguistic diversity, highlighting that such co-occurrence takes place mostly in areas inhabited by indigenous peoples across the tropics. The reasons underlying this spatial overlap are complex, differ among localities, and vary at different scales; yet, recent research suggests there could be some form of functional connection between such diversities. Though this fact remains poorly understood, it seems clear that certain indigenous cultural systems and practices favor the conservation of species and the ecosystems that host them, and vice versa.

In Amazonia, indigenous peoples have been actively managing forests for hundreds if not thousands of years, often safeguarding (and sometimes enhancing) the continuous availability of forest resources through different management strategies adapted to local ecological conditions and shaped by culture throughout centuries. Such indigenous forest utilization may create a forest-culture continuum within villages resulting in a biodiversity-rich domesticated landscape characterized by managed forests and agroforestry systems. For instance, swidden cultivation-fallow management systems are agroforestry systems often found among native Amazonian groups, which have significant ecological and economic benefits. Intrinsically tied to such management practices, indigenous Amazonians have developed an in-depth local environmental knowledge and a comprehensive set of beliefs as part of their cosmology. This practice-knowledge-belief complex, typical of indigenous and traditional societies worldwide, is what has been coined as traditional ecological knowledge (TEK) and underpins most claims about the role of indigenous peoples in conservation.

Several authors have emphasized the key role that indigenous territories play in forest conservation across Amazonia and the indigenous role in conservation due to factors such as managing their forestlands more efficiently, with lower intensity than non-indigenous peoples and a cosmology interwoven with forests and non-human nature. Nonetheless, the question of whether forest conservation across indigenous lands is typically the result of low population density, lack of technology, and absence of markets due to isolation, rather than of a real indigenous conservation ethics, remains controversial. In contributing to this debate, empirical studies assessing the potential role of indigenous TEK in forest conservation (as compared with other factors) may be particularly clarifying. Some studies have been recently published on the topic and it appears that indigenous TEK (broadly defined to include not just knowledge but also practices and beliefs) may make an important contribution to forest management and conservation in indigenous territories. However, previous studies addressing the importance of indigenous TEK for forest conservation have been carried out in one or few indigenous villages, which may make difficult to extract general conclusions even for the entire indigenous society studied. Further, lack of spatially-explicit estimates of both TEK and forest conservation at local scales has precluded the analysis of their spatial patterns to assess the degree of co-occurrence within a specific indigenous society, which is essential to better understand connections between TEK and conservation (as thus far all the studies evaluating the spatial overlap of biological and cultural or linguistic diversities have been made at regional, continental or global scales.

To address the knowledge gaps identified regarding the association of indigenous TEK and tropical forest conservation, this study set out with two objectives: (1) to test whether there exists an
The association between the level of tropical forest conservation and the level of indigenous TEK at the village level; and (2) to evaluate whether the spatial patterns of tropical forest conservation are similar to those of indigenous TEK (i.e., if there is a significant spatial overlap between both) at the local level. We hypothesize that indigenous villages with higher levels of TEK will have around them higher proportions of forest and lower levels of forest fragmentation. We conduct our study using TEK data from the Tsimane’ Amerindians (Bolivian Amazon), who constitute an ideal indigenous group because their TEK has been extensively studied, their villages exhibit a large gradient in TEK and cultural change and also in relation to forest conservation around them.

Raindrops keep falling on my roof: Sociotechnical imaginaries and practices of rainwater harvesting in Berlin
Ourania Papasozomenou

Studies of rainwater harvesting regularly highlight the rich diversity of technologies used to collect, treat and reuse rainwater in cities, but rarely devote attention to the equally diverse visions driving rainwater harvesting projects. The UrbanRain Project (Urban Rainwater Harvesting, from niche to mainstream: Challenges and opportunities for planning) examines the opportunities and challenges in planning for the up-scaling and expansion of rainwater harvesting systems, in three European metropoles, namely Stockholm, Barcelona and Berlin. There is consensus of the need for a more holistic and integrated urban water management that will include freshwater, wastewater and stormwater alike.

To enrich social studies research on rainwater harvesting, we present research findings from a city – Berlin – which has a long tradition of rainwater harvesting that has given rise, over the past 30 years, to an astonishingly varied range of schemes.

We conducted an online investigation and documented over 250 rainwater harvesting-related projects in Berlin that were executed from the 1980s onwards. Although this methodology has limitations (for example, not all projects are documented online), it is a first step in identifying, mapping and typifying the rainwater harvesting schemes realised in Berlin over the last 30 years.

From a database of over 250 rainwater harvesting projects we select, analyse and compare three case studies which encapsulate three distinct project types: public, grassroots and commercial. The public project concerns a big publicly planned, funded and executed social housing settlement, initiated in 1984 and finalised in 1994 (following the fall of the Berlin wall). It was the first time that ecological criteria were introduced as a prerequisite for acquiring funding for the realisation of such a scheme. The particular settlement wanted to illustrate that an ecologically friendly lifestyle should not be considered a luxury, and as such the settlement was destined to be a social-housing one, with affordable rents. Following the reunification of Berlin and its subsequent budget crisis, funding for the maintenance of this project came to a halt and it is now dependent on the residents for maintenance.

The grassroots project concerns an apartments’ building that was bought and renovated by an architect and an engineer in 2000. The initiators formed a joint-stock partnership whose ownership was then transferred to the tenants. The aim was to achieve at least 75% resource saving and, much like the public project mentioned above, to illustrate that socially and ecologically friendly living can be combined, and that it can sustainable at the long term. After 15 years, the initiators report 85% reduction of drinking water, 75% reduction of CO2 emissions and a very strong sense of belonging to a community and a commitment to the longevity of the project.

The commercial project concerns a multinational company that constructed its most environmentally friendly building in Berlin in 2010. Rainwater harvesting in this project is not a major component compared to other interventions in the building, like photovoltaics and wastewater heat recovery. It is however important as rainwater harvesting provides all the water needed for the toilets and for watering the plants in the building’s greenhouse, throughout the year.
The purpose of the paper is to illustrate not only the nature of diversity between the three, but also how each one reflects particular imaginaries of why we should be harvesting urban rainwater, how and for whom and how this informs practices of rainwater use.

To this end we have conducted over 30 interviews with residents of the two settlements (grassroots and public), public officials as well as representatives of the multinational company. Where necessary, interviews were complemented by additional questionnaires.

We have not yet completed the analysis of the interviews and the questionnaires and we cannot say much about the results, except that the projects are indeed very different in their vision and aim. A preliminary and sketchy conclusion might be that depending on the type of project, different factors are crucial for its success (support by the state, personal commitment, funds, networking). The analysis will help in understanding which factors, which conditions and which alliances are needed to mainstream urban rainwater harvesting.

In comparing the three cases, the paper interprets their differences in terms of the institutional settings in which they are each embedded, the particular actor alliances which they enrol and the urban materialities which they seek to reconfigure. The findings are framed conceptually in terms of socio-technical transitions and institutional change.

Social contagion in the adoption of solar photovoltaic technology: Evidence from Switzerland
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The transition towards a greener economy requires countries to switch from fossil to renewable sources of energy. Technology lock-in and resistance to the adoption of first best strategies such as carbon taxes (cf. Thalmann 2004; Bürgenmeier et al. 2006; Dresner et al. 2006; Sælen and Kallbekken 2011; Baranzini and Carattini 2014; Baranzini and Carattini 2016) have led the governments of some developed countries to heavily subsidize the adoption of renewable energy. This type of support policy comes with important costs. For instance the implicit carbon price of subsidies for adopting solar energy is in the order of 550 €/tCO2 for the period 2006–2010 in Germany (Marcantonini and Ellerman 2014) and of 1,000 €/tCO2 for the period 2008–2011 in Italy (Marcantonini and Valero 2015). Over the long run, however, subsidising renewables may create a virtuous circle of adoption through the mechanisms of social contagion, which makes adoption more likely where neighbours have chosen to install a given renewable energy technology. Social imitation and learning can thus lower the long-term costs of these schemes, in particular if social contagion survives to the phase-out of subsidies. Several governments are indeed planning to gradually reduce financial support for renewable energy. One question that has only be partly addressed by the literature is how large can these social effects be, and what are their specific determinants. In this paper we analyse the adoption of solar photovoltaic (PV) panels in Switzerland. We relate to a nascent literature trying to assess the role of peer effects in the adoption of solar panels. Bollinger and Gillingham (2012) are the first to demonstrate the existence of peer effects in the adoption of PV systems. Based on 85’046 residential PV systems in California, they show that one extra installation in the zip code increases the probability of adoption in the zip code by 0.78 percentage point. Graziano and Gillingham (2015) confirm this result and suggest that most recent installations may have stronger peer effects. Rode and Weber (2016) produce similar results with a much larger sample of solar panels, using data for Germany. Social contagion is expected to work through both word-of-mouth and visibility. The former effect is supposed to act upon the learning costs and uncertainty that households face when considering the option of an investment in solar PV. The latter effect acts upon the motivation of individuals to stay in tune with the norm and thus adopt pro-environmental behaviour when this is sufficiently spread and
Our paper extends the existing literature by assessing the patterns of social contagion in Switzerland and providing further evidence on the microeconomic mechanisms behind peer effects. While the literature has so far focused on residential solar PV adoption only, we also examine the behaviour of firms and farms. In addition, we investigate in detail the impact of PV characteristics (size, type and ownership) on the magnitude of social spillovers. We aim in this way to provide empirical evidence to contribute disentangling the effects of visibility and word-of-mouth in social contagion. Our analysis is based on a very rich dataset containing geographic location and technical information on 63’190 PV systems in Switzerland, covering all applications made over the years 2008-2015. Our methodological approach is as follows. Following Graziano and Gillingham’s strategy (cf. also Graziano and Gillingham 2015), our model explains the number of new adoptions in a municipality during a quarter by the average bands installed bases of these newly installed PV systems. In detail, for each geocoded PV installation in our database, we count the number of pre-existing installations within different radius (0.5, 1, 2, 4 and 8 km) at the time of the decision to adopt. Then, we create bands with the installed bases by retrieving the inner circles from the outer radii. Finally, we aggregate the bands at the municipality level to obtain the mean number of neighbouring installations per band around the installations having adopted the technology during a given quarter.

In our panel data analysis, we deliver causal estimates of peer effects, by addressing the main threats to identification: self-selection of households into specific neighbourhoods (homophily); correlated unobservables; and simultaneity. The first two issues are addressed by including in the model fixed effects at the level of the municipalities, cantons and quarters, and their interaction with time dummies. In addition, we incorporate socio-economic controls and location characteristics to account for spatial and temporal heterogeneity. To address the issue of reflection (see Manski 1993) we adopt the approach developed by Bollinger and Gillingham (2012) and rely on the time lag between the decision to adopt solar energy and the moment of installation. We find that decisions to adopt the PV technology in Switzerland are dependent on spatially close, pre-existing PV systems: an extra installation within 1 km increases the number of adoptions in the municipality by 0.14 installations on average per quarter. As expected, we observe that the distance is an important determinant of social contagion: bands situated further away show persistently lower impact on the likelihood of adoption than the nearest ones. In line with Graziano and Gillingham (2015), our results also highlight that oldest nearby installations have a lower impact in the adoption choice than the most recently build PV systems.

Beside providing new evidence of social contagion in PV technology, we further investigate the variation of social spillovers with size, type and ownership of the solar panels. Our results show that firms and farms react to neighbouring PV panels, although in a lesser extent than households. A closer analysis reveals that social contagion is primarily due to similar ownership, i.e. firms (farms) are mainly influenced by the nearby farm-owned (farm-owned) installations. We observe that adoptions are more heavily stimulated by building-integrated than building-applied PV systems. Also in this case, the adoption of building-integrated systems is more likely to be influenced by previous adoption of similar systems, everything else equal. These first results point to an especially strong role of learning through word-of-mouth.

References


**Insights from the capability and needs approaches to better define and assess well-being in a degrowth perspective**

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The goal of this contribution is to present the advantages of the concepts of capabilities and fundamental human needs for a better definition of human well-being in a Degrowth perspective. We also state that the evaluative tool coming from human development can be useful in order to foster degrowth operationalization in a social justice perspective. The basic concepts will be presented in order to feed the collective discussion about “how to conceptualize human well-being in a Degrowth perspective”.

In the capability approach a person is not anymore defined by the goods she posses or by her income but by what she is able to be and to do regarding her aspirations of what the good life is (Sen, 1999; Robeyns, 2005). This “capability” to do something and to be someone depends on the person’s access to a diversity of resources (material and non material, natural and man-made) but also of her capacity to convert these resources into the functionings she valued. The person’s conversion capacity depends on her personal characteristics (age, gender, mental and physical health, skills, etc.) but also on characteristics that are external to her such as social norms, political regimes, markets, public services, infrastructures, environmental conditions, etc. The introduction of “conversion factors” is one of the major inputs of the capability approach. Indeed, neoclassical microeconomics considers that
everybody has the same capacity to convert goods into well-being achievements. In sum, conversion factors account for interpersonal heterogeneity/diversity. The capability approach also emphasizes the multidimensionality of human well-being but this point will develop hereafter. To be brief, capabilities correspond to the individual and collective freedoms that people really enjoy to satisfy their needs according to their aspirations (Pelenc, 2016). Many more could be said but we now shift to the fundamental human needs approach which presents some similarities with the capability approach.

The Max-Neef’s fundamental human needs approach offers a very interesting conceptualization of needs for the Degrowth movement. Max-Neef (1991) explains that fundamental human needs are finite, identifiable, satiable, largely immaterial and common to all humans. He has developed a taxonomy of human needs that goes far beyond material needs. He distinguishes four categories of existential needs: Being, Having, Doing and Interacting; and nine categories of axiological needs: Subsistence, Protection, Affection, Understanding, Participation, Idleness, Creation, Identity and Freedom. The combination of axiological (in rows) and existential (in columns) needs creates a matrix that is used for a multidimensional and participatory assessment of well-being. One other major input of Max-Neef is the introduction of a clear distinction between “needs” and what he calls “satisfiers”. Satisfiers are the ways/means by which needs are pursued/satisfied/actualized. For example, food and shelter are not needs but satisfiers of the fundamental need of Subsistence. Education is not a need but a satisfier of the need of Understanding. If needs are common to all humankind, satisfiers vary across time and cultures. To give a rough example, in indigenous rural communities the need of Protection is actualized through solidarity whereas in modern liberal society it is actualized through what remains of the welfare state or the market. In the same way, the need of subsistence is satisfied through self-managed production in indigenous rural communities and through market and wage labor in modern liberal society. Finally, Max-Neef (1991, p31-34) introduces a third level of analysis regarding the nature of the satisfiers: “Because satisfiers have various characteristics, we suggest for analytical purposes five types that may be identified, namely »:

(a) violators or destroyers : When applied with the intention of satisfying a given need, not only do they annihilate the possibility of its satisfaction over time, but they also impair the adequate satisfaction of other needs (e.j. national security doctrine, censorship, bureaucracy, racism, are violators of needs of Protection for example);

(b) pseudo-satisfiers: Pseudo-satisfiers are elements that generate a false sense of satisfaction of a given need (e.j. mechanistic medicine for Protection, fashion for Identity, formal democracy for Participation and so on);

(c) inhibiting satisfiers: Inhibiting satisfiers are those that generally over-satisfy a given need, therefore seriously curtailing the possibility of satisfying other needs. (Paternalism for protection, authoritarian classroom for Understanding, taylorist production for Subsistence etc.

(d) singular satisfiers: Singular satisfiers are those that satisfy one particular need. In regard to the satisfaction of other needs, they are neutral (Humanitarian aid for Subsistence, guided tour for leisure, etc.)

(e) synergic satisfiers: Synergic satisfiers are those that satisfy a given need, simultaneously stimulating and contributing to the fulfillment of other needs. They share the attribute of being antiauthoritarian in the sense that they constitute a reversal of predominant values, such as competition and coerciveness (self-managed production enables the satisfaction of Subsistence but also contribute to the satisfaction of the needs of Understanding, Participation, Creation, etc.).

Community supported agriculture is a good example of a way to enjoy a synergetic satisfaction of the need of Subsistence for example. Indeed, if both the group of consumers and the producer first aim at satisfying their need of Subsistence through food provision, their association also contributes to actualize the needs of participation, understanding, and may be Identity (becoming a transitioner, political consumption, etc.).

Through this partnership they are also able to develop collective capabilities and a shared sense of responsibility (Pelenc et al. 2013). This example will be developed during the oral presentation.

In sum, both approaches help to abandon the concept of preferences which lies at the core of the
growth paradigm by postulating perfect substitutability and non-satiation. As O’Neil (2011) explained, the concept of needs is a threshold concept but preference is not. There is a minimal level of need satisfaction and a maximal level of satiation. Some capability scholars have also introduced a similar idea regarding functionings and capabilities (Nussbaum, 2003; Holland, 2014; Peteers, 2015). According to O’neil (2011, p32): “The fact that the concept of needs is a threshold concept blocks substitutability here as well. Where an agent suffers a loss in one dimension of need that takes her below a certain minimal threshold, there will not be a gain in some other dimension of need that will compensate for that loss”. This reasoning leads us to formulate a strong conception of social sustainability which recognizes the irreducible multidimensional character of human well-being and the impossibility of compensating irreversible degradations over the different dimensions of wellbeing.

This aspect is reinforced by the attention the capability approach pays to interpersonal diversity through conversion factors. Lastly O’Neil (2011) remarks that the concept of needs is related to harm but the concept of preference is not. That is one of the reasons why the concept of preference is associated with efficiency (maximization of personal utility regarding a bundle of goods) whereas the concept of needs and capabilities are related to justice (do all people really enjoy the freedom to flourish in all human well-being dimensions). In his book “the Idea of Justice” Amartya Sen (2009), on the contrary to Rawls, advocates for a pragmatic, contextual and comparative approach to justice rather than a transcendental one. In this perspective capabilities and fundamental human needs offer a relevant informational and public deliberation offers the procedure through which injustices can be identified and tackled. These relections could helps to foster the social justice debate within EE in a Degrowth perspective.

Finally, regarding these different inputs, the final question could be formulated as: “how to define and then ensure every human being with a range of capabilities that enable an adequate actualization of all fundamental human needs (taking into account interpersonal diversity) in order to offer to all the opportunity to live well within certain clearly defined limits?” (Jackson, 2011; O’Neil, 2011; Holland, 2014). In a more pragmatic and less abstract way: how to synergistically satisfy the needs of a local population while taking into account interpersonal diversity and biophysical limits of a given socio-ecological system?

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Understanding personal and social transformations emerging from an environmental conflict. The case of the resistance to the mega-jail project in Haren (Brussels)

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Opposition movements somehow represent a more radical political engagement embarking more tensions within the collective of protesters (radical democracy, dissent and conflict are center stage) than the so-called “transition” initiatives that are sometimes considered apolitical (Chatterton and Cutler, 2013).

This contribution analyses a particularly strong social mobilization against a mega-jail project that is planned to be built in Haren (Brussels’ region, Belgium) on a 20-ha natural site. The project is supported by the three main levels of Belgian government (federal, regional and municipal) and is to be financed through a public-private partnership involving an international private consortium. The actors involved in the resistance are very diverse ranging form local inhabitants, local environmental NGOs to the syndicate of magistrates, a lawyers association, international observatory of prisons and passing by more radical activists (ZADistes) who illegally occupied the threaten site.

The aim of this contribution is to understand, from the inside (I spent one year analyzing and participating in the mobilization), the collective and personal transformations and tensions that arose during this mobilization. The analysis of collective and personal transformations is achieved through the capability approach (Pelenc et al., 2015; Pelenc, 2016) and the analysis of the tensions is achieved through what David Vercauteren (2011) calls “groups’ micro-politics”.

At the collective level, cooperation is required to develop a sufficient agency to fight and resist the State but also to develop a strong sense of solidarity in order to reduce individual vulnerability. Indeed, engaging in such politically oriented combat involves for the resisting persons legal, financial, socio-psychological even physical consequences. This engagement also implies strong individual and collective learning and cross-pollination between the different actors according to their diverse background. At the collective level, transformations are analyzed through the concept of collective capability. We demonstrate that the resistance has entailed the creation of four collective capabilities in order to stop the project: being able to build alliances, being able to develop a counter-expertise, being able to develop place-attachment and being able to develop political agency.

At the individual level, we investigate what is the impact (either positive or negative) of the individual involvement in the collective action. This assessment is achieved by using the 10 dimensions of fundamental capabilities (subsistence, protection, affection, understanding, participation, idleness, identity, creation, spirituality and freedom) defined by Pelenc (2016). In doing so, we can identify the “benefits” individuals gained from their engagement in collective action but also the “costs” of the former. This gives us an idea of the 1 Post-doctoral fellow, Fund for Scientific Research (FRS-FNRS), Centre for Studies on Sustainable tensions that exist when investigating the interactions between individual and collective level of agency and well-being.

Building on this, the last part of the contribution gives a look at the movement through the lens of micro-politics. Micro-politics is defined by David Vercauteren (2011) as the understanding of the « ecology of groups practices ». In order to dig deeper into the « ecology of practices » of this group, we use a re-interpretation of Wilbert’s four perspectives (Individual/collective/inside/outside) (Wilbert, 1985) inspiring us from the work previously achieved by Rauschmayer et al. (2011). This framework enables us to better understand the conflicts that exist within the mobilization. According to the four perspectives we investigate four types of conflicts:

- Individual/inner: conflicts that arise within the individual himself (questioning oneself about the meaning of the engagement, reflecting on what is my position regarding prison or regarding our “democratic” institutions, questioning personal responsibility: should I expose myself or not, questioning the meaning of work and everyday life compare to the exciting social moments of the mobilization, questioning legal VS legitimate actions, etc.)
• Individual/outer: conflicts that arise between the individual who is involved in the mobilization and his/her family, friends or work entourage (conflicts with the partners or friends or colleagues or even the children regarding how the engagement in the mobilization change how the others perceived the involved individual, tensions regarding social role and identity of individuals, etc.),

• Collective/inner: conflicts that arise within one of the particular group of actors involved in the mobilization (for example tensions that arise inside the group of mobilized inhabitants regarding leadership and distribution of roles/tasks etc., or within the group of occupiers or even within the group of associations)

• Collective/outer: conflicts that arise between two different groups of actors involved in the mobilization (for example between those who prefer to fight on the physical terrain through the occupation often advocating for direct and illegal actions and those who privilege the legal battle).

All these tensions help to grasp how hard it is to build a collectivity when you are fighting against the State (not controlling the agenda) and when you are acting with such a diversity actors. All these internal conflicts put solidarity and cooperation in tension thus increasing both individual and collective vulnerability. However, they are also a source of learning what radical democracy really is and “force” oneself to accept the other. Moreover, it is a real public space where collective political identities can emerge and lead to a re-politization of society (Swyngedouw, 2015). This represents an opportunity for personal and collective selfreflection and change. These kinds of true public space are extremely rare in our neoliberal society. The confrontation with “alterity (otherness)” and “institutions” is really strong in opposition movements and so we think the personal and collective transformations that occurred in this kind of micro social movements deserve better attention from Ecological Economics if we really want to transform society in a Degrowth perspective.

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Environmental conflicts in Andean countries: A social metabolism analysis
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In the global map of environmental injustices (www.ejatlas.org), the Andean region stands out with a high number of environmental conflicts. Therefore, it is relevant to analyze the dynamic increment of environmental conflicts in Andean countries. One of the main questions is which are the causes that explain the increment of environmental conflicts in the Andean countries? In this research we test the hypothesis that the growth of social metabolism and productive specialization based on extractive
sectors are some of the main causes of the increment of environmental conflicts in the Andean region. We first built a Material Flow Analysis (MFA) data set for Bolivia, Colombia, Ecuador and Peru during 1970-2013 and analyzed the Domestic Extraction (DE) and the Biophysical Exports (BE) of these countries. Second, we analyzed 244 environmental conflicts reported in Ejatlas (24 of Bolivia, 115 of Colombia, 56 of Ecuador and 49 of Peru) in relation to their temporal dynamics, the metabolic sectors and economic goods, which cause environmental conflicts. Third, the analysis of environmental conflicts was compared to the MFA in order to establish the relation between these two within the four analyzed countries. Our results indicate that the growth of social metabolism and the productive specialization based on natural resources extractions are both induced by national policies and the international trade patterns. Such growth and extraction increase the dynamics and intensity of environmental conflicts in the Andean countries. The pattern of natural resource extraction is a main factor influencing the intensity of territory use. In turn, the increase of the territory use generates spatial reconfigurations, intensifies environmental impacts and affects the local ways in which people relate with nature. The increment of natural resource extraction fosters community’s deterritorialization and fuels environmental conflicts.

**Spatial planning in Swedish forest governance: consequences for flood risk management**

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**Background**

Although also many goods and services that are not traded on markets contribute to human welfare, they are often undervalued and under produced due to the fact that their economic value is not well known. The Swedish forest sector is of considerable importance in terms of production and export values; it contributes to about 3 percent of GDP and about 75000 individuals are employed in the forest, timber and paper and pulp sectors in Sweden (Swedish Forest Agency 2014, Zglejc 2014) but the forest serves many uses; it also produces significant recreation values and non-use values including berry and mushroom picking, recreation, tourism, biodiversity, flood mitigation and habitat protection (Bostedt and Mattson 1995, Ezebilo 2016, Richnau et al. 2013). One of the most significant conflicts related to forestry use is rooted in the divergence between production forest and protection of forest land, e.g. for flood mitigation purposes.

Flood mitigation can be defined as a strategy for minimising the likelihood and magnitude of flooding through the implementation of measures that aim to accommodate water (Fournier et al. 2016), for example the establishment of flood storage areas, forms of sustainable urban drainage, wetland creation, restoration of river corridors and tree planting, as well as property level measures such as air brick covers, flood gates or flood resilient buildings (Hegger et al. 2014). As a flood risk management strategy, flood mitigation complements other strategies to manage floods and flood risk, such as flood defence, which is traditionally the most common flood risk management strategy and which aims to “keep the water away from the people”; and flood prevention, which aims to “keep the people away from the water” e.g. through spatial planning (REF). It thus follows that flood mitigation also occurs naturally, for example as a result of the existence of urban forests, parks and natural wetlands. This is particularly apparent in countries like Sweden, where flood mitigation is to a large extent a “side effect” of other activities, such as area conservation.

This study focuses on the potential for flood mitigating services provided by Swedish forests. The aim is to discuss/identify opportunities and barriers for increased protection of forest land in urban areas for e.g. the purpose of flood protection (i.e. mitigation).

**Approach and expected results**

We analyse the management of the Swedish forest sector from a governance perspective. While virtually all land and water areas in Sweden are subject to decentralised physical planning, the planning system does not include forests. Hence the possibilities to plan for and
control the use of forest land is limited. Instead, it is the landowners who are responsible for the forest planning, controlled by the Swedish Forest Agency who has the formal (regulatory) authority over the sector. While draining and ditching is typically regulated by law (and usually requires a permit), the forms for these activities are not necessarily adapted to the natural flow of the water, which may lead to sub-optimal solutions.

We further analyse the trade-offs between utilizing forests for production and for protection from a social efficiency perspective, and the (limited) incentives for the forest owner to protect forest land; the forest owner has no incentive to consider other values than productive monetary values. This implies that alternative uses of forests to a large extent may become under-valued and under-exploited. This in turn would have consequences for the possibilities to make use of e.g. the forests’ flood mitigation capacity.

Therefore we expect the amount of forest land protected is likely to be lower than what would be socially efficient, primarily due to a somewhat mixed and unclear control of the forest land.

References

We need to talk! Bridging together social sciences, economics and epidemiology to improve animal health surveillance performances
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Major issues in animal health surveillance performances.
In most region of the world farming systems aim to ensure food security but also poorest communities’ livelihood. Issues in disease control strategies and husbandry practices can result in disease introduction and endemic situations and directly pose a threat for the farmer’s livelihood. Early detection and control of animal diseases through efficient surveillance system is critical to prevent such issue but also emergence and re-emergence of human pathogens adapted from animals. Despite the efforts undertaken by international organisations and national actors, the effectiveness of most surveillance system remains limited especially in low-income countries (Goutard et al., 2015). Weaknesses in surveillance are inherent in most developed countries. This is mainly linked to different perception, lack of communication and understanding between the different actors from local to national levels resulting in limited coverage and disease underreporting as recently experienced with the Ebola outbreak (SciDev.Net, 2015). Numerous socio-economic factors are involved in farmers’ disease reporting decision process (from poor awareness to fear of penalty or stigmatization and
therefore distrust in government authorities) (Delabougilse et al., 2015a, 2015b; Goutard et al., 2015). Often farmers do not perceive how being part of surveillance systems could contribute to improving their livelihoods (Goutard et al., 2015). The implementation of comprehensive evaluations of the systems, including functional aspects closely linked to people’s behavior is critical to improve their efficiency and relevance. The complex nature of these systems and the variable contexts in which they are implemented call for an interdisciplinary approach and the development of flexible evaluation tools. Until recently the tool box available to evaluate animal health surveillance system performances did not take into consideration the context in which surveillance was implemented, and rarely considering the socio-economic factors affecting surveillance performances (Calba et al., 2015).

How to engage all the actors towards improvement of animal health surveillance?

The understanding of individual and local community choices regarding animal disease prevention and control is the key factor in efficiency and sustainability of the prevention system at the local and national levels. Several recent initiatives have demonstrated that a combination of participatory methods and modern technologies could help to overcome the constraint of disease surveillance and not only in low income but also in developed countries (Calba et al., 2016; Calba et al., 2014; Delabougilse et al., 2016, 2015b; Pham et al., 2016). A range of participatory methods and tools were used in order to take into consideration the stakeholders’ perceptions and expectations regarding the system and to identify and describe problems and local solutions at grass root level. Participatory Epidemiology (PE) is a flexible, inexpensive, and effective method for the identification and prioritization of issues within communities (Mariner and Paskin, 2000a). This approach is especially aimed at addressing actors’ perception on epidemiologic issues. PE methods are flexible enough to address the wide range of issues, including costs and benefits perceived by actors regarding animal health management systems (Catley et al., 2012).

Innovative approaches have been developed by combining PE with modeling or econometrics techniques (e.g. discrete choice experiment) to generate information on the animal health disease surveillance process, acceptability, non-monetary costs and benefits; these methods have been used in South East Asia but also transposed and adapted under the European context (Pham et al., 2016). The respondents often have some knowledge on animal health but with their own perception on animal health surveillance and control linked to their specific socio-cultural, economic, or political context. A deep understanding of these issues involving relevant people actors outside the boundaries of animal health field is thus essential. However this approach is not without its drawbacks. Information obtained from social and human sciences including participatory approaches is usually qualitative or semi-quantitative and often dismissed point of view of quantitative epidemiologist or mis-trusted by decision makers (Catley, 2005; Mariner and Paskin, 2000b). Solid study protocols and when possible validation of the efficacy and impact of such approaches are essential to ensure wider use and uptake of the outputs by decision makers (Schultz, 2016).

The added value of interdisciplinary approach to improve animal health surveillance and control.

An inter-disciplinary approach bridging social and economical and epidemiological sciences, including the use of participatory and innovative tools allow tackling attributes of surveillance systems which are often disregarded in an evaluation as difficult to assess and highly subjective (e.g. sustainability, acceptability). Such approaches also ensure a better acceptability of the evaluation process itself. This method gives priority to dialog aiming to engage decision makers and other stakeholders in a mutual learning process, developing trust and fostering corrective actions. Such methods allow providing context dependent recommendations for the improvement of the current surveillance system by taking into consideration stakeholders’ local constraints, perceptions and expectations regarding the system. Such bottom-up specificity, gathering critical information from the local level (bottom) to inform national policy making (top) are more and more recognized as powerful to ensure sustainable and meaningful changes.

References
Explaining social ecological crises and dynamics. The contribution of Marx and eco-Marxists to theory development in ecological economics

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The need for advancing ecological economic theory

In order to provide sound strategies and actions to tackle contemporary challenges such as climate change or biodiversity loss, a systemic, holistic, dynamic and realistic understanding of the interrelation between the economy and the environment as a whole is needed. Ecological economics mainly offers a biophysical and systems-based view of the economy. What is still missing is a sound understanding of how key macroeconomic issues such as profit, accumulation dynamics, inflation, debt, money creation and financial speculation are entangled with qualitative and quantitative environmental shifts and destructive feedbacks. This is a gap noted in the literature (Klitgaard and Krall, 2012; Özkaynak et al., 2012) that is attempted to be filled by the development of an ‘ecological...
Macroeconomics’. Most of the current debate in ecological macroeconomics is based on Post Keynesian thinking and modelling, whereas contact with Marxist theory has remained surprisingly limited. However, Marxist theory is a particularly promising heterodox school of thought because it looks at the system as a whole (i.e. capitalism), takes a long-term perspective and is consistent with a biophysical perspective of the economy offered by ecological economics. Moreover, it is methodologically consistent with the ambitions of ecological economics to offer theories that are based on realism and focus on interrelations, dynamics and change. In fact, it is unique in conceptualising the interplay of biophysical and monetary processes throughout the system by starting from use and exchange value considerations. A strong case can be made for building more bridges between Marxist political economy and ecological economics.

Ambition of this research

This paper investigates to what extent and how Marxist theory can help fill theoretical gaps in the further development of ecological economics. The approach taken is to explore two bodies of literature – Marx’s theory of the inner workings of capitalism as laid out in Capital Vol. I-III – especially his theory of money, profit and prices – and the latest wave of the eco-Marxist literature (Foster and Burkett, 2016; Malm, 2016; Moore, 2015). Contemporary eco-Marxist debates seem particularly relevant because they move away from trying to defend Marx towards synthesising relevant Marxian insights with a view to effectively addressing contemporary challenges. Both streams of thought taken together offer a systemic, structural and systematic explanation of social ecological crises & dynamics. The destruction of the environment with related social conflicts is mainly explained as unintended by-product of profit-seeking, increasing labour productivity, an inbuilt drive for compressing time and space and the particular role of money in the system. What we get from this school of thought is an explanation why system-inherent dynamics prevent the large-scale adoption of sustainability practices, i.e. structural barriers against social ecological transformation. In other words: there are good reasons why policies such as work-time reduction, ecological tax reform or green investments proposed by post-growth and degrowth scholars within ecological economics are not implemented on the scale needed. Recognising and understanding such systemic issues is a precondition for thinking about how to tackle them, which makes this research especially relevant for ecological economics.

The research questions motivating this research are: What building blocks for ecological-economic theory can be derived from studying Marx’ Capital and the recent eco-Marxist literature? What elements are missing?

Expected results

This paper will provide theoretical insights and building blocks from Marxist theory for ecological economic theory. The special session on ‘Developing consistent theory for social ecological economics – where do we stand?’ provides the ideal platform for discussing these elements and sharing ideas how to take this research forward.

References

The role of trade as driver of global material use: A structural decomposition analysis of international raw material consumption from 1990-2010

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In reviewing recent history it is obvious that international trade has, on the one hand, increased in an extensive manner and on the other hand, played an important role for global economic development as mechanism for improving accessibility and efficient distribution of resources (Bernstein, 2009). At the same time, the systematization of material flow analysis (MFA) enabled researchers to show that global material extraction has been increasing steadily as well (e.g. Behrens et al., 2007; Krausmann et al., 2009; Steinberger et al., 2010). Therefore, the interconnections between trade, resource extraction and environment have been analysed intensively in the past two decades (e.g. Dittrich et al., 2012; Dittrich and Bringezu, 2010; Giljum and Eisenmenger, 2004; Hertwich and Peters, 2009; Schaffartzik et al., 2014; Wiedmann et al., 2015). However, there is still a lack of research trying to answer the question of a causal relationship between trade and resource extraction, i.e. if increasing international trade is actually driving the increase of global resource consumption.

With this work, I am empirically trying to answer the question if international trade can be defined as a driving force of global raw material consumption from 1990 to 2010. To date, there have been several studies on the driving forces of material consumption of selected countries (Hashimoto et al., 2008; Muñoz and Hubacek, 2008; Wang et al., 2014; Weinzettel and Kovanda, 2011; Wenzlik et al., 2015; Wood et al., 2009). However, they did not specifically separate the effect of international trade as a driving force; additionally, there is not yet an investigation of drivers of material flows on a global scale so far.

To calculate material flows embodied in international trade the nowadays most promised and promoted method is the environmentally extended input-output analysis (EEIOA) in a multi-regional input-output model (MRIO) (Giljum et al., 2013; Wiedmann et al., 2011). The framework of EEIOA provides a suitable foundation to link environmental impacts associated with production to the consumption of final products, no matter where either production or consumption are actually happening (Leontief, 1970; Miller and Blair, 2009). In this analysis, I use the Eora model, which is one of the most detailed and recent MRIO models to date (Lenzen et al., 2012, 2013).

In the framework of input-output analysis the structural decomposition analysis (SDA) offers the possibility to divide the change in material consumption within a certain time period into several components and to analyze their influence on the total change of material consumption (Ang, 2004; Ang et al., 2003; Dietzenbacher and Los, 1998; Hoekstra and van den Bergh, 2002; Su and Ang, 2012). It allows for isolation of the contribution of each factor ceteris paribus, i.e. if all the other factors would not change. As components/drivers I chose to divide technology, import structure, consumption mix, consumption level and population. The SDA was conducted on an annual basis from 1990 to 2010 for the four main MFA material categories biomass, metals, non-metallic minerals and fossil fuels and all 180 countries covered in Eora.

The first analysis of the results shows a contribution of changes in the global import structure to the changes in total raw material consumption of 9,8 Gt (30% of the total change of 32,5 Gt). Therefore, besides the main drivers consumption level and population, international trade also plays a major role in increasing material consumption on a global scale. Technology is partially offsetting the effects of consumption level, population and import structure. A remarkable difference of the contribution of changes in the import structure between net-importers and net-exporters of materials is also clearly visible.

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Degrowth and food sovereignty in CEE

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Degrowth represents, so far, a still relatively new and not very widespread known concept within the Central and Eastern European countries (CEE). For a long time, the term did not exist at all and it only got translated into many of the regions’ languages quite recently. Events like the last degrowth conference in summer 2016 in Budapest tried to break with the unfamiliarity of the concept and strived for spreading the degrowth vocabulary in the post-socialist countries. They aimed at contributing to a wider dissemination of degrowth as a political as well as a scientific approach. Yet, this fact of relative unfamiliarity with degrowth does not correspond to a lack of actual degrowth practices in the region. Rather, typical degrowth practices such as gardening and food self-provisioning do not only exist in these countries but have a long-standing tradition in the region.

Against this background, the paper therefore asks why despite the existences of these practices of degrowth in the post-socialist countries, an understanding of degrowth has not strongly developed and widely spread throughout the region yet. By analogy to the term “quiet food sovereignty” – highlighting that practices of food sovereignty exists but there is the lack of a movement fighting for it – the paper explore whether “quiet degrowth” would be an appropriate term to understand ongoing developments in CEE. The paper argues that with the end of the cold war, the regional understanding of development was strongly influenced by the West that put forward a catch-up perspective for countries of the East. This did not allow to value well-established (non-market based) practices but aimed at integrating CEE’s states and economies as new markets in their old markets. However, recently, alternative patterns of production and consumption such as food networks are on the rise, in the West and the East.

Drawing on critical transition studies, the paper qualifies CEE as semi-periphery, thus as a region that lies politically as well as economically between the core and the periphery of the world. This theoretical view enables to analyse the imposed development model – from a planned economy and authoritarianism to market economy and democratisation – that was advocated since the transition in the 1990ies by Western and Eastern elites from a critical perspective. By further drawing on a political ecology perspective and critical agrarian studies perspective, it highlights who is winnig an who is losing in this transition process.

First, the paper embeds degrowth practices in the broader economic development of the agriculture and food sector. It thus shows the regional experience of degrowing economically after the fall of the
Soviet Union, which was a life-changing experience for people in CEE. It focuses on the agriculture and food sector and discusses the implications of European Unions’ politics in the pre- and post-accession period. The paper asks for the potential as well as for the limits of growth in the agricultural sector, pointing out how catching-up with the Western development model that fueled into austerity politics manifested itself. It analyzes how food self-provisioning corresponds with the overall structure of the agricultural sector, that is, farms structures, availability of supermarkets and price development.

Second, the paper focuses on degrowth practices that are part of the food sovereignty movement in CEE by exploring existing and developing alternative food networks. While focusing on a CEE country, namely the Czech Republic, new relations of production and consumption are analyzed, drawing on the example of Community Supported Agriculture (CSA). CSA restructures existing patterns of production and consumption in an innovative way and tries in this way to break with the capitalist growth paradigm. In addition, the Czech case shall be compared to the Austrian CSA structures to elaborate on the similarities and differences between the different models and cases.

An empirical analysis of institutional demand for Valuation Knowledge

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The ecosystem services literature makes the assumption that an increased understanding of ecosystems, ecosystem services and, in particular, the value of ecosystem services will feed to decision-making, as new knowledge is produced (De Groot et al., 2010; Potschin and Haines-Young, 2011). Similarly, research efforts directly contributing to decision-making are justified with the assumption that understanding the value of ecosystem services constitutes a major threshold for integrating ecosystem service considerations in decision-making (e.g., TEEB, 2010; IPBES, 2016). Yet, there is little evidence for the assumptions about demand and applicability of valuation knowledge. In an extensive review of valuation knowledge use, Laurans et al. (2013) find that only a fraction of analyses have paid any attention to operational use of valuation. This observation has motivated our analysis.

Thorough analyses of the applicability of valuation knowledge show that expected uses include awareness raising, evaluating the status and trends of ecosystems, ranking different decision alternatives and, more concretely, for instrument design, litigation and compensation (Gómez-Baggethun and Barton, 2013). The limited empirical analyses of ecosystem knowledge use have, however, shown that expectations exceed practical experiences. Indeed, those who have not worked with the concept have higher expectations than those who lack experience (Albert et al., 2015). Despite the unclear diffusion of knowledge on ecosystem values, decisions on ecosystem services are made every day, based on those knowledge sources and knowledge management practices that decision-makers have at hand (Primmer et al., 2015).

Research on valuation is not un-critical, quite on the contrary. Attention is repeatedly drawn to the multi-dimensionality of values, and new valuation analyses are developed to include integrated valuation processes, which would engage stakeholders and draw on the accumulating conceptual work in the area (Vatn, 2009; IPBES, 2016; Jacobs et al., 2016). Based on these analyses, we know that values range from verbal statements of worth to quantitative and monetary estimates, and that they range from individual preferences to socially construed beliefs. What these analyses lack, however, is empirical investigation of the knowledge needs and expectations of decision-makers at different governance levels.

Against this backdrop, we have designed an empirical study to analyze the demand for valuation knowledge in a specific decision-making setting. The context where we analyze decision-makers’ expectations regarding value knowledge, is a recently tabled peatland protection programme in Finland, a country where more than a quarter of land surface is mire or peatland. The implementation of the carefully designed programme was withdrawn after the Green Party left the Government in
2014, which resulted in an ongoing controversy on the use and conservation of Finland’s valuable peatlands.

The paper reports an empirical analysis of nine stakeholder interviews (with 10 individuals) representing different organisations with an interest in the use or protection of peatlands. The stakeholders representing administration and NGOs have been part of various decision-making processes on peatlands. The analysis focuses on the importance and use of value knowledge as well as the expectations on the usefulness of valuation knowledge. Paying attention to the ways in which value knowledge can influence behaviour, or rights to use ecosystem services, the analysis also investigates the constraints on the use of valuation knowledge. The paper will report the detailed analysis and results of this empirical study.

Based on our initial observations, we find that the stakeholders framed ecosystem services in a variety of ways, ranging from general description of decision-making processes and history of peatlands and the environment or examples from own experience to practical, almost technical, targets of decision-making. The respondents identified the value knowledge needs from the position of their own organization, contrasting them against other stakeholders’ values. The interviews pointed to some apprehension about evaluating phenomena of different dimensions and scale or different levels of scarcity simultaneously. Incommensurability, technical difficulty and unreliability raised suspicion, and several respondents considered valuation unfeasible. On the other hand, existing knowledge systems were considered to serve decision-making.

Interestingly, the institutional factors raised in literature, such as rights to benefits, and their distribution, were at the focus of decision-making among the NGO respondents. Similar to the framing of ecosystem services and value knowledge, also the emphasis placed on rights related to the position of the organization, with environmental NGOs focusing on open access, land-owner representatives focusing on property rights and industry focusing on the right to operate in a predictable institutional environment. Contrastingly, stakeholders representing administration considered assigning benefits and rights quite challenging.

Based on these first observations, our paper will draw messages about valuation providing useful background knowledge, rather than solving trade-offs or benefit distribution. Identifying and measuring values might support integration of different dimensions in decision-making, and might even contribute to compromise. But it is not a panacea for sustainable or equitable provision of ecosystem services.

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Resource abundance and participatory governance in the commons: a behavioural experiment
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This theory-founded behavioural experiment aims to investigate two questions: 1) Does governance, i.e. in the form of property rights protection, always lessen competition in the commons?; and 2) What happens when there is sudden resource abundance or scarcity?

Our motivation is non-experimental literature regarding vague evidence on natural resource abundance and competition. Grossman and Mendoza (2003) noted that scarcity drives competition, and hence greater resource exploitation. In contrast, more recent literature provide stronger evidence that it is the sudden abundance in natural resource wealth (i.e. not scarcity) that worsens competition. Van der Ploeg and Poelhekke (2009, 2010) and Van der Ploeg and Rohner (2012) support the so-called “resource curse hypothesis” and argue that a positive change in the level of natural resources intensifies conflict, esp. if property rights are weak. This is consistent with Sachs and Warner’s (2001) macro-econometric observation that sudden abundance in wealth from natural resources leads to socially inefficient outcomes.

In this resource curse literature, abundance in natural resources like oil and diamonds increases unproductive competition like violent wars and rent-seeking (Wick and Bulte, 2006). Nonetheless, this result is conditional on the strength of institutions, e.g. property rights protection and governance (Hodler, 2006). Behind this literature, we find cases such as oil-rich Nigeria, Congo, and Sierra Leone where conflict and corruption over natural resources are dominant. In contrast, there are countries characterized by a well-functioning rule of law and strong property rights like Norway and Botswana which are able to avoid the negative effects of sudden resource abundance and thus have experienced decent economic development (Mehlum et al., 2006).

Also looking at historical observations unrelated to the resource curse, there have been several papers on governance mechanisms and natural resource management. An example is Platteau and Seki’s (2000) interview survey of Japanese fisheries. They observed that some fishermen within a group of vessels share their catch. Pooled output was sold through a common outlet and each member receives an equal share of his group’s gross revenue. Doing so avoided over-crowding of vessels and hence reduced extraction of the resource.

Inspired by the above anecdotes, this paper proposes a theory-founded common-pool experiment on governance in a resource-abundant environment. Depending on the setting, groups can use two instruments to cooperate: 1) strengthen property rights, and 2) minimize resource appropriation investments. We propose a resource competition game with a preliminary stage in which selected members of the group can choose the level of property rights over the resource. The protected portion of the resource is equally shared by all members at no cost. The amount of unprotected resource is distributed through a competition in the subsequent stage. Because our game theoretical model assumes symmetry and costless property rights selection, the way how the resource is protected should not matter. Group members always have the incentive to share the resource and avoid second-stage competition.

On the contrary, our behavioural observations show that when property rights are chosen by members of the group, there is sometimes more cooperation. We compare three institutions that differ over how groups decide the level of property rights over the resource: 1) vote (i.e. everyone in the group decides), 2) leader (i.e. one representative member chooses), and 3) outsider (i.e. nobody in the group
participates). Because property rights selection is neither costly nor advantageous, the only difference between these treatments is the degree of inequality in participation among group members in the protection stage. Although our theoretical results predict that institutional differences should not occur, our experiment found behavioural deviations. We found that greater participation in property rights protection leads less appropriation. However, this finding is more significant when the resource becomes suddenly abundant than when it is scarce.

Insurance value, market access, and the sustainability of ecosystem use

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The natural insurance value has been conceptualized as the reduction of the risk premium a risk-averse ecosystem manager can obtain by conservative ecosystem management (Baumgärtner, 2007). It depends on the access to financial insurance (Quaas and Baumgärtner, 2008), and thus it has been found that the incentive for conservative ecosystem use is particularly strong when there is less access to financial insurance instruments (Müller et al., 2011). However, the use of ecosystems typically takes place in a dynamic setting, such that a more conservative use under uncertainty is linked to the prudence (Kimball, 1990) of the value function associated to the benefits derived from using the dynamic ecosystem (Kapaun and Quaas, 2013).

In this paper we study the interaction between natural insurance value, prudent use of ecosystems, and access to financial markets in a dynamic setting. It sets up a generic dynamic ecological-economic model with a risk-averse ecosystem manager who derives benefits from a flow of ecosystem services, and who has constrained access to financial markets. Conservative ecosystem use resembles the dynamic self-protection problem recently studied in several contributions (Courbage and Rey, 2012; Eeckhoudt et al., 2012; Wang and Li, 2015): Investing in natural ecosystem capital can be seen as a 'precautionary effort' that reduces the probability of a loss event occurring, i.e. provides 'self protection' in the sense of Ehrlich and Becker (1972). This approach extends the model set-up by Baumgärtner and Strunz (2014) to a dynamic setting. We show that the propensity to use the natural insurance function of the ecosystem by means of conservative ecosystem use is not a generic outcome, but depends on the decision-maker's risk and time preferences as well as on ecosystem dynamics and processes. Especially, the new dynamic set-up studied here allows to qualify previous results on how access to financial markets affects the incentives for a sustainable use of ecosystems under uncertainty and to show how these results depend on ecological and economic conditions.

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The macroeconomic impact of financing the renewable energy transition: an agent-based approach

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The current analysis of climate policies is mainly based on general equilibrium models, which introduce climate policy as an additional constraint and hence, lead to a reduction in economic growth rates. So far, the possibility for climate policy to offer economic opportunities has been largely neglected. The state of the European Union, characterized by low investment rates, low growth and high unemployment suggests that there is an urgent need for new economic opportunities. The need to scale-up investments in low-carbon technologies and infrastructure has been recognized. However, the question on how to finance these capital-intensive investments remains a key concern.

In this study, we employ and enrich the agent-based macroeconomic model and simulator Eurace to investigate how to finance the sustainability transition in the energy sector. So far, agent-based models have mainly been used for fiscal and monetary policy evaluation, not for climate and energy policy. This will add a new modeling approach to the climate and energy policy toolbox, which combines largely disconnected areas of research. It offers a new approach by including aspects into the analysis, which are underrepresented in current climate economic models, such as financial market dynamics and monetary policy.

There is an extensive literature on different types of subsidies or incentive schemes fostering investments into renewable energy production. However, little analysis has been done on different ways of financing such a subsidy scheme, especially with monetary policy. We use the introduction of a feed-in-tariff (FiT) system (guaranteed price for renewable energy producers and preferred access to the electricity grid, ensuring stable and long-term cashflows) as an example of a well-known climate policy, which has been introduced in many countries. In particular, Eurace has been enriched by including an energy sector where electricity is demanded by domestic producers and is supplied by a fossil-fuel based power producer as well as a renewable-energy based one. Both power producers undertake pricing and capacity investment decisions based on the price of imported fossil fuel and feed-in tariff government policy.

We investigate how the economy is affected by the cost of financing the feed-in tariff mechanism and by the benefits of lower fossil fuels imports, in order to devise the financing policy with the best cost-benefit trade-off for the macroeconomy as a whole. In particular, we will investigate and compare the following financing policies of the feed-in tariff mechanism:
1. General tax financing (redistribution): The government finances the FiT via an increase of the overall tax rate.
2. Bond financing (green fiscal stimulus): The government issues additional government bonds, hence it increases the government deficit.
3. Green QE financing: The government issues additional government bonds, which the central bank buys in a special green quantitative easing program. This requires a coordinated action between government and central banks.

Considering the macroeconomic effects of the FiT policy, results show that it is effective in fostering the sustainability transition of the energy sector and that it increases the level of investments in the economy with a slightly positive impact on the unemployment rates. Due to the lower unemployment rate, wages increase, prices of consumption goods and of investment goods increase. Assuming that
the Central Bank applies the Taylor rule, this leads to an increase in the interest rates (due to a lower output gap and higher inflation). On the other hand, the higher level of investments occurs at the expense of the production of consumption goods, therefore with a negative impact for the living standards, at least according to the perspective of a consumerist society. Considering the comparison of the three different financing mechanisms, results show that the Green QE financing mechanism offers the highest share of renewable energy production capacity and the best trade-off between consumption and investment for low feed-in tariffs but it’s not fiscally sustainable for higher FiT values.

The insurance value of ecosystem services: a systematic mapping of empirical evidence
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The occurrence and severity of disasters is increasing throughout the world, exposing individuals, households, businesses and public authorities to multiple and new risks. This trend is further aggravated by environmental degradation, biodiversity loss and climate change, as well as by population growth and increasing pressures from urbanisation and land use change. Ecosystems can provide natural insurance against adverse events or gradual environmental degradation (Baumgartner, 2007), decreasing the probability of future decline in the provision of ecosystem services and itswelfare (Baumgartner and Strunz, 2014). As such, ecosystems can reduce the costs of risk-bearing (Quaas and Baumgartner, 2008) translating into an economic value that has been conceptualized as ‘insurance value’ (Baumgartner, 2007). Recent literature has begun to conceptualize the notion of insurance value and started to test mechanisms by which it can be measured (Maler et al. 2007, Baumgartner and Strunz, 2014).

In this paper we explore the emerging conceptualisations of insurance value and trace the empirical evidence produced so far. For that, we apply a flexible systematic review, which follows the principles of traditional full systematic reviews but allows more flexibility to tailor the process towards improving the quality of the overall findings (Mallett et al. 2012). As the term ‘insurance value’ is relatively new, we do not simply apply a search string of related terms, such as ‘ecosystem resilience’, but develop a multi-dimensional insurance value conceptual framework. We then map the broader environmental economics and ecosystem services literature against this framework. The conceptual framework is composed of six key components:

1) Type of ecosystem (e.g. coastal ecosystems, peatland areas, woodland and forest, inland water systems, agricultural land, urban green infrastructure etc.),
2) Associated risk (e.g. flooding, landslides, forest fires, avalanches, sea level rise, water logging, temperature extremes, pest or disease outbreak, etc.),
3) Insuring measure (e.g. increased vegetation cover, tree planting, wetland restoration, slope stabilization, peatland restoration, erosion control, biodiversity conservation, etc.),
4) Assessed insurance value (in monetary and non-monetary terms)
5) Associated co-benefits (e.g. health benefits, cultural ecosystem services, provision of habitat for biodiversity, outdoor recreation resource, pollution reduction, carbon sequestration and storage, etc.) and
6) Value capture models (i.e. related public or private options associated with the managing of the insurance service, such as payments for ecosystem services, the development of insurance policies linked to ecosystem properties and management, etc.).
This conceptual framework is co-constructed with a range of key stakeholders, including representatives of insurance companies, local authorities, academics, businesses and community groups and civil society organizations. Using semi-structured interviews and follow up contacts, stakeholders are consulted on the conceptual framework, which they are asked to validate and refine. After literature searching is complete, stakeholders are then presented with the evidence base. By combining a rapid, flexible systematic review with a process of co-developing a conceptual framework around the insurance values of ecosystems, this consultative exercise allows to identify key gaps and develop future research, policy and implementation recommendations. In turn these can guide the development of this fast-evolving concept to meet both researcher and practitioner needs. Forming a robust basis for the quantification, qualification and valuation of the insurance value of ecosystem services across multiple contexts and ecosystems is a necessary starting point for operationalizing the concept in practice. Ultimately this could involve integrating ecosystems insurance into conventional insurance policies and developing new public and private sector insurance models for resilience.

References

Dealing with the Water-Energy-Food nexus conundrum. A multiscale approach for societal metabolism
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Water, food and energy security are crucial for long-term economic growth and human wellbeing and are strongly interlinked. The resolution adopted by the General Assembly of the United Nations on 25 September 2015 is symptomatic of the water-energy-food (WEF) nexus. It postulates goals and related targets for 2030 that include (1) ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture; (2) ensuring availability and sustainable management of water and sanitation for all; and (3) ensuring access to affordable, reliable, sustainable, and modern energy for all. The tendency to see environmental issues as linked to one another, and to study them in conjunction with social and economic problems has partly been the outcome of theoretical scholarship and empirical evidence highlighting the interconnections between different spheres of human activity and their intersection with the environment. This has been strongly supported by Ecological Economics over the last forty years. This water-energy-food nexus is complex and requires improved tools that account for interdependencies, feedbacks and multi-layered relationships in order to properly inform decision-makers about trade-offs and synergies between different development and management choices. A multi-scale approach offers a suitable platform to look at the Nexus in terms of the metabolic pattern of Socio-Ecological Systems (SES). Within the framework of a wider project entitled MAGIC (Moving Towards Adaptive Governance in Complexity: Informing Nexus Security), funded by
In 2016, this study aims at a better understanding of the nature of the challenges implied by the European energy policies via a better quantitative representation. In particular, here the focus is placed on the implications of ‘energy security’, defined as “access to clean, reliable and affordable energy services for cooking and heating, lighting, communications and productive uses” (AGECC, 2010). Energy, in fact, is a nexus-core issue as it is required to produce, transport and distribute food as well as to extract, pump, lift, collect, transport and treat water. In this study, MuSIASEM (Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism) (Giampietro et al., 2009), an innovative method of accounting having the goal of keeping coherence across scales and dimensions of quantitative assessments generated, is used to provide a diagnostic analysis of the metabolic pattern of energy in Europe at the level of the union and the individual states. This analysis is useful for characterizing the level of self-sufficiency and the long-term stability of the existing state of the SES. Indeed, the concept of strong sustainability assumes that the flows consumed and discarded by a society should be fully generated and absorbed by the natural processes available in local ecosystems. Nevertheless, this assumption is not tenable in modern societies whose metabolic pattern is heavily dependent on both imports and non-renewable sources. The MuSIASEM approach makes it possible to analyze the dynamic budget of the metabolic pattern looking at the compatibility between: (i) the characteristics of the requirement side – this can be obtained by measuring the fraction of the fund and flow elements (by using Georgescu-Roegen’s flow-fund concept) of the whole society that is invested in the final consumption (HH – Household sector plus SG – Service and Government), called in jargon the “bioeconomic pressure” – the higher the standard of living the larger is this fraction; and (ii) the characteristics of the supply side – this can be obtained by measuring the fraction of the fund and flow elements of the whole society that are invested in the primary (AG – Agriculture and EM – Energy and Mining) and secondary sectors (CM – Construction and Manufacturing), called in jargon the “strength of the hypercycle” – this ratio indicates the level of surplus made available to the rest of society by the flow and fund elements invested in the basic sectors. By carrying out this analysis it becomes possible to identify the role that imports, and reliance on fossil energy, play in making the metabolic pattern possible. The analysis also provides a quantitative criterion to define what should be considered as feasible, viable, and desirable at the moment of discussing a policy in relation to the nexus. In this way, the quantitative assessment and the qualitative perceptions (narratives) of the nexus are bridged under the Quantitative Story-Telling (QST) approach.


Towards Linking the Concepts of Ecosystem Services and Environmental Justice: A Hungarian Case Study
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The concepts of ecosystem services and environmental justice have mainly developed separately until recently. Though these two concepts have both a longer history of development, connecting them has a very recent academic phenomenon. Both concepts represent well-established research fields, but there is much less research on their linkages. The present paper reports about an ongoing research attempts to link the two concepts through a case study, learn the possibilities for theoretical integration and develop a framework to link the two concepts grounded in a Hungarian case study. In a fundamental sense, taking seriously the concept of ecosystem services is intended to embed economic activities in their ecological context in a way that economic actors and policy makers will become aware of their dependence as well as effects upon ecosystems. Moreover, from a
sustainability viewpoint, social justice seems as important as respecting the health and integrity of ecosystems. The environmental justice movement and research worldwide have demonstrated that human rights, marginalisation, and domination and ecological unsustainability go hand in hand and struggles for the rights of oppressed minorities, ethnicities, and indigenous people entails a struggle for ecological integrity. The case study in Hungary is constructed around a waterfront development which may significantly alter the potential access to benefiting from different types of ecosystem services a freshwater ecosystem currently provides to a diverse group of local stakeholders. The case site is located in a Southern city of Hungary, Szeged and the second biggest river of Hungary, Tisza which cuts through the city of Szeged. The river provides a lot of ecosystem services which a diverse groups of local inhabitants benefit from. However, a river wall construction is in progress as a waterfront development project what includes changes in the town- and riverscape creating new opportunities of access and eliminating some of the existing ones.

The present research aims to explore and understand how the proposed project will alter access to freshwater ecosystem services different local groups and individuals enjoy and need and what will be the ensuing implications from an environmental justice perspective. Theoretically the issue is approached as a need to link access to ecosystem services with environmental justice. Two main research questions was framed: (i) What kind of ecosystem services by River Tisza are known, used by and accessible to different social groups in Szeged? (ii) How the proposed waterfront development project will influence awareness, use, and access by different social groups? A qualitative research design was developed based on an ethnographic approach. In the first phase of field research, ethnographic participatory observations were pursued by attending public events discussing the proposed development project and in the research site of the most visited parts of the riverbank. During the public fora the communication by decision-makers towards local inhabitants was observed and recorded. It has become clear that these events failed to incorporate meaningfully the diverse views and interests of different groups of stakeholders by design. In the ethnographic engagement with the users of the riverbank patterns of use were observed and recoded along with the social characteristics of user groups. It has become clear that currently a very diverse pool of local stakeholders benefit from the ecosystem services of the river and there was no unequal access observed. However, the present plans developed by the dominant local actors of urban development planning will most probably and significantly change the current situation of access and use. Thus it seems timely to carefully examine the plans from an environmental justice perspective and highlight the potential implications of changing access and use patterns for the diverse local social groups currently benefiting from multiple ecosystem services the River Tisza provides.

Sustainable and Responsible City Excellence
Nora Rodek Berkes

In today’s globalized world we hear more and more about sustainable development, ethical corporate governance, ecological footprint and similar concepts that are inspiring us to behave and operate responsibly from individuals to large enterprises. An important element of the new rural development model is the question of sustainable city or region. Corporate Social Responsibility (CSR) is an important means of achieving sustainability. The CSR approach is about striving for sustainable development while creating value for the society. If the benefits of the CSR concept can be experienced in case of the companies, it can be assumed that they can be applied also in case of a city. The concept of CSR has only been examined in case of small and medium-sized enterprises. The innovative aspect of this research topic is the idea to apply the elements of the CSR concept on city level. Previous research on the subject have also highlighted the fact that most of the leaders in Hungary are not aware of the elements of the CSR concept and they identify CSR as environmental protection and charity. A directive of CSR is needed which enables leaders (even company or city leaders) to learn
about the concept of CSR and its elements, so this information could help them in responsible decision making. During the research the Sustainable and Responsible City Excellence Management and Assessment Tool (SRC EMAT) was developed based on the logic of the EFQM Excellence Model. It serves as a guideline and evaluation system for the city leaders and makes them comparable as a result of the evaluation process. The method is under validation, but the results of the evaluation will show the urban characteristics and competencies that most contributes to sustainable and responsible operation. The results of the research also highlight the correlation between the urban characteristics and the socially responsible operation.

We cannot expect from leaders to be able to decide responsibly without knowing this information. The research was motivated by the idea to identify the factors that can contribute to the successful adaptation of CSR elements. According to previous experiences gained from researches at this field it was proven that the socially responsible operation depends on the management’s approach. Based on this result, it is essential to inform the decision makers in a city about the positive impact of the socially responsible operation. Without this information it will be difficult for them to begin a sustainable and responsible city development. Taking this result into consideration it was assumed that social responsibility on city level can be reached through the local decision-makers (economic, social and political leaders). The research aimed to develop a quality management system and guidance to help leaders understand the CSR approach and its introduction into the city management practices.

Table 1. CSR guidelines and standards

CSR has no internationally agreed definition and there is no precise determination of its areas. Guidelines and standards related to CSR were collected into this table (Table 1.) to see what are the core subjects they have in common. As a result, the determined elements of the CSR concept can be found in the 5th column. The last column shows the key elements of the sustainable and responsible city (SRC). Similar to the corporate CSR areas, the following core subjects were determined in relation with the cities: 1. responsible leadership- makes responsible decisions and integrates social responsibility into the strategy as directives to be followed, 2. the local residents and communities- what the town leadership ensures in order to improve the standard of living and the services, 3. the environment- what the town leadership makes to protect the environment and to become a greener and cleaner town, 4. local businesses and organizations- what the town leadership makes to support the businesses and the organizations, 5. services- improving the quality of services and the number of services undertaken voluntarily. After collecting the elements of international standards and directives for social responsibility and sustainability, we were looking for a quality management system which framework is appropriate to develop the SRC excellence model. The SRC excellence management and assessment tool (SRC EMAT) was developed based on the logic of the EFQM Excellence Model.

Table 2. SRC Excellence Model

The SRC EMAT can help cities to identify the SR (social responsible) activities and it also shows improvement opportunities, as the model is based on the logic of TQM (Total Quality Management). With the use of the assessment tool the SR intensity of different cities can be comparable that also gives further research opportunities.

Keywords: Corporate Social Responsibility, EFQM Excellence Model, SRC EMAT, Sustainable and Responsible City Excellence Management and Assessment Tool, sustainable and responsible city
Elements of ecological macroeconomics: sustainability in the context of capitalist growth models

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Background: the challenge of developing a new economics
Since environmental research took off, a large number of scientific fields and communities have emerged. Many are inter- or transdisciplinary, are problem-oriented and focused on pressing issues. Within this family of related fields, ecological economics has a specific role to fill, namely to ensure that biophysical perspectives become foundational in the development of a new economics. A new economics is needed, because mainstream economics as a scientific field is based on flawed theoretical foundations (Keen 2011), legitimises inequalities and is not fit for meeting the considerable environmental, social and economic challenges facing the global society. An alternative economics should provide a better understanding of our current predicament and be supportive of socially just sustainability transitions.

To meet the challenge of developing a new economics, cooperation is needed between various streams of heterodox economics. As Fullbrook (2013, 2014) has argued, the different communities of heterodox economics tend to define themselves on the basis of their particular difference with the orthodoxy, which makes the alternative weak. However, there is a good basis for developing a more coherent and stronger alternative, since heterodox economists agree on a number of substantial points. From the perspective of ecological economics, linkages are established to other heterodox communities in relation to, for instance, environmental governance, conflicts and valuation, but there are potentials in many other areas. The purpose of this paper is to explore linkages to selected heterodox approaches to macroeconomics.

Macroeconomic issues in ecological economics

Macroeconomic perspectives have been central to modern ecological economics from the beginning. One of the starting points of the field was the growth debate – the discussion on the compatibility of economic growth and sustainable development. Important research programmes have been developed to operationalise the biophysical perspective on the economy as a metabolic organism, forming the basis for discussing decoupling, steady state, unequal exchange, and ethical concerns related to distribution and welfare. Other valuable contributions concern the relationship between exergy and economic growth, but until the crisis in 2007-2008, ecological economists did not pay much attention to macroeconomic issues such as booms and busts, employment, inflation, balance of payments, interest rates, the financial system, fiscal and monetary policies, etc. Since then, ecological economists have become much more aware of the importance of finance and macroeconomic policies for sustainability concerns.

The challenge for an ecological macroeconomics is to integrate environmental and macroeconomic concerns: how can we understand the relationships between macroeconomic dynamics and environmental impacts, how do environmental and economic crises coevolve, and what kind of interventions may meet environmental, social and economic concerns simultaneously? Recent years have seen a number of contributions to the development of an ecological macroeconomics. After a brief survey of the main issues, this paper focuses on capitalist growth models, in order to understand the current macroeconomic context for addressing sustainability challenges.

Phases of capitalism
The point of departure is the idea that the capitalist system, nationally and globally, has developed through various phases with qualitatively different characteristics. Different accounts from, for instance, the French Regulation School, the American Social Structures of Accumulation approach, and various Post-Keynesian authors, apply different concepts and emphasise different dynamics, but they do not differ fundamentally and in many ways complement each other (Hein et al. 2015).
During the post-war period, developed country economies experienced a Keynesian virtuous cycle with wage-led growth, depending on relatively strong unions, the development of welfare states, access to
cheap energy and other raw materials, and the role of the USA as the dominant power. During this period, poverty and inequality in OECD countries were reduced, but in the long run the model was vulnerable, partly due to inflationary pressures. The Bretton Woods system was undermined, and the 1970s became a period of great instability. From the early 1980s, the build-up of a neoliberal growth model took off. A key feature was financialisation, which implied an increasing role of financial actors, markets, and institutions in the operation of the economy. A process of deregulation enabled financial institutions to develop their activities and acquire more powerful positions in the economies.

This phase of capitalism is characterised as a finance-led growth regime or finance-dominated capitalism. The bargaining power of workers came under pressure from unemployment, increased labour market flexibility, globalisation and competition related to a new international division of labour, technological change, and less protection from the welfare state. Relating to the environment, financialisation implied increasing commodification of nature and privatisation of commons. Finance-dominated capitalism took different forms in various countries. While USA and UK can be described as ‘debt-led consumption boom’ economies, where the demand gap due to wage stagnation was filled by debt and asset price inflation, other countries, such as Germany, Japan and China, applied a ‘mercantilist export-led’ strategy. Since export-led growth was only possible because of the debt-fuelled growth in other countries, the strategies were interdependent (Hein et al. 2015). The interdependence was also strengthened by the reduction of barriers to international capital flows and the related trade in complex financial instruments.

The neoliberal growth model gave rise to a large number of financial crises, culminating in the Great Recession starting in 2007. The depth of the crisis was caused by the build-up of debt over a long period, very high leverage, increased interconnectedness, and the fact that the financial markets ceased to fill the demand gap created by increasing inequality. The phase of financialisation can be seen as a form of rentier capitalism, in which rent is captured through financial activities at the expense of the real economy and the environment. Presently, the combination of large inequalities and a large debt overhang makes it hard for the neoliberal model to recover.

Research questions

Macroeconomic controversies and power struggles revolve around the possibilities for economic recovery along neoliberal lines versus more Keynesian-inspired recipes. In addition, ecological economics questions whether any of these possibilities are compatible with sustainability. Many aspects are involved in the controversies, such as the importance of technological change and globalisation, but the main focus here will be the conflicts related to money and finance, including whether and how the appropriation of rent through financial activities, privatisation and commodification can be reversed (Mellor 2010, Sayer 2015). Based on an exploration of the present controversies, the intention is to combine the ecological economic focus on sustainability with heterodox macroeconomics to discuss the following questions:

- Is it possible to identify the contours of an emerging capitalist growth model? Or the contours of a post-growth model, capitalist or otherwise?
- How do the macroeconomic struggles influence the conditions for sustainability transitions?
- Which political demands in relation to money and finance could be supportive of sustainability?
- What is the sustainability potential of bottom-up activities related to money and finance?

References


Introduction:
In the recent past, there has been a significant increase in the anti-coal movements across the globe. Coal mining, as well as coal fired power plants produces a range of dire social and ecological impacts. These include degradation of natural ecosystems, generation of air and water pollution, loss of agricultural productivity, legal and illegal rehabilitation of people, loss of public health, violation of human rights both in terms of displacement as well as harmful working conditions, and production of carbon emissions. These harmful consequences have led to a wide spectrum of protests against coal in both the global North and the global South. However, the vocabulary of protest is different. In the global north, the anti-coal movement focus on a ‘climate justice’ perspective. These are primarily non-violent, civil disobedience movements, and involve large number of participants from different places who aren’t always directly affected by the coal mining or coal power plant activities, but are rather worried about the global climate and the future. On the other hand, in the global South, the anti-coal movements are largely protests to defend the land, livelihood, cultural and spiritual heritage and local biodiversity. These protests are carried out mostly by the ecosystem people (Guha and Gadgil, 1995), who are the most vulnerable as their means of sustenance is often in peril due to coal extraction and consumption.

As explicitly seen during the COP21 Paris Agreement, countries of the Global North are adopting strategies to phase-out coal to prevent climate change. As a consequence, in the next few years, the policies and protests against coal in the Global South will play a major role in shaping the climate justice as well as the environmental justice narrative regarding energy use changes. In this regard, India will play a prominent role in the near future. India remains heavily dependent of fossil fuels for its energy consumption, with coal providing more than two-thirds of the country’s electricity. It is the third largest producer (after China and USA) and importer (after China and Japan) of coal in the world. It continues to emphasise the importance of coal for providing energy, which is evident from the current government’s plans of doubling India’s coal production by 2020 to 1 billion tonnes (from 494.23 million tonnes produced in 2014-15).

The anti-coal movement in India currently can be seen from the ‘environmentalism of the poor’ (Martinez Alier, 2003) framework, where villagers and/or indigenous people whose lives, livelihoods and cultures are threatened raise their voices in defense of the environment. These protests are also a manifestation of ecological distribution conflicts. These conflicts arise from the destruction of the rich forests for coal related activities, resulting in the deprivation of the indigenous people inhabiting these forests of their resources (Martinez Alier, 2003).

Framework and Methods:
In this paper, I will analyse twenty cases of ecological distribution conflicts over coal in the Indian subcontinent, as reported in the Environmental Justice Atlas (www.ejatlas.org) with an attempt to understand the similarities and differences between the popular movements across the different regions of the subcontinent. The Environmental Justice Atlas is a unique global map of movements over ecological distribution conflicts which are directly reported by environmental justice organizations that are a part of it. The analysis of these cases will provide the different motivations of the anti-coal movement in India and her neighboring countries such as violation of human rights, land...
appropriation, climate injustice etc. I will also consult secondary data, such as petitions, court verdicts, grey literature like newspaper and magazine articles, NGO campaigns, both regional and national, to see the relevance of climate justice in the anti-coal movement in these countries.

Discussions:
The second part of the paper will derive the potential linkages of the anti-coal movement with the degrowth literature from the case studies. Degrowth aims to repoliticize the debate for socio-ecological equity and justice across the planet (D’Alisa et al., 2014). Although it started as a very European movement, it has found alliances in many alternative ideas of well-being from the global South. In India, although the word ‘degrowth’ isn’t openly used, many claims of environmental justice movements are aligned with those of degrowth, such as participative governance, autonomy, democratic rights over resources etc. The case study analyse will shed more light into this potential scope of aligning the anti-coal movement of India with the network of ideas in the vocabulary of degrowth.

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Can Instability Indicators Reveal Interesting Things About The Dynamics Of The Macroeconomy?
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This paper explores the use of instability indicators developed in statistical physics to analyse the stability of the GDP within national longitudinal datasets. The work was inspired by an interest in the role of inter-decadal factors which may affect the economic growth rate, including debt overhang and a decline in the quality of physical resources. Two particular indicators – the autocorrelation (AR1) and the variance – were found to be particularly useful. These indicators were first derived for the Maddison-Project dataset, which includes almost a century of data for some 80 countries and almost two centuries of data (1820-2010) for 9 countries. Further, they were applied to ~50 years (1960-2015) of recent annual per capita GDP data for around 130 countries from the World Bank dataset. Finally, they were applied to ~60 years (1955-2015) of recent quarterly per capita GDP data, for about 20 countries, taken from OECD data. Analysis of these historical GDP data highlights interesting inter-decadal patterns of instability. The most commonly occurring pattern of instability is significantly found in ~70% of the observed high GDP economies. It is characterised by an increase in instability from the 1900s to 1940s, a decline in instability between the 1930s and the 1970s, then a further increase in instability from the 1960s to 2010. Consistent with this pattern, a general increase in instability (as measured by the two indicators) is observed since ~1950 for 70% of high GDP economies in recent GDP datasets. From these early results, it is suggested that these novel instability indicators may provide invaluable insights into the inter-decadal dynamics of the macro-economy, providing potentially useful insights into (e.g.) the nature of the business cycle, secular stagnation and the restoring forces of the economy. Increasing our understanding of the long-run dynamics of the macro-economy is timely, particularly considering the immediate need for effective policy tools to tackle environmental concerns. The dynamics of the macro-economy and economic-stability may be central concerns for facilitating the transition to an environmentally sustainable economy.
Politics of space and scale of sharing initiatives in the Czech Republic
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If we define economy as means of fulfilling our material and practical needs for life, whole spectrum of activities that we perform daily unfolds before our eyes. Geographer Gibson-Graham illustrates this economical variety on the iceberg model. We can see only a small part of an iceberg above the surface, so it could seem like neoliberal economy is only one that exists. But under surface there is a great number of activities and these activities are very important part of economy. Many authors (Gibson-Graham 2006, Healy 2008...) call for radical heterogeneity, emphasize the need of diverse economies and recognition of all parts of economy as necessary and valuable. According to Gibson-Graham (2006) one of consequences of present capitalocentrism is that we subconsciously give positive economic value only to the activities that are connected with capitalism. Other types of production, distribution and commodity exchange are perceived as less valuable. But different types of production and transactions have various quantity and quality; it may not be something dominant. We don’t in fact express or value the multi-layerness of economic life. Theoretical background for highlighting of marginalized economic activities can be based on feminist geography or queer theory. While patriarchy or heterosexuality is dominant in other fields, in this case we can see relationship between capitalocentrism and economic alternatives. One of the marginalized activities is sharing. Belk (2007) describes sharing as form of distribution which is alternative to market exchange and gifts. Sharing can foster community, save resources and create some synergies. While market exchange and gift giving focuses on private ownership, sharing allows two or more people to use benefits and/or costs of property. Sharing is the oldest and most basic form of economic distribution of human history. Belk (2010) gives an example of several culture based sharing traditions as sharing cup of tea in Asia or dinner served in “family style”. People share for practical reasons and out of necessity to survive but also for altruistic motives. According to Belk (2013) more of sharing and collaborative consumption would be beneficial not only because of the consumer advantages, but also for fostering community and improvement of environment (mainly with respect to current discussion about climate change). Other authors ascribe sharing positive influence on the environment too. Heinrichs (2013) states that the collaborative way of life can disrupt mainstream economy and consumerism, improve social cohesion and minimize consumption of resources. Celata (2015) agrees that sharing is a powerful weapon in fight for mitigation of climate change and for sustainability, thanks to the reuse of sources and shift from ownership and market to collaborative consumption and commons. According to Jonas (2010) the research of alternative economics should begin with finding their place-based variants, so we can know conditions and circumstances in which those alternatives occur and exist. The paper deals with sharing as an important part of diverse economies. It briefly outlines the theoretical background of the research on this topic and then focuses on sharing initiatives in the Czech Republic. It concentrates mainly on activities based on the "bottom-up" approach and with non-profit or non-market character. Therefore, it shows a different angle of view on sharing than does the so called sharing economy, which is main topic for many researchers in recent years and which is characterized by the use of internet platforms and focus on profitability. Number of non-market initiatives however uses internet platform to connect people to share. Their motivation is primarily to be found in social or environmental aspect of sharing. Financial gain has only minor role or is completely excluded. Based on that we can draw line between sharing and pseudo-sharing as Belk (2013) explains. This paper, however, deals primarily with politics of space and scale of these initiatives. Thus, it answers the questions of whether initiatives are working locally or nationwide (possibly expand abroad), whether they have the ambition to expand in space, and whether, locality or scale is part of their program (e.g. whether they consider locality as one of their goal, whether it is one of the motives for establishing the initiative etc.). Presented results are based primarily on analysis of semi-structured interviews with representatives of several sharing initiatives. Several questions were focused solely on the attitude towards localization
of initiatives and their spatial extent. Interviews were conducted as part of the qualitative research within project Forms and norms of alternative economic practices in the Czech Republic at the Masaryk University in Brno in 2014-2016. Initiatives with which the interview was conducted, has been working for several years, so we can provide better view of their development of issues in spatial policies. Research shows that a local scale is an important element for the functioning of the pursued initiatives. Some even consider it an essential part of their identity and they are purposefully committed to localization. Local scope, however, is often based purely on practical reasons. Sharing is simply the best at close distance. However, as to space policy, that is different. Certain initiatives are working, or at least planning to operate nationwide, and some have even overlap abroad. Thus local scale is important, but we often observe spatial ambition to expand its activities. The issue of locality or globality is also important for many authors. According to Jonas (2010) rootedness in the place or region is crucial for alternative economies because it anchors social values in the area. Still it can have global impact, if what seems like a small local experiment, may grow to larger sizes. Sharing initiative, which now strengthens the community and reduces the burden on the environment only on a local scale, may tomorrow to expand into the whole region. Or inspire people elsewhere, who create their own small-scale initiative. Therefore, it is important also to explore the issues of scale and spatial policy of alternatives to better understand how they work and how they evolve.

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Integrating methods for valuation of peatland ecosystem services
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Valuation of ecosystem services calls for different disciplines and methods to represent multiple dimensions of value, including ecological, socio-cultural and economic values (Gómez-Baggethun and Martin-Lopez 2015) as well as individual, shared and social values (Kenter et al. 2015). Yet empirical valuation studies tend to focus only on one value dimension at a time, either economic or non-monetary values. Furthermore, although the rationale of valuation studies is to inform decision-
making, few valuation studies have looked at the ways in which value information is actually used by
decision-makers (Laurans et al. 2013). In this paper we will present a multi-method valuation study in
which we used choice experiment (CE), deliberative valuation workshops (citizen juries), and multi-
criteria decision analysis (MCDA) to address the multiple dimensions of values provided by peatland
ecosystems in Finland. Peatlands offer various, and mutually exclusive, ecosystem services: Peat is a
domestic source of energy but its extraction destroys peatland ecosystems and their capacity to
provide services such as water purification and carbon sequestration. The protection of peatlands is a
topical—and controversial—question in Finland: the Ministry of the Environment has prepared a
proposal to extend peatland protection areas and at the same time, bioeconomy is one of the
spearhead projects of the current Government.
Economic valuation is expected to communicate the importance of ecosystem services in terms that
matter to decision-makers, namely monetary units (ten Brink 2011). For economic valuation we used
CE method which invites respondents to select from multiple alternatives, displayed in terms of their
disaggregated dimensions like provisioning or cultural services, and the associated costs (Hanley 2001).
Economic valuation focuses on individual preferences (Sagoff 1998; Tienhaara et al. 2005) and
therefore we used citizens’ juries (Kenyon et al. 2001), which allow participants to articulate shared,
or transcendental (Kenter et al. 2015), values and ethical principles related to ecosystem services via
group deliberation (see also Wilson and Howarth 2002). A yet different approach is MCDA which is
particularly suited for illustrating trade-offs and assisting stakeholder dialogue about contested policy
problems (Belton and Stewart 2002).
The assessment process started with designing scenarios, which included alternative levels of peat
extraction and peatland protection: In the maximum protection scenario (S1), no untouched peatland
is used for peat extraction while in the maximum bioeconomy scenario (S4) extraction is increased by
30% compared to the business-as-usual scenario (S3). One scenario represented the proposal by the
Ministry of the Environment to extend protection to those peatlands that are most valuable for
biodiversity protection (S2). Next, we estimated the impacts of the different scenarios for the delivery
of ecosystem services that were identified on the basis of literature as well as interviews of key
stakeholders (participants to the MCDA process). The services included carbon sequestration, water
purification, recreation, biodiversity and peat.
The scenarios and their impacts (attribute levels) were used in a CE survey, which was administered to
11,000 randomly selected people. 2000 answers were received by October 2016, the analysis of the
results in under way. Tentative results suggest that majority of people found peatlands important
especially for recreational purposes and maintaining good quality of water bodies. Also biodiversity
was valued quite high by majority of the respondents. For example, 61% of the respondents agreed or
strongly agreed that peatland ecosystems have existence value.
The MCDA process started in spring 2016 with interviews of key stakeholder representatives. The
scenarios and ecosystem services to be included in the analysis were discussed in the first meeting
with the stakeholders in September 2016. Based on the feedback, a scenario in which all peat
extraction, also from the already drained peatlands, was included in the analysis to represent the most
climate-friendly scenario. Furthermore, some ecosystem services such as cultural heritage, education
and medicinal products and pharmaceuticals were added. The delivery of ecosystem services under
each scenario will be presented to and discussed with the stakeholders in December 2016. Interactive
decision analysis interviews (Marttunen and Hämäläinen 2008) will be carried out with the stakeholder
representatives in January 2017 to find out the relative importance of the criteria for the stakeholders
considering the range of variation in the criteria performance user each scenario. A meeting will be
organized in 2017 to discuss the results and explore the possibilities of finding some common ground
between the stakeholder representatives on the desirable level of peatland protection and peat
extraction.
Three parallel citizen juries will be carried out in January-February 2017. All juries will have three half-
day meetings and they will be facilitated by the same person. The initial assumption is that the MCDA
process with stakeholders with vested interests shows less learning among the participants than the
citizen juries (see Soma and Vatn 2010). It will also be interesting to see whether the three parallel
juries will all come to the same conclusions about the importance of different ecosystem services, and the preference order of the scenarios.

In the analysis we will explore the complementarities as well as contradictions between the three different approaches to ecosystem service valuation, and discuss the pros and cons of different valuation methods (see e.g. Vatn 2009; Hanley 2001) in the light of empirical experiences form the peatland case study. The analysis also draws on the feedback on the methods and their results by the actors who participated in the valuation exercises as well as on the results of a focus group with policy-makers in which the results of the different valuation processes were presented to them. It will look at the ways in which different valuation methods helped people—either in a position of a stakeholder, a consumer or a citizen—to articulate their values and interests related to peatland ecosystem services, and the ways in which policy-makers received the value information presented to them: Did they find the information useful in the context of current debate on peatland protection areas, did they trust, or favor, the results from certain valuation method, and did they find the combination of different methods helpful or confusing. The results of the study will provide insights into designing ecosystem service valuation processes that can account for multiple dimensions of value and better relate to real-world decision-making processes.

References


Emissions embodied in trade and Nationally Determined Contributions (NDCs): implications for ambitious climate targets

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The Paris Agreement represents the first time that all nations have come together under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) to participate in the common effort to combat climate change. To date, almost 60% of the 197 signing countries or Parties have ratified the agreement, whose overarching objective is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” (UNFCCC, 2015). Doing so, the agreement posits, would necessitate global greenhouse gas (GHGs) emissions to peak “as soon as possible” and be rapidly reduced thereafter so as to “achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century” (UNFCCC, 2015).

In preparation for the Paris Climate Conference, countries submitted national plans, better known as ‘Nationally Determined Contributions’ (NDCs), that spelled out their intended actions to effectively reduce their GHG emissions. In the lead-up to, and aftermath of, the Paris Conference a wealth of scholarly research has emerged on the consistency of these NDC mitigation pledges with the objectives of the Paris Agreement. The overall consensus has been that even if implemented in full, NDCs are insufficiently ambitious to put the world on a pathway to a lower-carbon future. Instead, projections point to a median warming of 2.6-3.1°C by the end of the century (Rogelj et al., 2016), while the window for achieving the 1.5°C target has been reported to be “small and rapidly closing” (Rogelj et al., 2015).

Even though parties have submitted voluntary (i.e. non-binding) targets, the agreement states that they should “communicate or update” these contributions on a five-yearly basis, understanding that each successive review should lead to further strengthening of target ambition and scope. Driven by this acknowledgement, a parallel strand of research has thus emerged that looks into what such ambition enhancement might need to look like if dangerous anthropogenic climate change is to be averted (Meinshausen et al., 2015), and how the requisite transformations could be plausibly brought about in the near-term (Rogelj and Knutti, 2016; Mitchell et al., 2016; Hallegatte et al., 2016).

Emissions embodied in trade

International climate policy processes, in which the Paris Agreement is embedded, have historically ignored trade, treating emissions from domestic production differently from emissions embodied in imports. As a result of globalization, 20-25 percent of overall carbon dioxide emissions are associated with the production of internationally traded products (Peters and Hertwich, 2008; Barrett, J. et al., 2013). The associated implications for global mitigation policy can be, in this sense, far-reaching. In particular, while domestic mitigation policies in wealthy nations may well result in relative decarbonisation, such effects can be nominal at best if they promote expansion of export production in less efficient locales of the global economy. Such ‘off-shoring’ of emissions merely externalizes the environmental and social costs of consumption, as domestic emissions reductions are effectively counterbalanced by the importation of cheaper, yet (often) more carbon-intensive, substitutes from abroad (Dauvergne, 2010). This phenomenon has been commonly referred to as demand-driven carbon leakage (Peters, 2010).

Emissions embodied in trade, and particularly carbon leakage, constituted an issue of concern in the Kyoto Protocol period, as it was argued that industries located in nations with legally-binding reduction targets were in disadvantage with respect to similar industries located in regions with no mitigation costs. It is believed, however, that the relevance of carbon leakage will decrease under the Paris Agreement, since emissions from developed and developing countries, including the most carbon intensive, will now be covered. For instance, China, the current largest net-exporter of emissions, has pledged to lower its carbon intensity by 60% to 65% below 2005 levels by 2030.
In this study, we assess the implications of the current NDCs for GHG emissions embodied in trade. This work complements and adds to the existing literature on NDCs and the post-2020 climate regime by moving away from a production-based focus and taking into account instead the ‘embodied’ or ‘virtual’ emissions in internationally traded goods and services up to 2030. In particular, we look at the NDCs of the 17 countries that form the Major Economies Forum on Energy and Climate (MEF) from a consumption-based angle and explore their consistency with the objectives of the Paris Agreement.

In terms of methodology, we use an Econometric Multi-Regional Input-Output (EMRIO) model to project production- and consumption-based emissions for these countries up to 2030. Input-Output Analysis has been traditionally used to calculate the virtual content of trade flows (Wiedmann, 2009), and in this case we add an econometric component to be able to estimate future trajectories. Data was obtained from the World Input-Output Database (WIOD), which encompasses information for 41 countries for the period from 1995 to 2011. GHG emissions data was provided by the Carbon Dioxide Information Analysis Centre (CDIAC) and the World Bank.

Selected results

We find that the carbon trade balance in many of the MEF countries will change, with important consequences for the global carbon budget. With respect to developed-country MEF members, an even greater portion of their emissions will be emitted outside their borders to satisfy domestic consumer demands. Consequently, even if they make good progress towards reducing their domestic emissions relative to a base year, they will still be emitting more than their fair share of the global emissions budget associated with a 2°C future.

Our findings also indicate that China, from being the single-largest source of embodied emissions, is in route to become a net-importer by the 2030s. Moreover, it will be soon overtaken as the world’s greater net-exporter by countries like China and Russia.

In overall terms, the amount of embodied emissions in trade will tend to gradually increase as a proportion of total emissions. If a cumulative perspective is taken, the carbon budget compatible with a 2°C future (approximately 1000 Gt of CO2e till the end of the century) will be exhausted by the 2030s if reductions are not intensified in the near future.

The results obtained in this analysis are important and have significant policy implications. Such changes, like China becoming a net-importer, could create a new set of power relations within the UNFCCC regime, with further implications as to which countries should be the appropriate targets for future technology transfer and innovation support. Furthermore, given the current NDC emission trends, the need to ratchet up the level of ambition in the next round of NDCs is undoubtedly critical in order to limit the global average temperature to well below 2°C above pre-industrial levels. Finally, the findings offered in this study show the importance of addressing trade and, more importantly, consumption in any future climate negotiations.

References
Investigating the relationships between economic growth and the primary, final and useful stages of energy transformation in economies: Portugal 1960-2009

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The importance of energy for modern economies is empirically suggested by the simultaneous global increase in energy use and economic growth, verified over the last decades. Advances in energy efficiency technologies, coupled with increasing energy consumption, have characterized industrialization and economic development in the past century.

However, the vast literature focusing on causal relations between energy use and economic growth is inconclusive regarding both the direction of causality and impacts on policy [8]. Published results fall into the following categories: a) no causality (neutrality hypothesis); b) unidirectional causality from energy use to economic growth (growth hypothesis); c) unidirectional causality from economic growth to energy use (conservation hypothesis); d) bidirectional causality (feedback hypothesis).

The method for aggregating and measuring energy flows is widely debated, and can exert a significant effect on the results from causality studies [2]. Energy flows are commonly aggregated in units of thermal equivalents, but this method fails to reflect the qualitative differences among energy inputs. Although alternative measures have been proposed, only a small fraction of relevant studies considers these alternatives [4].

One such alternative – useful exergy – is proposed by [1] as the appropriate representation of energy used productively in the economy. Understanding this choice requires understanding the distinction between different stages of energy transformation in economies: primary (energy in nature), final (energy sold to consumers), and useful (energy actually used to perform a final function in the economy). It also requires an understanding of the concept of exergy. In thermodynamics, exergy is the maximum amount of physical work that can theoretically be recovered as a system approaches equilibrium with its surroundings. It is a measure of potential work that accounts for irreversibility due to increases in entropy, and allows for the construction of comparable aggregate measures of energy flows. Hence, useful exergy measures exergy flows at their useful stage, after all transformation and conversion losses, just before becoming energy services in the economy. It is a quality-adjusted measure for energy used productively.

Due to its empirically-observed close relationship with economic output [7,9], useful exergy is also regarded as the appropriate measure to account for energy as a factor of production within an aggregate production function (APF) framework. Recently, a cointegration-based method has been applied to identify and test for statistically significant APFs linking output, capital, labor, and energy inputs [6]. The latest generations of causality studies between energy use and economic growth also adopt multivariate cointegration methods [5]. To date, the long-run relationships between primary, final and useful energy/exergy inputs and economic growth have received little attention, and so we apply the methods in [6] to fill this gap. The implications are highly relevant for policymaking, especially for economies facing energy security issues. If useful exergy has a causal effect on economic growth, improvements to energy efficiency and shifts in the patterns of energy service demand can stimulate economic development without increased energy consumption.
Methodologically, we identify long-run economic relationships through joint statistical properties of economic and energy data. Testing for cointegration between data series is equivalent to testing the hypothesis that there is a statistically significant connection between them. If the considered data series correspond to economic output, traditional inputs to economic production (capital, labor), and energy inputs to production, the long-run statistical relationships reported in cointegration analysis can be interpreted as (Cobb-Douglas) APFs, if satisfying a set of criteria to assure economic plausibility. Each criterion corresponds to conditions imposed on the cointegration subspace and causal dynamics between variables, and constitutes a stage of acceptance of rejection of empirically tested models.

1. Cointegration must be observed between output and factor inputs. Time series are tested for unit roots, grouped in well-specified vector autoregressive models (VAR), and tested for cointegration following [3];
2. Normalized cointegration coefficients must be positive and significant. These coefficients will correspond to factors’ output elasticities in identified Cobb-Douglas APFs;
3. Long-run Granger-causality must be observed between factor inputs and economic output. Insights to the causality dynamics between energy use and economic growth are obtained from these tests; Besides econometric-driven criteria, the models are also evaluated and compared regarding goodness-of-fit to historical data, and correspondence between estimated output elasticities from identified APFs, and historical capital and labor cost.

The methodology is applied to historical economic and energy data for Portugal (1960-2009). Alternative models are considered, for each distinct energy input adopted: primary energy, final energy, primary exergy, final exergy, and useful exergy [7]. All VAR models also include time series for economic output (gross value added), and quality-adjusted capital and labor inputs (capital services, and human-capital adjusted hours worked, respectively).

Preliminary results show that cointegration is observed between economic variables (output, capital, labor) and any of the energy input measures considered. However, economically plausible APFs are only identified when useful exergy is included in the model – thus confirming and strengthening the results of [6]. All remaining models fail to satisfy the second criterion listed above, as well as correspondence with historical cost shares for capital and labor.

Regarding causality dynamics, obtained results do not allow for a “clear-cut” categorization of energy-growth causality according to the above-mentioned hypothesis. However, there is evidence to support the notion that energy inputs measured closer to their use in economic production exhibit a statistically stronger (possibly bidirectional – feedback hypothesis) causal relationship with economic output. Final exergy, and especially useful exergy have a long-term causal effect on economic growth, thus revealing the importance to economic production of energy use at these stages. Useful exergy also appears as the only considered energy input exerting both a direct causal effect on output, and an indirect effect, through unidirectional causality towards capital inputs.

Overall, our analysis shows how useful exergy likely constitutes the appropriate measure for energy inputs to economic production, and to accurately account for the impact of energy use on economic development. By virtue of both the direct and indirect causality links between useful exergy and economic output, economic growth can be maintained or stimulated not only by increasing the amount of energy resources consumed, but also by using the available energy (exergy) more efficiently, i.e. increasing the useful exergy obtained per unit of energy consumed.

References

Defining and Quantifying Natural and Environmental Amenities: a Literature Review
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This paper takes a step back from the notions of natural amenities and environmental amenities. What are natural and environmental amenities? How are they defined and measured in the scientific literature, and in relations to what research purposes? To answer these questions, we present a review of the (about 225) peer-reviewed quantitative articles published during the period 1989-2013 exhibiting one of these two notions in their titles, abstracts or keywords. We observe a strong trend toward an increasing number of publications per year, and a concentration into five main journals (Ecological Economics being the first). Two main research objectives are followed: recovering implicit prices of natural assets (about 40% of the papers) and understanding their impacts on regional economic development (about 35%). Most articles do not mention any definition of natural or environmental amenities, but move directly to the issue of measuring them. The two notions are not distinguished empirically since they are measured with analogous indicators. Neither are they distinguished theoretically in the papers providing definitions. In these later, we cannot identify a single or even a small set of commonly accepted definitions. Nevertheless, at least seven distinct classes of amenities can be identified, and a huge diversity of measures within each class. Most papers use a set of unidimensional measures of natural/environmental attributes (predominantly land-cover/land-use and water-related indicators, and to a lesser extent topographic and climatic indicators). Fewer papers use PCA-based so-called “amenity indices”, and even fewer multidimensional indicators stemming from ecological science. Natural/environmental “disamenities” are rarely considered together with natural/environmental amenities.

Is the achievement of “good ecological status” for German surface waters disproportionately expensive? Justifying less stringent objectives according to WFD with disproportionately high costs
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The European Water Framework Directive (WFD) pursues the ambitious goal to bring all European
Waters into a “good status” by 2015, the latest by 2027. As a matter of fact, however, currently only 8.2% of German surface water bodies have reached a good ecological status and none reached a good chemical status (UBA 2016). Results throughout Europe are also disappointing (EEA, 2012). For all those water bodies that presumably will not achieve the objective by 2027, the WFD prescribes that the member states have to justify an exemption by 2021 and to define “less stringent environmental objectives”. There is a catalogue of possible reasons for that, in particular “disproportionately high costs”.

But what are disproportionally high costs? Throughout Europe, there is yet no unified and only a few well-established, applicable methodologies for routinely assessing disproportionality (for an overview see Klauer et al., 2016). Disproportionality according to the WFD can generally mean that costs for potential measures to achieve the objective are too high either in relation to the positive effects, i.e. the generated utility of the measures (cost-benefit analysis, CBA), or in relation to the financial capacity of the (public or private) subjects that have to bear the costs (affordability) (Klauer et al. 2007).

The interpretation of “disproportionality” in terms of a cost-benefit calculus may seem most obvious at first sight (Martin-Ortega, 2012), and accordingly several attempts for an operationalization have been made along this line (e.g. Postle et al., 2004; Molinos-Senante et al., 2011; Vinten et al., 2012; Jensen et al., 2013; Hecht et al., 2014). However, direct and indirect methods for evaluating the benefits (i.e. ecosystem services) have been found to be very laborious (e.g. Hecht et al., 2014) and to face methodological shortcomings (e.g. Spash and Vatn, 2006; Wegner and Pascual, 2011; Lo and Spash, 2013; Spash and Aslaksen, 2015). In conclusion, we consider CBA to be an appropriate method for selected cases only (large cities, exceptionally high economic interests at stake, important employment issues etc.), but not to be suitable as a routine methodology for a large number of water bodies (Klauer et al., 2016). So, whereas some EU member states (e.g. the UK and Denmark) consider CBA to be the backbone of disproportionality assessments in the context of practical water management, German water authorities show strong reservations against any routine application of CBA to assess disproportionality.

Attempts have therefore been made to develop alternative methods, which are not exclusively based on CBA but also consider affordability aspects. In this paper, two approaches that, for assessing disproportionality, weigh the costs of achieving “good status” against past or current projected expenditures for water management in other contexts (Ammermüller et al. 2011, Klauer et al. 2007, 2016, Sigel et al. 2015) are empirically tested and compared on a set of real world data from one of the German federal states.

Comparison of two approaches to assess disproportionality

Two methodologies have been proposed to assess disproportionality of costs, which compare the projected costs for achieving “good status” of a given surface water body by 2027 to some sort of cost benchmark, which is specific to that water body. If the projected costs are higher than the benchmark, then costs are considered to be disproportionally high. The two methods vary, however, in the way this benchmark is defined:

Method A (Ammermüller et al. 2011)

Ammermüller et al. base their cost benchmark for any given surface water body on the projected costs to achieve “good status” in all other water bodies in the federal state. These costs are normalized with respect to the catchment area of the water body and the mean value is determined. The benchmark is then derived by multiplying the mean value with some factor which depends on the generated utility (regarding the water body itself and beyond) by bringing the surface water body in question from the current to a good ecological status. This utility is not measured in monetary terms but estimated by semi-quantitative proxy variables (current state to target distance, additionally generated utility for, e.g., tourism). Hence, effectively, this method is based on a cost ranking of all water bodies. The water bodies, which are the most expensive in relation to size and generated utility, are then outranked as being disproportionally expensive. This method is, however, only applicable, if projected cost data are available for all water bodies in the domain of the responsible water authority.

Method B (Klauer et al. 2016, Sigel et al. 2015)
Following some criticism of practitioners concerning too high data requirements (mainly concerning the unavailability of comprehensive cost data), Klauer et al. and Sigel et al. developed a different path to obtain a cost benchmark, which is based on past public expenditure on water management. Such expenditures can be interpreted as a proxy for the financial capacity of the state to invest into water protection not only in the past, but also in the future until 2027. Data on past public expenditures for water protection over some period of time are normalized with respect to the catchment area of the water body in question. The resulting figure is, again, marked up by some factor depending on the generated utility (regarding the water body itself and beyond) by bringing the surface water body in question from the current to a good ecological status. As has been argued by the respective authors, both benchmarks can be considered as a proxy for society’s will and capability to spend resources on surface water protection. And both methods include some rough considerations of the benefits to society that are generated by the measures to reach a good surface water status. The main difference between Methods A and B are the two different starting points for the derivation of the cost benchmark: In Method A, it is the mean value of the projected costs per catchment area to reach a good status by 2027, and in Method B it is the past expenditures for surface water protection. The data requirements for Method A are higher than for Method B. Method A requires a complete overview of the projected costs for reaching a good status/good potential in all water bodies of a federal state. The data necessary to calculate the cost thresholds with Method B stem mainly from the environmental-economic accounting of the German Federal Statistic Office and the monitoring program which is mandatory according to the WFD. Hence, these data are routinely available.

Assessment of the two methodologies on a set of real world data
Both methods are empirically tested and compared on a set of real world data from one German federal state comprising data for all 164 water bodies of that state. The main results are:
1. Both methods can be applied and successfully discriminate between water bodies with and without disproportionally high costs. The results are intuitive.
2. Surprisingly to the authors, both methods yield similar results, i.e. water bodies in which projected costs have been identified as proportionate with method A were with a few exemptions also proportionate when applying method B.
3. Overall, irrespective of the method employed, only for a small proportion (less than 10 %) of water bodies less stringent objectives could be justified with disproportional costs. The paper will elaborate on this in more detail.

Discussion
The notion of disproportionality intrinsically includes a value judgement. It is, hence, not possible to objectively determine a priori which cost level is proportionate or disproportionate. The only benchmark which is – seemingly – less prone to these value judgements and sometimes claimed to be more “objective” would be the benefits in a cost-benefit calculus. However, due to the significant methodological shortcomings of CBA (see above) this is not a real asset. Interestingly, the WFD itself refrains from using CBA to determine its environmental objectives in the first place, but bases these on a natural reference state without cost-benefit considerations.

From that it follows that a test of the above described methodologies cannot prove them as being “wrong” or “right” or as being “accurate” or “inaccurate”, on a fundamental level, because there is no “objective” benchmark. However, it can be argued on the level of applicability and plausibility, whether or not such a methodology is appropriate. On this level, our comparative test finds both methods to be appropriate. Very relevant for this conclusion is the fact, that (i) both ways of determining the cost benchmark can be backed up in an argument of plausibility and that (ii) both methods yield very similar results.

It is another major result of the empirical test on real world data that only for a small portion of surface water bodies a valid argument of justifying an exemption for achieving “good status” can be made based on disproportionate costs. Two different interpretations of this result are at hand: (i) The actual costs of measures to achieve “good status” are much less extraordinarily high than is sometimes claimed. (ii) Or the projected cost figures do not properly reproduce the true costs. The latter is
considered plausible because they are partly based on rough estimation and the assignment of costs to different public tasks is notoriously difficult.

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The imperative of tackling climate risks beyond adaptation: A transdisciplinary framework for transformative action on Loss and Damage
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It is indisputable that the most significant and welcome outcome of the 21st Conference of the Parties to the Climate Convention (COP 21) in Paris was the agreement on the ambitious target of limiting global warming to “well below 2°C” temperature, with efforts of further reducing this to 1.5°C (UNFCCC, 2015). The announcement of the Paris Agreement generated intense discussions regarding the scientific challenges ahead (Peters, 2016; Mitchel et al., 2016) as well as concerning the political and technical feasibility of the target. Despite the Paris Agreement’s call for a “global [peak] in greenhouse gas emissions as soon as possible … and [the undertaking of] rapid reductions thereafter”, current GHG emission reduction pledges and mitigation efforts are likely to lead to significantly higher levels of warming (Rogelj, 2016), thus intensifying what are already significant impacts on the climate world-wide (IPCC, 2014a).

Policy makers, practitioners and members of civil society are increasingly advocating to pursue a climate risk management strategy, i.e. comprehensively managing existing and future climate-related risks, including to limit their adverse impacts on natural structure and functioning of ecosystems, and the ability of countries to pursue sustainable development pathways (IPCC, 2014b). This imperative becomes particularly challenging when focusing on those impacts that cannot or will not be avoided through mitigation and adaptation, thus causing irreversible loss and residual damage, which can be alleviated to some extent (Felgenhauer, 2015); this is particularly true for the global South where coping capacities for climate variability are often already strained due to a number of trends unrelated to climate change (Abeygunawardena et al., 2009).

Seen from this perspective, another important outcome of COP 21 was the full endorsement of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM). However, the concrete scope and scale for L&D remains (deliberately) unclear in the climate policy discourse (James et al., 2014). While the parties to the UNFCCC acknowledge that L&D “includes, and in some cases involves more than, that which can be reduced by adaptation” and some authors argue that it focuses on those climate-related risks where physical and socio-economic limits to adaptation are breached (Verheyen, 2012), the boundaries between climate change adaptation (CCA) and L&D, and thus the WIM’s remit has been uncertainly defined. This remains a core issue even as the WIM has very generally been reviewed at COP 22 in Marrakesh in November 2016, with a closer scrutiny scheduled for 2019.

At the same time, finding common ground among non-Annex I countries demanding compensation for incurred losses, and Annex I countries suggesting to focus on risk management of future losses seems possible. Mechler and Schinko recently pointed out a policy space for L&D with two sets of options as distinct from CCA or disaster risk reduction (DRR) (Mechler and Schinko, 2016). The first set of options refers to support for curative measures, which deal with unavoided and unavoidable risks. The second set of options refers to the concept of transformative risk management—that means building resilience against climate-related impacts while also realizing that people and communities will need
support to develop new livelihoods, or even voluntarily migrate to new homes to cope with the impacts of climate change.

Identifying the L&D risk and policy space appears useful to ensure that support, including funding, from the WIM is aimed at those countries in greatest need. Yet, the question remains how to implement action on climate-related risks today and in the future given a number of risk-analytical and socio-political challenges. More specifically, conventional economic approaches, methods and tools, such as benefit-cost analysis and expected utility theory, are not well-equipped to tackle these methodological challenges, particularly as their capacity to deal with risk and uncertainty (Kunreuther et al., 2013), as well as with distributional effects and non-market impacts, is rather limited. We summarize these challenges before presenting a transdisciplinary dynamic framework building on adaptive learning theory as applied to climate change via the concept of iterative CRM, which holds great potential for addressing the remit of L&D. We see the main advantage of this approach in that it provides an immediate strategy for tackling the climate crisis (Watkins, et al., 2014) – early action on climate change considered highly relevant for the prevention and management of climate change impacts, in addition to establishing transformative adaptation and mitigation pathways and ultimately limiting global warming to 1.5°C vs 2°C (Knutti et al., 2015).

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Biodiversity and ecosystem services in European cultural landscapes: Pathways, pitfalls, and perspectives

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Throughout Europe, ingenious land use practices have generated biodiversity-rich cultural landscapes. These are under pressure from agricultural intensification, land abandonment, and urbanization. The cultural landscape concept has recently been broadly adopted in conservation science, policy, and management to address these challenges; and global initiatives such as the Satoyama Initiative promote the protection, and governance of cultural landscapes. The ecosystem services approach – focusing on the services nature provides – can be a powerful framework to guide conservation efforts. However, while there are some very promising examples of conceptualizing, testing, and applying the ecosystem services concept in landscape-level conservation and management there is still room for development and improvement.

Drawing on empirical evidence from studies conducted in two human-shaped landscapes located in Upper Lusatia and Swabian Alb, Germany, we aim to enhance the knowledge of how to safeguard biodiversity and ecosystem services in integrated, subsequently termed ‘cultural’ landscapes. We analyze the relations between ecosystem services, policy instruments, and local quality of life, and shed light on the various context-specific aspects that need to be considered when implementing the ecosystem services approach in cultural landscapes. We identify how biodiversity conservation in such cultural landscapes can contribute to green economic development. In particular, we address a number of important aspects that need to be understood when managing cultural landscapes, including the spatial dimensions of biodiversity and ecosystem services, the existing policy instruments and ownership structures, the perspectives, knowledge, and action of local people and land-users, the multiplicity of ecosystem services, including cultural ecosystem services, and the importance for adopting a dynamic view on landscapes. Finally, we present practical and policy implications of fostering ecosystem services in integrated landscapes and explore linkages between the landscape approach and the debate around a ‘green economy’.

This contribution represents the synthesis of a four-year research project that was carried out by an interdisciplinary research team, comprising environmental and resource economists, political scientists, and landscape ecologists as well as agricultural and forest scientists. Empirical and analytical methods used include GIS-based landscape analysis, ecosystem sampling, scenario techniques, social surveys, participatory mapping, policy discourse analysis, and literature reviews. Among others, our findings show that safeguarding biodiversity and the ecosystem services it provides depends on numerous individual land use decisions at field-level (or on some form of cross-farm activities), which in turn depend on land use policies and land ownership structures. However, crucial
spatial dimensions of ecosystem services are largely neglected by regulatory and voluntary policies focusing on individual farms or on small-scale measures at the field-level. Policies fostering coordination and cooperation for providing these ecosystem services are rare. We argue that economic instruments are no panacea for the governance of biodiversity and ecosystem services, not the least because many factors including problem characteristics, actor constellations, instrument design, policy process, and market conditions often reduce their performance in specific contexts. The case studies we discuss manifest that local communities possess some local ecological knowledge that shapes the perceptions, attitudes, and land use decisions of landowners and users. Revitalizing this local ecological knowledge might be an opportunity for local biodiversity management to become more effective in terms of ecosystem service preservation and public acceptance. We also illustrate that cultural services are the crucial issue in the perception and valuation of landscapes by local people, being closely connected to biophysical and human action. The interest in cultural ecosystem services provides a strong motive for people to actively engage in landscape preservation, and thus can be a powerful tool for an integrative landscape management strategy.

Landscape change can be destructive or beneficial with respect to the protection of biodiversity and the provision of ecosystem services. Since sustaining cultural landscapes and their services by means of low-intensity management is likely to be costly, it thus becomes important to define which services and dynamic processes are desired. Incentives for biodiversity conservation and ecosystem services provision need to take into account the spatial dimensions of the respective ecosystems (and of the ecosystem services provided by them). This means that such incentives need to be set at the appropriate spatial level if they are to be (cost-) effective. Due to the wide range of spatial scales and dimensions, it must be considered where ecosystem services are actually “produced” and “consumed”.

Policy instruments should also aim to address bundles of ecosystem services instead of maximizing single services such as, for instance, bioenergy production. Particular attention should be paid to non-material benefits, such as cultural services because for the general public landscape benefits such as nature-based recreation are the most directly perceived contributions of biophysical landscape features to human wellbeing. If market-based instruments are designed, private funding should only be additional to state support, and should support supplemental civil society engagement. Importantly, funding priorities should follow societal needs rather than investors’ interests.

The acknowledgement and valuation of cultural ecosystem services, however, vary across different groups of people and landscapes. Therefore, participatory and regionalized approaches are indispensable for the assessment of cultural ecosystem services and their integration in policies. Given their high relevance for people, cultural ecosystem services provide a powerful argument to encourage public engagement for biodiversity conservation and sustainable rural development. Fostering cultural ecosystem services often shows positive synergetic outcomes with other ecosystem services, and in this respect it can contribute to the conservation of biodiversity and other ecosystem services reducing thus tradeoffs. In this regard, integrated land-use practices such as high-nature-value-farming have particular potential.

Finally, the supply and availability of biodiversity and ecosystem services depends on natural factors as well as on their social, economic, and cultural context. However, these factors are subject to frequent and sometimes substantial dynamics. Thus, rigid policy instruments in a one-fits-all-style are not appropriate. Instead, policy instruments that aim at conserving and enhancing ecosystem services must accommodate such dynamics and varying contexts. In an adaptive management way, they should be able to react to changing natural or socio-economic circumstances, embrace local knowledge, and include periodic reviewing of their impact and outcomes. Thus, in a Green Economy, biodiversity and ecosystem service considerations need to be systematically integrated in policy-making and planning, particularly in agricultural, forestry, and nature conservation policies. The contribution will also briefly present a set of guidelines derived from the empirical analysis on how such integration can be designed in the context of cultural landscapes. These concrete guidelines will include options to improve the acceptance and cost-effectiveness of agri-environmental schemes and other PES schemes and practical ways to better account for the importance of
cooperative and participatory approaches as alternative instruments or forms of governance that can likewise contribute to greening the economy and increase the social inclusiveness of cultural landscapes. Finally, the presented guidelines will identify ways to better integrate the consideration of biodiversity and ecosystem services into sectoral (e.g., agricultural or forest) and cross-sectoral policies focussing on the examples of the Common Agricultural Policy of the EU, Regulatory Impact Assessments of draft legislation, Strategic Environmental Assessments of policies and plans, and Environmental Impact Assessments.

Cost-effectiveness of buying land for conservation versus paying land-users for conservation measures – the case of preserving an oligotrophic lake in a Natura 2000 area in North Germany

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Nature conservation agencies are confronted with a crucial decision to make at the beginning of every conservation project: which mode of governance to choose for the project implementation: (1) to buy areas of interest and implement the planned conservation measures themselves, or (2) to offer compensation payments to landowners to incentivize them to voluntarily implement the conservation measure on their land (Juutinen et al. 2008; Schöttker et al. 2016). From a theoretical point of view, this choice is based on considerations on transaction costs in general, and the make-or-buy decision in special (Coase 1937; Williamson 1975). To our knowledge, only few case studies have investigated the issue of cost-effectiveness differences between buying and compensating land for biodiversity conservation (Juutinen et al. 2008; Curran et al. 2016).

The goal of this paper is to investigate the cost-effectiveness of governance options for biodiversity conservation against the background of the make-or-buy decision at hand of a case study on the Natura 2000 conservation site of the lake Bültsee in Schleswig-Holstein, Germany. The project site is implemented by a governmentally funded, however independent nature conservation agency, the Stiftung Naturschutz Schleswig-Holstein (SNSSH), which buys and administratively manages land for grassland conservation. After purchase, the area was extensified to increase biodiversity and re-establish an oligotrophic environment in and around the mesotrophic lake. The first parcels of today 51 ha of land were purchased in 1980. The area was then gradually extended until 2011, when the last project site expansion was made. The actual cultivation and agricultural management, i.e. the implementation of extensive grassland measures, is performed by an external contractor, the Bunde Wischen e.V. (BW). The relevant grassland management scheme – an extensive cattle grazing regime – is operated by the contractor which implements the prescribed measure on the land. The land is therefore leased by the BW from the SNSSH, based on a long-term contract. The agency thus faces the one-time costs of buying the land plus side expenses (e.g. purchasing prices, notary fees, taxes and administrative costs), periodical expenses for actively managing and monitoring the conservation site, and a periodical income from leasing the land to the contractor. This governance mode of buying land is compared with the hypothetical costs of alternatively implementing an alternative compensation scheme with an identical conservation outcome on the same area. In this hypothetical governance mode, the agency faces periodical expenses for compensation payments and transaction costs, both based on the opportunity costs of the extensive grassland measure, and potential income from selling produce generated by the implemented extensive grassland measure. The results for both government mode options are then compared on a cumulated yearly basis to determine the costs up to a given year and to determine the cost-effective choice for each year throughout the case study timeframe. Our data consists of historical data provided by the SNSSH and the local contractor the BW on the actual costs of buying and managing land at the conservation site between 1980 and 2015, as well as extensive third party literature, e.g. on agricultural land profitability, produce prices and transaction costs.
costs for estimating the hypothetical costs of a compensation scheme for that timeframe. We provide a detailed conceptual framework of relevant costs in either alternative and show that the cost-effectiveness of governance mode depends on parameters like transaction costs, leasehold conditions, agricultural land prices, and AES-subsidy-availability. We then conduct a sensitivity analysis and individually assess the influence of the mentioned parameters on the cost-effectiveness. We find that the compensation scheme is more cost-effective in the short run, while buying land and internally managing it outperforms in the long run, with a break-even point around 2006. Among other factors, we find that with increasing transaction costs the implementation costs of the compensation scheme are relatively increased and both alternatives break-even earlier. Increasing agricultural land prices, i.e. resale values of the project land, make the buying alternative more attractive, with a correspondingly predated break-even point. We could not confirm any relevant influence due to the booming bio-fuel sector. Contrary to the prevailing opinion that buying land for conservation projects is less cost-effective compared to borrowing land, we showed that for sufficiently long time frames and under certain economic conditions buying is indeed the superior governance alternative. Results from our study have been used by the SNSSH in policy planning and communication with policy makers and have already been communicated to various other conservation agencies and projects to support cost-effective decision making with respect to governance modes.

Bibliography

Compatibilities and incompatibilities between the life-satisfaction, capability and human needs approaches?
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Finding a best tool to assess changes and processes taking place on individual level in a context of communities embarking on degrowth has been a contentious issue. The relevance of subjective well-being as a measurement tool and approach has been challenged by various authors (O’Neil 2008, Davies 2015).

The capability approach has been criticized for its uneasy operationalization and culturally assigned features (Clark 2005). The basic needs approach, resting on objective lists of universal requirements for achieving certain level of well-being is also prone to universalization, and its implementation is not straightforward to implement, nor standardized.

It would be difficult to argue that any of the approaches listed above contains an all-encompassing approach to defining, studying and assessing human well-being. Certainly, there are multiple ways to conceptualize subjective well-being, as well as to interpret data on life-satisfaction. While certain types of life-satisfaction data can be interpreted in the framework of happiness enhancing productivity and eventually growth, other studies show that there are point of decoupling between income growth/material consumption and subjective well-being; between increases in working hours/focus on earnings and scores on individual happiness; and inversely – average levels of equity, volunteering
and participation tend to growth and fall with levels of subjective well-being. These studies point to the relevance of subjective well-being measurement as one of the avenues to argue for degrowth trajectories.

Rather than setting the pros and cons of using subjective tools for measuring well-being however, in this session we would explore whether and to what extent subjective well-being studies can align with capability and fundamental human needs approaches, or provide coherent results in terms of measuring progress towards sustainability objectives. While the differences between the three approaches are well articulated in the literature, the complementarities between them are barely explored. This discussion would certainly also involve looking at the complementarities between quantitative and qualitative approaches to assessing human well-being; between participative/multidimensional and more rigid/closed-survey ways to evaluating well-being. Relevant questions to ask in this respect are: What are the empirical frameworks where complementarities emerge and could be explored? Are the challenges of addressing issues of justice underpinning all three approaches? Can we argue that the three measures feed and complement each other, rather than compare with each other? In the context of degrowth and the need for using multi-faceted approaches to understanding and evaluating human wellbeing, we will also ask whether voluntary (intentionally) acts of ‘bounding’ our capabilities (in order to share resources with the current and future generations, for example) would negatively affect:

- the fulfillment of our fundamental human needs,
- our key capabilities, or our
- subjective well-being?

Bibliography

Conflicts and vulnerability: the multiple facets of degrowth
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What would be the major challenges for societies embarking on lower material throughput, and hence consumption through collective action and challenging power structures? Observing spaces of experimentation and structures which align themselves with degrowth ideas and practice we can identify two generic challenges, amongst multiple others, which this intervention will try to explore and reflect upon.

The first challenge concerns the way conflicts are dealt with, conflicts associated with rank, with power structures and power relations, within groups or with external bodies or institutions. Often new frameworks of analysis such as the one of degrowth poses new questions and challenges, but the very ways of addressing them tend to fall within an “old” framework, the one belonging to societies entwined in competition, domination, hegemony, dualities and ‘otherness’. In this short talk and discussion, I would like to take another look upon conflicts and perceive them as points of tension that could eventually open up new sets of possibilities, or as containers of useful information which needs to be carefully unpacked. As an illustration we can look at the conflict between being ecologically/politically correct and adopting certain unsustainable lifestyle decisions in your daily life, or the conflict between one’s formal job and her worldview or utopia. On a more conceptual level, the conflict between (strong) sustainability on the one side and quick “dirty jobs” creation is a typical intellectual counterargument of degrowth. We will look at these conflicts and explore the multiple,
visible and invisible voices they bring up, trying to see how conflicts evolve and what emerges when the different sides/visions/actors acknowledge each other in an open and sincere dialogue and communication.

The second challenge is related and concerns the ways we address vulnerability. The very idea of limiting exposure to vulnerability is deeply nested in neoclassical economic relations, in business and state institutions, harnessed in monetary exchanges that eventually contribute to the society of growth. These so-called structural limits to reducing vulnerability are co-evolving with the human and psychological limits to experiencing it. The search for safety, comfort and high-ranking achievements is guiding economic and technological progress by way of limiting vulnerability. Yet, removing vulnerability also means ostracizing those relational goods and processes that are time-intensive, non-reciprocal and non-utilitarian. Indeed close or deep relations are risky, for they open the door to experiencing a relational wound. However they also represent a key component of living fulfilling lives.

The proposals advocated by the community of degrowth researchers and practitioners imply strengthening the relationships based on gift and human inter-dependence, which might involve higher vulnerability. Degrowth, I will argue, is only perceivable when opening space for vulnerability and therefore deep connectedness with the other(s).

In this session conceptualizations of conflicts and vulnerability will be shortly exposed, followed by a facilitated group discussion, and collection of personal reflections, where participants connect with their experiences.

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Energy, exergy and theories of growth and distribution
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This contribution discusses how energy and exergy analysis can feed into different economic theories of growth and distribution. After explaining how past analysis has been carried out with reference to the neoclassical theory, it explores the possibility of detaching energy/exergy analysis from the neoclassical theory of growth and distribution, and instead including it in a cost-based theory of value (and hence growth and distribution). It is argued that because of the simultaneous determination of distribution and value in the cost-based theory on which ecological macroeconomics is also built, this can establish a connection between energy and exergy analysis of economic growth and ecological macroeconomics.

At the root of a theory of economic growth and distribution is the insight that the economic cost of production or the price, p, of a particular commodity, can be dissolved into \( p = w + \pi + m \), where \( w \) are wages of labor, \( \pi \) profits of capital and \( m \) material costs. But since material costs are the incomes another set of labor and capital have produced, this can be written as a nested sum of labor and capital incomes. For the economy as a whole, this translates into the fundamental accounting identity \( \text{Y} = wL + rK \), where \( \text{Y} \) is aggregate value added or output, and \( L \) and \( K \) the aggregate labor and capital.

Starting from this identity, a number of economic theories have attempted to explain the process of growth and distribution.

In recent decades, much work has been done on elucidating the importance of energy, and in recent years, on exergy for the production of economic product. In principle, this need not be carried out in a particular theoretical framework. However, extant energy and exergy analyses of this process have
typically been made with reference to the neoclassical theory of growth and distribution (Stern and Kander 2012, Santos 2016). In this theory, assuming twice differentiable ‘production functions’ which can combine inputs in an uncountable infinity of different techniques, distribution (wages and capital) is a consequence of factors’ relative ‘marginal’ productivities, hence distribution is an afterthought of production, but is supposed to reflect contribution to the product. Adding energy and analyzing its productivity requires augmenting value added with the share of m represented by energy and taking its marginal product. However, estimating production functions suggests that the share of energy in this augmented value added should be higher than its actual share (Kuemmel and Lindenberger 2014). This provides a puzzle for neoclassical theory of growth.

However, it has also long been acknowledged that using aggregate production functions to explain distribution is problematic (Wicksell 1901), and the so-called Cambridge capital controversies have shown that the value of ‘capital’ (including the circulating capital which pays for energy) cannot be established independent of the distribution between wages and profits (Robinson 1953-54, Sraffa 1960; for a recent summary see Harcourt and Cohen 2003). Starting from a cost of production theory perspective, a numerical example is developed that shows how the cost of energy production can vary with the income distribution that obtains, as well as with the cost of producing energy. Once this is taken seriously, it can be reasoned that the value (and hence share) of energy (or exergy) in the (augmented) value added is not a measure of energy’s contribution to production but rather a reflection of the techniques of production and the income distribution that obtains.

It is concluded that in ecological macroeconomic models, which is an ‘aggregated’ version of a cost-based theory of value, the cost of energy or exergy in producing the output, could be made plausible analyzing the input structure of energy in multi-product models. Then aggregate ecological macroeconomics models of growth can treat energy costs as a constraint on distributive outcomes, and given the insights from exergy analysis on ‘minimum’ useful work requirements, can be used to analyse plausible growth scenarios simultaneously with their distributional outcomes.

References

Understanding regional divergences: the development of the Spanish agricultural sector in the long term
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From 1950 the Spanish agricultural sector underwent an intense process of changes closely related to the development of the irrigation system. The expansion and modernization of water infrastructures allowed overcoming aridity in many areas of the country. However, it entailed important pressures on
natural resources and divergences between the provinces with natural water endowments and those with a high agricultural productivity. Cazcarro et al. (2015) analyse the impact of irrigation on agricultural production and water resources at the country level. They find an intense transition towards water intensive crops during these years that generated growing pressures on water resources. In this line, a significant share of the pressures on domestic water resources in Spain is linked to irrigated agriculture, consuming 75% of total water (INE 2008).

Traditionally supply side measures were implemented to manage the regional mismatches between water availability and water demands, boosting hydraulic investments in the most arid regions of the country (oriented to high value added and export crops). The entry of Spain into the European Union (EU) in 1986 and the Water Framework Directive triggered a smooth reorientation of water management towards demand policies. This change has been studied in several papers (Aguilera 1999; Arrojo 2003) showing the abandonment of old paradigms on agricultural development that were replaced by new approaches based on demand (water savings, efficiency, prices, etc.) that consider water as a multidimensional good.

In this framework, this paper focuses on the assessment of the long term generating process of regional divergences regarding apparent water productivity in Spain. With this aim, we will obtain indicators on the historical development of the agricultural sector, highlighting water disparities and evaluating some of the main determinants of this process. These analyses that join agricultural returns, productivity and water use have been previously carried out for Spain in a short term period (Garrido et al. 2006). Our study will shed light into the different long term impacts of irrigation in the Spanish regions, notably contributing to the existing literature on this topic. Additionally, the disparities on water productivity (income obtained per each cubic meter of water used) have been a common argument to develop waterworks in the most arid areas in Spain (producing high value added crops notably oriented to foreign markets). In this concern, this paper will provide a better understanding of this long term process, considering not only economic but also sustainability and social criteria, essential to design any water management policy.

This work will be developed using historical information on production taken from the Spanish Ministry of Agriculture (MAGRAMA, 2016). This data offer disaggregated detail on the specific crops cultivated in every Spanish province. In addition, consumptive water use data at a regional level stem from Mekonnen and Hoekstra (2011). We will analyse the period 1950 to 2010. Therefore, we will evaluate a relevant period with notable structural and institutional changes affecting the agricultural sector and considerably modifying its relationship with natural resources. This regional data will be analysed deepening into the differences in terms of economic output and water impacts generated by the expansion of irrigation at the provincial level.

This work tackles one of the Millennium Development Goals established by the Organization of United Nations (ONU), ensure environmental sustainability. Water is a scarce resource, particularly in Spain a semi-arid country with important temporal and spatial divergences concerning precipitation. Aldaya and Llamas (2012) acknowledge that water scarcity problems in the world are not generally related to physical water scarcity but to a bad management of water resources. In this regard, Spain, the country with the largest arid area in the European Union, historically implemented policies that fostered agricultural development at the expense of environmental impacts and internal water conflicts among regions or river basins. Therefore, this assessment on the environmental, economic and regional impacts of the development of the Spanish agricultural sector will offer instruments and historical insights for a better management of water resources at a national and regional level. Finally, our analysis will provide scientific criteria to understand current water conflicts in Spain, useful for every agent involved in the agricultural sector and for the society as a whole.

References
Pro-environmental behavior: on the interplay of moral norms, green infrastructures and attitudes towards the future
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A key issue for ecological economics concerns the processes whereby people engage in ecologically responsible behavior and contribute to environmental quality even when that comes at a personal cost for a shared benefit. This paper explores the relative impact of intrinsic motivation versus external conditions and economic incentives on eight pro-environmental behaviors (PEBs): waste separation for recycling; reduction of waste (by avoiding over-packaged products and buying products with a longer life); reduction of domestic water consumption; reduction of domestic energy consumption; purchase of green label products; purchase of local products; choice of a greener way to travel; and diminished car use. It also investigates the influence on PEB of seemingly unrelated factors such as financial problems and attitudes towards the future.

Like human behavior in general, PEB is jointly determined by cognitive processes internal to the individual and by the external context that surrounds her. In the past, most studies, and consequently policy recommendations, have typically focused on one of these two aspects; favoring either educational interventions or alterations of external conditions through incentives or taxes (Fehr and Gintis, 2007; Guagnano et al., 1995; Turaga et al., 2010). However, these one-pronged approaches ignore the insights from the other perspective; any conditional effect that the variables in one approach may have on variables of the other; as well as interactions between them (Guagnano et al., 1995).

This paper proposes an integrated framework to address these shortcomings in support of two-pronged policies. It contributes to the understanding of the conditions under which external factors are conducive of PEB, and when providing external incentives—such as the provision of monetary incentives and green infrastructures—can be effective.

Using the Eurobarometer 2014 dataset measuring PEBs and environmental attitudes in the European Union’s 28 member states, it represents the first empirical test where the interaction of intrinsic and external factors is considered on a wide set of countries. Previous studies have been limited to case studies and field experiments, which restricted the potential applicability of their findings to the particular socio-cultural context involved.

Findings suggest that both intrinsic motivation and external conditions positively contributed to the likelihood that an individual behaved pro-environmentally (PE). Yet, among the two, intrinsic motivation—as measured by an individual’s norm recognition, ascription of responsibility and awareness of consequences proxies—dominates over external conditions. This finding was consistent
across the eight PEBs examined. In particular, individual ascription of responsibility for the environment appears to be an essential precondition for the individual to respond positively to external incentives: e.g., less prone to negative influences (such as economic constraints) and more receptive to enabling conditions (such as the availability of economic rewards). Guagnano et al. (1995) proposed that intrinsic motivation can predict behavior outside of extreme external conditions (positive or negative); symmetrically, this paper analyzes the limits of external incentives and suggests that they can only be effective in promoting PEB on individuals who have a minimum level of intrinsic motivation. The considerations above lead us to conclude that a policy mix combining both intrinsic and extrinsic incentives is needed to secure a high observance rate of PEBs in the population. Raising intrinsic motivation through education and the perception that observance of the norm is dominant should in the long term decrease the number or non-intrinsically motivated individuals (i.e. defectors).

Meanwhile, in the short term, improving external conditions will likely facilitate norm observance among those who are already motivated above a minimum threshold.

The framework proposed goes beyond directly related factors such as attitudes towards the environment or incentives to behave PE. Studies suggest that the activation of a norm into behavior also depends on the salience of such norm in a particular situation (Cialdini et al., 2006). An individual’s ability to focus on environmental norms could for example be negatively affected by other more pressing preoccupations such as financial constraints. The paper demonstrates that pressing economic preoccupations can distract the individual from behaving PE, even when the PEB observed is cost neutral. In this case, reframing the choice context into economic terms —by attaching an economic value to the behavior— can be successful in repairing this “loss of focus”. Although a thorough test of the often-cited motivation crowding out effect (1) is not the scope of this paper, it can be noted that, providing an economic incentive to recycle (e.g., as implied by a Bottle Bill legislation) did not decrease recycling rates, but rather increased them. Additionally, the economic incentive was effective only in individuals with a medium to high personal commitment (e.g., ascription to responsibility) to act PEB, supposedly because the economic payoff is generally too small to be even noticed by people who do not minimally commit towards the environment. Thus, the evidence collected in this paper suggests that monetary incentives did not crowd out moral motivation but positively interacted with it.

Additionally, since PEB implies a cost today for increased environmental quality tomorrow, future environmental quality might be more salient to individuals that do not discount future outcomes too much. Thus, through a series of indicators measuring respondents’ attitudes towards the future, this paper investigated whether more future oriented individuals behave more PE. More specifically, we tested whether an individual who has i) a personal stake into the future —i.e. is a parent—; ii) an optimist attitude towards it; or iii) a more long term oriented mindset —i.e. as proxied by the grammatical structure of future tense in her native language— is more likely to act PE (2). These indicators supported the hypothesis that individuals who have a stake into the future; have a more positive attitude towards it; and have a more future oriented mindset are more likely to adopt a higher number of PEBs. Linking attitudes towards the future and a person’s financial preoccupations with PEB is a novel attempt in the literature.

The wider significance of these results for environmental policy is discussed.

Footnotes:
(1) The motivation crowding out theory proposes that the provision of external incentives, such as a monetary payoff, can undermine intrinsic motivation. See Frey, (2012, 2008); and Frey and Jergen, (2001) for an introduction to the concept.
(2) Chen (2013) and later Chen et al., (2015) and Guin, (2015) proposed that the primary language that an individual speaks correlates with the likelihood that she will engage in future oriented behavior. The use of language as proxy for measuring cultural differences is frequent in the literature (Ginsburgh and Weber, 2014).

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Financial Schemes for Flood Recovery in Flood-Resilient Cities
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From the Central European perspective, inland flooding caused by heavy rainfall represents the most severe natural disaster in terms of property damages (Barredo 2007; EEA 2010). A flood occurrence is always followed by discussions of the extent of public relief provisions, issues of responsibility and liability for damages (particularly public versus private risk-sharing) and innovations of mitigation strategies (see, e.g., Bubeck et al. 2012; Hartmann and Albrecht 2014, among many others). Changes in the responsibility-sharing in flood risk management (FRM) is widely addressed due to changing climate patterns, the continual increase in potential flood damages, etc. (see, e.g., Penning-Rossell and Priest 2015).

The basic idea of building so-called flood-resilient cities is to enable them to absorb the negative consequences of flooding – both physically and institutionally – in other words, allowing cities to be flooded while sustaining minimal damage (Begum et al. 2007; Petrow et al. 2006). Cities are not meant to be inundated. Making them resilient requires physical adjustments, such as using streets for retention or as discharge flumes, creating evacuation routes, and installing calamity polders or even floating homes (Pierdolla 2008). Institutional adjustments – such as robust and efficient financial recovery and insurance schemes - are also necessary.

However, flood protection of cities as well as post-disaster emergency relief in general is usually considered to be a governmental task (Barraqué 2014). The European Commission established the Solidarity Fund to support affected countries. But how is this recovery money used? How does it prevent flood risks? As damage statistics tell us, fast reconstruction has often not led to more adaptive and resilient cities or areas. Flood victims are often regarded as mere recipients of financial flood recovery schemes, but not as key stakeholders in preventing damage during the next event. In this context, flood recovery schemes and their contribution to flood prevention are not highlighted, but they directly complement the other efforts aimed to prevent flood damage.

Our intention is to change the understanding of financial flood recovery schemes in terms of their solidarity versus efficiency and to prove their risk prevention potential (when properly applied) and to
analyse the potential of their application at the municipal/city level. In the paper we also discuss into what extent should be the role of the central government reduced in favour of city representatives, which bear the responsibility for spatial planning, and individuals, who are encouraged to consider self-protection strategies. The deductive argumentation directly refers to the theoretical concept of crowding-out effect that explains how increased central government activity negatively affects the involvement of other actors in a particular sector of an economy.

References:

Beyond shareholder value: using social learning and stakeholder theory to explain corporate involvement in biodiversity conservation
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Natural resource management and biodiversity conservation form a key dimension of understanding the function of social-ecological systems (SES). Whilst the broader governance of biodiversity (Biermann, 2012) and new markets and initiatives such as Payments for Ecosystem Services (PES), (Chan et al., 2012) have been subject to a great deal of research and debate, apart from a few isolated examples relatively little attention has been paid to corporate perspectives and priorities in relation to involvement in biodiversity conservation. Most studies that have explored business motivations have tended to focus on the dynamics of the design of schemes or tools to manage biodiversity (Koellner et al., 2010, Lambooy and Levashova, 2011, Nidumolu, 2013, Sell et al., 2006), but the few that have gone beyond institutional dynamics suggest that business involvement in biodiversity is the function of businesses interacting with a complex mix of social, economic and ecological factors (Boiral and Heras-Saizarbitoria, 2015, Houdet et al., 2012, Overbeek et al., 2013, van den Burg and Bogaardt, 2014). Of the few studies that have specifically focussed on exploring corporate perceptions of biodiversity and/ or motivations to be involved in biodiversity conservation schemes, a number of key questions remain unanswered. Do businesses purely view biodiversity through an operational lens, or is reputation also important? To what extent does the sector and regulatory context that a business operates in shape that view? How does the firm’s size shape its outlook? Several studies note a link between sector dependency and/ or impact on biodiversity and likelihood to act (Bhattacharya and Managi, 2013, Bonini and Oppenheim, 2010), but have been unable to rule-out a range of drivers, including reputation, financial and supply chain vulnerability, and direct operational risks. Just as Ecological Economics has sought to challenge the assumption of homo economicus in mainstream economic
enquiry therefore, the view of corporate interests focussed on profit and shareholder value maximisation requires greater investigation, in particular in relation to biodiversity conservation. This paper uses a case study of forestry and salmon farming firms in Chile to explore the factors influencing corporate perceptions of biodiversity and their conservation activities. Drawing on data from 70 interviews covering managers in both sectors and key stakeholders, including representatives from conservation NGOs, conservation biologists and local community activists, it explores why these two sectors have taken such divergent paths with regards conservation. Whilst forestry firms have begun to consider biodiversity management and conservation as important aspects of their activities, salmon farmers have experienced a series of ecological crises, with few signs of the fundamental reforms required to move them towards a sustainable future. These different paths can be explained by combining social learning, drawn from ecology and ecological economics (Reed et al., 2010, Siebenhüner et al., 2016) and stakeholder theory, well established in the fields of management and corporate strategy (Freeman, 2010, Donaldson and Preston, 1995). Social learning helps to reveal how mechanisms associated with certification have enabled forestry firms to build ecological knowledge, whilst restrictive regulatory structures in salmon farming have mitigated against fundamental change. Stakeholder theory addresses two weaknesses in social learning (Reed et al., 2010, Siebenhüner et al., 2016), firstly by identifying who the relevant stakeholders are – conservation NGOs and academics in forestry, state agencies and suppliers in salmon farming – and secondly in understanding why they matter in each case. By linking these two theories into the literature on corporate sustainability (Schaltegger et al., 2013, Starik and Kanashiro, 2013), it is possible to explain why businesses perceive biodiversity in the way they do, and how that links into corporate strategy. Overall, the study demonstrates that whilst firms in both sectors retain a strong profit and shareholder value maximisation strategy, external stakeholders cannot be completely ignored. The cases of forestry and salmon farming also reveal how stakeholder management strategies evolve over time and are linked to the wider formal institutional context in which businesses operate.

This study makes several important contributions in relation to understanding corporate involvement in biodiversity management in ecological economics. Firstly, it demonstrates how concepts developed in related fields, namely corporate responsibility and business strategy, can be successfully combined with established theories in ecological economics to help explain complex phenomena. Secondly, the findings indicate that corporate motivations in relation to biodiversity and its conservation are more complex than a simple profit/ shareholder maximisation view would suggest, and therefore also help to support the more critical outlook generally taken in ecological economics. Finally, this study sheds light on a previously under-explored area of research, namely corporate motivations to be involved in conservation. Better understanding these motivations is important for the design of future biodiversity management schemes and reforms to existing ones: profits may not be the primary consideration and other incentives and levers to promote action may exist.

Select Bibliography


Capturing nature? A critical assessment of TEEB and the valuation of nature

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Economic valuation of nature and the coining of nature in economic terms (‘natural capital’ and ‘ecosystem services’) is steadily gaining increased traction in national and international policy processes. Although the first conceptual grounds were laid already in the late 1960s, thinking of nature as capital providing a flow of income or benefits has become particularly prominent during the neoliberal era. This study looks at one particular event in the course of this process - the UN-backed TEEB (The Economics of Ecosystems and Biodiversity) study inspired by and building on the momentum from the Stern Review on the economics of climate change. Although still ongoing with a small secretariat based at the UNEP, the main output of the study was a series of reports published in 2010 at the time of the important Nagoya meeting of the Convention of Biological Diversity (CBD). While monetary valuation of nature had previously been a contentious topic and methodology within ecological economics, a large number of ecological economists chose to participate in this study which started out with a mandate similar to the Stern review: to calculate the benefits of global biodiversity and the costs of inaction, i.e. the costs of its losses. Much thanks to the ecological economists and other participants sympathetic of their position, TEEB did in the end not carry out a global cost-benefit analysis like Stern did.

So what did it do instead? TEEB instead promotes a particular approach for how to take economics into account in all fields of policy and decision-making, including recognising, demonstrating and capturing value. It is open to the fact that there are other ways to conserve nature than applying economic valuation, but builds its arguments around how we should take into account and appeal to the dominant logic of our world - i.e. economic values. Demonstrating nature’s values in economic
terms communicates with decision makers in a language they understand and allows for rational and efficient decision making. However, even demonstrating the economic value of nature might not always be enough. We must also create incentives which takes nature’s values into account in decision-making. This can be done through various measures allowing to ‘capture values’.

A particular feature of the output from TEEB, is the gap between the mainstream economics discourse outlined in the 400-pages foundations report, and the visionary discourse of TEEB’s study leader Pavan Sukhdev, presented for example in the preface of the same report. While Sukhdev relies on economics for legitimacy, his discourse is in fact about something else: how to build a new economy. Building a new economy requires that we recalibrate our economic compass, i.e. develop new metrics, and spread economic rationality to all areas of decision-making involving nature. Sukhdev links the root cause of degradation to the nature of human relationship with nature. The problem is that modern, urban people in particular have distanced themselves from the nature that we depend on for our survival. This is not something we can change because the process has gone too far, so we must now live with the consequences. But there is hope, and it is here that economic valuation can make a difference. On the one hand valuation can make us more aware and self-reflexive. Further, economic valuation appeals to the dominant language of our societies and can hence alert modern people to nature’s values. We can only appeal to people in their own language, but the result might be nothing less than a new cosmology!

The question which is not raised is how appealing to the same economic rationality that created the problem in the first place can possibly be a solution. Instead we observe a naturalisation of the very same cultural tradition (economic man). It is the economic compass which is problematic, not the economic rationality or greed. Hence, to save nature it must be integrated into an economic logic – not vice versa. To oppose this vision for changing our societies is dismissed as 'ideological'. Although, there were dissenting voices in the study, Sukhdev’s impact has been important, especially as laid down in the TEEB approach. TEEB has gained influence in various ongoing international processes related to biodiversity and nature conservation. Ultimately, the strong push for economic rationality and thinking promoted by TEEB, makes cost-benefit calculations look relatively innocent by comparison.

The study uses a critical discourse approach to identify various ‘voices’ in the documents/project, and to describe how they argue, how they frame the issue, what their motivations and strategies are. The analysis is based on a close reading of some of the main TEEB texts, supplemented by interviews with TEEB participants. The paper argues for the need to place valuation of nature within the broader political economic context. To appeal to the dominant economic logic of our times, is to appeal to power and to the interests of the powerful. There is no reason why this should contribute to the preservation of biodiversity.

Responses of worker organizations to the restructuring of the Austrian energy sector and the increase of renewable energies in the energy mix

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Excessive resource-based production and consumption have led to a situation where our economic activity overshoots planetary boundaries. Multiple crises in the ecological, social and economic sphere are the result. In order to preserve the biophysical basis for a good life for future generations, major parts of the industrial production system have to be reorganized. This transformation towards a sustainable production system challenges current institutions and the predominant logic of actors along the whole production process. Trade unions as the main representatives of workers’ interests in the realm of production have to actively take part in this reorganization. Hence, the questions arise what is necessary that trade unions and worker organizations actively take part in the reconstructing
of our economy and which political positions and strategies do they pursue in dealing with the necessary substantial structural changes.

To shed light on these questions, this paper focuses on the specific case of the ongoing reconstructing of the Austrian electricity production towards renewable energies. This special case is of particular interest, because it was historically marked by severe conflicts and controversies between Austrian worker organizations and environmental concerns. Therefore, it allows us to explore the reasons for the pursued political strategies of Austrian worker organizations in reaction to structural changes in energy production and also to identify the conditions under which they overcome their reservation and actively support the necessary changes.

To carve out these conditions, we applied a threefold qualitative research design. In the first step, we analyzed 48 written documents from the Austrian Trade Union Federation (ÖGB) as well as relevant sectoral trade unions and the Chamber of Labor (AK). Preliminary codes were developed based on a qualitative content analysis as well as a thematic analysis in order to ensure an empirically grounded categorization of the employee representatives’ positions and core arguments. The documents of interest encompassed 10 official press releases between, 14 position papers and policy statements as well as 24 comments on national and European legislative processes. In the second step, we conducted 19 problem-centered interviews with unionists from the energy sector and worker representatives concerned with energy related topics. We selected our interview partners purposefully and we used a snowball sampling approach as it is common in qualitative research. All of our interview partners were chosen, because they represent worker’s interests on different organizational levels in the Austrian Trade Union Federation. In this way, we tried to capture different points of view, positions and strategies within and between the Austrian trade unions.

In the third step, we employed a group discussion between unionists, members of the Austrian chamber of labor and researchers concerned with the topic of a social-ecological transformation, to deliberately deepen the generated insights from the qualitative content analysis and the conducted interviews. The discussion group consisted of 14 participants, eight trade unionists and six researchers. All conducted interviews as well as the group discussion were tape-recorded and transcribed. Based on the collected material, our findings suggest that there are considerable dilemmas in the nexus of environmental policy and the political goals of trade unions. On the one hand, such dilemmas prevent trade unions to strongly engage in environmental problems if they are not explicitly connected with their core competencies or if the solution of these problems does not directly contribute to their main political goals. On the other hand, this paper identifies a set of conditions under which a worker interests oriented reconstructing of the energy system should take place. These conditions include the level and quality of employment as well as the role and extent of market mechanisms, public investment and ownership in energy production and supply. It also shows that if these conditions are fulfilled, or at least part of transformation strategies, worker organizations can be powerful partners in the reconstructing of our energy production towards renewable energies.

Tailoring benefit-sharing for sustainability of global environmental commons: revisiting incentives and systematizing discrepancies
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Global collaboration is both the defining necessity and the main challenge of global environmental commons. Global environmental commons such as atmosphere, forests, shared land and water resources, biodiversity are common pool resources sustainable management of which requires collaboration beyond boundaries of any single nation. The recent decades have seen rapid growth of collaborative treaties signed with the purpose to protect global environmental commons and increasing number of countries joining those treaties. However, there is a common recognition that
due to development needs of societies and effects from changing climate, the stress mounted on
global environmental commons has reached unprecedented high levels (Walker et al. 2009). Examples
include increased frequency and intensity of recorded natural disasters (United Nations 2015),
depletion and pollution of freshwater resources (World Economic Forum 2016), degradation of land
resources and deforestation (Brienen et al. 2015), extinction of species (Butchart et al. 2010) and more,
while forecasts for business as usual scenario are far from optimistic. We therefore explore
collaborative ways with shared benefits that can facilitate changes towards sustainability of global
environmental commons.

A specific feature of treaties on global environmental commons is that the nations have profound
incentives for a so-called free-ride while action or inaction of one nation might have significant
consequences beyond its territories. Although joining a treaty and making a commitment is relatively
easy, enforcement and implementation is usually difficult. We analyze in a structured way first,
incentives of individual States to join treaties on global environmental commons and second,
incentives to implement their commitments. In doing so, potential of the benefit sharing method to
facilitate cooperation, i.e. provide mutual benefits for collaboration, is examined. The focus of the
benefit sharing approach is not on quantities rather on benefits derivable from use and allocation of
global environmental commons. The approach originates from game theoretic concepts such as Pareto
improvement where benefits can be increased at least for one of the players without making any other
player worse-off. The benefit sharing approach enriches the pool that can be shared – enlarging the
cake - to tackle the challenges of negotiations over and implementation of treaties on global
environmental commons. We will discuss three qualities that make benefit sharing particularly
attractive (e.g. Soliev 2016): (1) based on game theoretical concepts benefit sharing aims to improve
net benefits for all, thus, it shifts the focus from positions to interests and therefore transforms the
very potential of conflict into an opportunity to cooperate; (2) benefit sharing calls on innovative
solutions where benefits can be considered not only in pure economic terms but rather across the
entire spectrum of the so called “basket of benefits” including environmental, political and catalytic
(spillover) benefits; and (3) the approach offers a wide range of mechanisms to implement
arrangements with shared benefits which generally could be grouped in (a) financial and in-kind
compensations and (b) issue linkages, where agreements are reached by connecting trade-offs in one
sector, e.g. forestry, with other sectors, e.g. energy.

In terms of application, benefit sharing replicates the “mutual gains approach” known within the
negotiation research since 1980s (Fisher et al. 1991) which focuses on achieving mutually beneficial
deals between negotiating parties. Recently, the term “benefit sharing” has gained attention with the
2010 Nagoya Protocol on Access and Benefit Sharing to the Convention on Biological Diversity which
focuses on fair and equitable utilization of Genetic Resources (CBD 2016; Oberthür and Rosendal 2014)
and as a method has been increasingly suggested within the context of various transboundary water
agreements (Sadoff and Grey 2005).

We will present our study conducted in the following three steps.

First, the focus is on conceptual extension of the research on global environmental commons from
collective action perspective. We will present a theoretical debate about the conceptual boundaries of
a global public good and the way of its joint provision, which at the same time defines the process as
a common-property regime, shortly referred to as new global commons. Here the classification
proposed by Barrett (2007) turned out to be helpful. He uses it for understanding the incentive
structure for cooperation over global public goods. As Barrett (2007) suggests although global public
goods might vary fundamentally by their nature they are often under-provided for reasons that are
similar. Barrett (2007, p. 2) powerfully demonstrates that “some global public goods require
cooperation of all countries; that many need the cooperation of only certain key countries; that most,
but not all, require financing; that some can be supplied by mutual restraint or coordination; and that
others demand only a single best effort”. Yet, Ostrom (2012), in the example of global climate change,
urged to focus not only on global solutions but that much could be done at other scales.

Second, drawing on the above analyses, the study presents a concept how global environmental
commons could be categorized in terms of the needed cooperation for their sustainable governance.
We elaborated a catalogue of existing benefit sharing arrangements from various geopolitical contexts and a selection of global environmental commons to be shared and to be jointly provided in a systematic manner.

Third, based on this categorization, we analyzed capacities of selected forms and mechanisms that could bridge the gap between the status quo and the needed cooperation. We aim to improve understanding why discrepancies occur between an agreement and its implementation. Particularly, the aim of this step of the study is to be able to distinguish across different degrees of discrepancy. To do so, we (i) systematized common factors determining why despite the growing number of scholarship calculating benefits from cooperation over global environmental commons which often demonstrate clear win-win solutions (see e.g. a collection edited by Finus and Caparrós 2015), implementation of these models remains problematic, while some are described as failure; and (ii) analyzed constellations of factors that can lead to significant or not significant degrees of discrepancies in terms of compliance. Structuring and highlighting reasons for no de-facto implementation of the (signed) agreements, should allow us to better tailor benefit sharing arrangements for sustainability of global environmental commons in the future. It may likewise guide our way to improved options for transferring collective action regimes from larger- to global scales.

References
Key Elements of a Social Ecological Economics

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This paper is a contribution to the special session on Developing Consistent Theory for Social Ecological Economics, aiming to reflect on the achievements and impacts of ecological economics in terms of theory building, taking stock of what we have achieved, recalling important and core concepts and topics, and finally aiming at identifying gaps.

The financial crisis highlights the potential for collapse of the macroeconomic system. However, the response from the alternative economic community was weak, half-hearted and soon lost in a revival of neoliberal and, 1920s style, economic austerity politics. Much work in ecological economics has been devoted to deconstructing and critically analysing mainstream economics from microeconomic value theory through to macroeconomic growth imperatives. Yet, there remains no clear or coherent alternative theory that is readily recognised or ready to be implemented.

This paper will highlight core elements of theory that already create a foundational basis from which to work (Spash 2012). Emphasis here is placed upon the need to unite around a common philosophy of science in terms of a shared understanding of ontology and epistemology to build towards methodologies that can inform policy. A related but distinct element of theory building is in terms of social theory. Here ecological economics has been particularly weak and often contradictory and confused, e.g. moving from pro-capitalist positions of Herman Daly, through pro-market mechanisms to degrowth and (often implicit) critiques of capitalism. Here a key neglect is theories of alternative conceptualisations of society and power with the closest area of theoretical research being critical institutionalism (Vatn 2015).

The orthodox approach in economics is a status quo society organised in the (theoretically) most efficient way, where efficiency is in fact taken to mean many different and ill-defined things. The heterodoxy often, like the Post Keynesians, neo-Austrian, traditional Marxists, want to maintain the growth machine. What about ecological economics is it going to be shallow or deep (Spash 2013)? Much of the literature has focussed on side constraint and limits without any fundamental analysis of the capitalism and capital accumulating structure of the economy or the institutions of which it is constituted. Is the intention to organise an alternative ‘degrowing’ economy or only uphold principles for procedural justice (e.g. deliberation, democratic elections regardless of what they bring)? How are human and animals rights to feature in the plural value theory of ecological economics? What about international trade and the associated exploitation, unequal exchange (Hornborg 1998), ecological debt, environmentalism of the poor (Martinez-Alier 2002), environmental justice, and imperial mode of living (Brand and Wissen 2013). These illustrative gaps make clear the need for the ‘social’ domain to re-enter and do so as a primary aspect of ecological economics.

Strengths of ecological economics have been its ontology and the foundational critique based on thermodynamics. However, from there a shallow reliance on benevolent governments to implement market based instruments has become predominant. This faith in good government and market institutions ignores the inadequacy of consumer sovereignty, and the role of corporate structure and power in determining the outcomes of the resulting political economy. Kapp (1950) and Galbraith (1979) long ago pointed out how markets actually operate. A far more realistic perspective is necessary and scientifically justified. Consumer theory should be consistent with actual human behaviour and production theory should be consistent with biophysical laws (Georgescu-Roegen 2009 [1975]). The economic focus needs to be shifted from production to reproduction.

In bringing these various factors together a range of forces can be identified as operating on the economy including systemic and structure factors such as material and energy use, institutions, technology, and population growth. Identifying these powers leads to suggestions as to how a social ecological transformation could operated and needs to operate. What needs to change is the structure of interaction between the economy and the environment (as opposed to just limits and boundaries on biophysical scale), i.e., a fundamental restructuring of society and economy is identified. In this
transformation the political question arises of who needs to make the change? Here research must develop more concrete ideas of institutional structures, power relationships, and how value articulating institutions, public participation and deliberation might operate as means for transformation. All this implies a stronger engagement with structure-agency debate.

The overall thesis of this paper, and indeed the special session of which it is part, is that ecological economists must “understanding the past to see the future” (Spash 2011). This future vision needs to be as utopian as the orthodoxy (with its ever accelerating material and energy growth on a finite planet) in order to capture the imagination of humanity. Yet the transition to that utopia is a realist one. The subject matter includes critical and realist analysis of the limits to wealth creation, the meaning of the ‘good life’, how to achieve well-being individually and socially, the meaning of ethical behaviour, the epistemology of value and the psychological and social impacts of ostentatious consumption. Covering the range of issue outlined above this paper will explore how ecological economics is today failing to achieve its potential and what must be done to rectify that situation.

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Sustainable work: Does work increase your wellbeing?

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This paper is part of a bigger effort to develop a deeper understanding of how to conceptualise work for a sustainable economy and society and what institutional arrangements would support sustainable work.

Neoclassical economics and its applied field of labour economics consider work as a commodity that is traded on labour markets. Hence it is limited to activities within the monetized economic process and one factor of production among others. In an idealized labour market, both companies and workers are price-takers that cannot influence the wage. Firms’ estimates of their future workload determines the demand curve for labour, while the supply curve results from the aggregated preferences of individuals towards work. Where labour supply meets labour demand ‘efficient’ use of all labour resources, in case there are no market failures. In theory, and in combination with other markets, labour markets ensure therefore the most efficient allocation of all resources available and
satisfies preferences articulated in the monetized economy. A range of scholars from different
disciplines have challenged the theoretical assumptions that underlie this depiction of labour markets,
and most important for this study, the labour supply function. Leaving aside that individuals have
neither perfect information nor ordered preferences to determine their attitude towards work, people
are, most importantly, not free to choose between work and leisure. Most people depend on an
income from wages to make their living. Moreover, labour cannot be separated from the person
embodying it. Hence, some authors have put forward that exchanging labour in markets resembles the
renting of human beings. Treatment of work as a commodity therefore demands the existence of
‘wage-slavery’, as people lack other means of production and hence decide to sell all their future time
and renounce their freedom.

Neoclassical theory treats labour, land, and capital equally; they are considered interchangeable and
replaceable by the others. Moreover, in human capital theory, labour (as embodied in the worker) can
be understood as a form of capital and is assumed to behave like it. Defined as a ‘non-material stock’
that individuals accumulate, human capital is determined by the educational level a worker attains
during his or her working life. Accumulation of human capital increases workers’ productivity levels
and their possibilities of earning better wages.

However, the human capital theory has a number of shortcomings. First, it does not consider social
structures and the differences in individuals’ educational preferences they generate. Second, it ignores
categories such as gender or race, assuming that labour markets are free from discrimination and
remuneration solely relies on individuals’ human capital. Third, it excludes any non-monetary benefits
of work. Fourth, it treats everyone as an owner of a means of production, ignoring the dialectics and
incommensurability of labour and capital. Finally, it is blind to the social reproduction of skills in the
educational system. Further, the theory shifts responsibility to the individual. For example, according
to the theory, poor individuals are poor due to their preferences concerning investment in education
and skills, and not due to the social structures they are embedded in.

Moreover, in neoclassical theory, workers' predisposition towards different types of work is revealed
as a preference in labour markets. Such preferences are based solely on the trade-offs between leisure
and work. Work is then always an unsatisfactory activity that is bad, and necessary to create income
for consumption. Such a disutility theory of labour sees work as a pain and in contrast to consumption,
which is associated with leisure and pleasure. The latter ensures the motivation of workers by
providing them with utility to compensate for the disutility of work. The theory further implies that
workers who perform harder jobs receive higher wages. First, because fewer people are willing to take
up such jobs, resulting in a decrease of the supply of labour; and second, to compensate the large
disutility that these jobs entail. Hence, in theory, high-income jobs are the least attractive and are done
due to their high-level of payment.

Such a simplified ‘negative’ view of work allows neoclassical economists to sidestep value judgments
and neglects the value inherent to work, which has been pointed out been philosophers like Aristotle,
Sen or Nußbaum. Psychology has shown that work, or more precisely, good work, is vital for
psychological health, not just as providing an income. ‘Meaningful work’ might even be a fundamental
need in itself, as it is vital for fulfilling other fundamental needs. This vision is in contrast to an
instrumental view of work as merely enabling consumption; it rather considers work as an opportunity
for everybody to contribute equally to society and to fulfil his or her needs in doing so.

Finally, the concept of nature and environment in neoclassical economic theory neglects any relation
between economic processes and natural processes. Due to the sole focus on monetized economic
processes, neoclassical economic theory introduces natural processes only via market ‘externalities’.
The theory says nothing about the immediate relation between work (or in fact any activity) and the
natural surrounding it is embedded in. Rather, it assumes that the values of the environment are
commensurable with monetary economic values (once externalities are ‘internalized’), side-lining
necessary choices and conflicts between different values. However, all actions that human beings
perform on a daily basis have some effect on other species and the non-living world. Work, as one such
action, builds inherently on the productivities of nature; most notably in the case of agriculture. Work
arrangements indirectly shape humans’ relations to the environment as well as human behaviour. For
example, scholars have related working time arrangements to consumer behaviour and energy use. Neoclassical economics, however, is largely blind to these insights. In line with the neoclassical concept of work, the System of National Accounts (SNA) methodologically remains to define the ‘production boundary’ between work and non-work through its presence in the monetized economic process. In the 1990s, the production boundaries were explicitly limited to activities that generate commodities traded in markets, or that resemble such activities. This application of the ‘market standard’ was contradictory as, for example, subsistence agriculture was considered to be production (or work) in the SNA, while meal preparation or caring for children remained excluded. Feminist critics called for including the ‘third party criterion’ into a definition of work: considering those activities as work that can be delegated to a third person that is neither the one performing the task nor the one benefiting from it. The debate on this ‘third party criterion’ has partially contributed to dismissing the market standard and substituting it by a more inclusive approach.

Empirical evidence sheds light on aspects of this critique of the depiction of work in modern neoclassical economics. This paper offers a comprehensive review of the empirical evidence of work on subjective wellbeing and life satisfaction. Work impacts wellbeing through a variety of channels. The paper lists the channels, related empirical evidence and the direction of the effects.

**Human flourishing within planetary boundaries**

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Staying within biophysical boundaries is essential for sustainability, yet what does it mean for human development? The pathways to sustainability that are open to us within biophysical boundaries differ in social, environmental and economic characteristics. What these pathways have in common is the quest for human flourishing. The paper aims to contribute by reframing the understanding of development as the provision of services that can be generated from different stock-flow combinations. We focus on services and explore in which ways they contribute to human flourishing. More specifically we use the capability approach and the energy services approach and argue that they form theoretical underpinnings for capturing stock-flow interactions and for guiding decisions towards pathways of human flourishing within planetary boundaries.

2015 was an important year for global action for sustainability. In September the Sustainable Development Goals (SDGs) “Transforming our world: the 2030 Agenda for Sustainable Development” were agreed. In December 2015 at the 21st Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) representatives of 195 countries adopted an agreement dealing with greenhouse gases emissions mitigation, adaptation and finance. The agreement went into effect on 4 November 2016. Yet still getting back on the GDP growth path is what analysts and policy makers in Europe and elsewhere strive for after the most recent financial crisis. This is not only in conflict with the SDGs, but also with the Paris Agreement. An increasing body of empirical research shows that the relationship between income and life satisfaction is weak, income and wealth inequality is on the rise and while energy and resource efficiency have risen, absolute decoupling between GDP and natural resources or emissions remains to be seen. And these trends are interrelated, e.g. inequality reduces wellbeing and magnifies environmental problems.

It has become commonplace to question the adequacy of current measures of economic performance. This search for new ground is augmented by a rising urgency to account for environmental change, social justice and inclusion. These challenges are important in themselves and they have an increasing impact on the wellbeing of citizens. A lively debate about competing concepts for measuring socio-ecological performance has unfolded in recent decades. The way how we measure performance affects
what and how we decide. If the goals or their measurements are flawed, decisions may be distorted. For example, if models and performance measures include only flows and no stocks, it may be late when realising that stocks are dwindling. Besides starting from production and consumption rather than wellbeing, GDP does not adequately account for environmental goods and services; when per capita figures are used, information about income distribution is lost and GDP being a flow variable is blind to levels of wealth and capital stock. In this paper, we are reframing the understanding of development as changes in stocks and flows that help to achieve a broader array of wellbeing dimensions by focussing on the provision of services. We start from Kate Raworth’s idea to bring biophysical and social limits together and thus have a way to explore options for the safe and just development space for humanity (Raworth 2012). To develop the approach further, we apply two theoretical underpinnings, notably the capability approach and energy services, to capture the human flourishing that is possible within planetary boundaries. Section 2 reviews the literature on environmental and social limits. Section 3 introduces the capability approach. Section 4 introduces the energy services approach. Section 5 presents our framework and section 6 concludes.

Recreational cultural ecosystem services: How do citizens describe the value?
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Different ways of viewing human-nature interactions affect the ways in which these are conceptualized and operationalized with regards to ecosystem services (ES). Alternative theories and analytical strategies start from different ontologies, adhere to different epistemologies and draw on different methods thus giving rise to a variety of framings of complex human-nature interaction. An appreciation of this methodological variety implies, we argue, that we need to scrutinize available framings and discuss if some allow for more appropriate and useful conceptualizations of the benefits that society derives from nature. In this article we like to highlight some aspects of the controversy around the use of the cultural ecosystem services concept and associated framing of ‘values’, based on citizens’ own descriptions of their benefits of nature. There is currently no consensus on how social and cultural values should be operationalized in decision-making and to what extent current methods and value indicators provide reasonable representations of individual’s values of experiences in nature. Conceptualizing benefits of nature in terms of measurable units in ES assessments involves a translation of situational values and experience into value-indicators. Value-indicators are not values in an ontological sense but often get treated as such within the ES discourse. The distinction between values and value indicators opens up for the question of a potential gap between how values are experienced and articulated by stakeholders on the one hand and indicators of these values on the other. In order to avoid a misrepresentation of the meaning of cultural ecosystem services assessments, the distinction between values and indicators of value needs to be highlighted and scrutinized. Our aim is to understand potential distinctions between individuals’ expressions of values of their experiences in nature and the language of value of ES.

The study builds on a Swedish focus groups material that was initially formed to how individuals perceive and express their values of the experiences of spending time in natural environments in their own words. We use an interpretivist approach inspired by grounded theory and discursive psychology to investigate situated knowledge with a recreational focus amongst citizens in Sweden. Theoretically, the study is framed by the term of cultural ecosystem services. The interpretative repertoire can be seen as a central metaphor of a broader construction that informs the underlying discourses and ideas that participants associate and describe as valuable in relation to experiences in nature. Our findings are presented as the broader interpretative repertoire ‘axiomatic value’, demonstrated through participant’s inability to describe the benefits of their recreational experiences in terms of
value, instead characterized by the apparent worth as self-evident. Overall, participants had difficulties describing their experiences in detail, in terms of ‘values’ and in relation to quality of life. We here refer to this overriding notion as the ‘axiomatic repertoire of values’ which was frequently expressed when participants were asked to articulate and explain how experiences in nature were valuable to them. The interpretative repertoire informed three discourses that participant’s associate and describe as valuable in relation to experiences in nature: ‘indivisibility’, ‘incommensurability’, and ‘the goodness of perceived naturalness’. The latter comprised the underlying themes that present what participants described as meaningful and valuable during their experiences with reference to how they view nature. These themes are ‘nature as identity’, ‘nature as healing’ and ‘nature as beauty, magic and movement’.

Based on the analysis, we discuss implications for the CES framework and question the appropriateness of the non-contextual and categorical language of ES as a means to represent citizens’ descriptions of benefits of nature as ‘values’. Our most salient finding of participants having difficulty describing their experiences in terms of an instrumental benefit to their well-being or as a ‘value’ contradicts the ES framework assumption of a cognitivist ontology, which involves a separation between valuer and the object of value as a starting point. It seems reasonable to question how value possibly can be derived or captured through preference-based valuation methods if it is experienced as axiomatic to individuals. Furthermore, participants descriptions of experiences in nature that have to do with identity and spirituality seem to violate the assumption that local inhabitants in the western world share an ontology of human-nature interaction that appropriately can be conceptualized within the ES framework. The appropriateness of attempting to make intangible CES values tangible possibly needs reconsideration and there is a need to investigate the possibility of defining critical circumstances where qualitative values should best stay qualitative in order to avoid an ES scientific imperialism of experience.

Ecosystem services to mitigate climate change in cities
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There is currently up to 75% of Europeans living in an urban environment. Cities for citizens provide a wide range of functions and services such as education, jobs and culture and they are also known as the engine of regional development. But the fast expanding of the cities with permanently increasing concentration of population brings the great pressure on the balance of the environment. Under the pressure of economic activities the traffic is increasing and the biodiversity and fragmentation of natural environment is losing. How cities are planned and structured exacerbates the negative effects of climate change while natural elements and green areas are shrinking. Climate change has negative impact on urban environment as flooding, overgrowth of mosquitoes, and soil erosion and landslides. Generally says the climate change including increasing temperature and extremely rainfall has impact on people health (McMichael, et al, 2003) (Patz, et al, 2005). It is believed that an estimated 15 000 deaths occurring in France where the result of heat waves in 2003 (BBC, 2003). Climate change also can influence on water quality and availability of drinking water (Fouillet, et al, 2006). The cities are dependent on healthy natural environment that continuously provide a wide range of benefits – ecosystem services. This article focuses on regulatory ecosystem services in the city, especially climate regulation. Regulating ecosystem services are defined as the benefits gained from the regulation of ecosystem processes for example climate regulation, natural hazard regulation, disease regulation, water purification, food regulating, waste management, pollination, pest control or water purification. The quality of life in cities is closely related to the quality of the environment helped by green infrastructure. Green infrastructure in urban environment will be important to reducing the impact of climate change and for resilience cities. (EFB, 2015)
Mainstreaming ecosystem services into spatial planning in cities can bring a number of benefits for quality of life in cities because microclimatic function of green infrastructure can mitigate the negative impact of climate change in cities. This paper identifies the concept of green infrastructure and what it can actually bring to the city. First, it is necessary to determine the possible impacts of climate change in urban areas and then define green infrastructure.

The paper concerns effective green infrastructure management, which abates negative effect of CO2. It is argued that, the proper spatial planning including adaptation measures that can reduce negative consequences and enhance well-being. Paper evaluates the perception of risk of climate change by semi-structured interviews with key actors in these cities: Bratislava the largest Slovak city and also the capital with growing negative impact of climate change to urban and human health and with well expanding adaption strategy. The largest regional centrum of western Slovakia -Trnava. Trnava has growing exposition to climate change effects and emerging adaption strategy.

Ružomberok is city of northern Slovakia with low perception of climate change risk but high risk of natural disasters such as torrential rains and flood.

We address following questions: What is mayor climate change risk perceived by key actors in selected cities? How climate change smart practices can be implemented? Results are compared with cities Praha, Brno, Plzen analyses with project UrbanAdapt actually running in Czech and the recommendation derived for central Europe.

Key words: ecosystem services, climate change, green infrastructure, urban environment, heat islands, adaptation, mitigation

Bibliography


Sustainability entrepreneurs as institutional innovators

Sustainability entrepreneurs as institutional innovators

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Entrepreneurs setting up environmental social enterprises to address environmental issues have become increasingly visible across the economic sphere. They are part of a larger movement working for social change, as well as change agents in the economy and in their local environments. The purpose of this article is to analyse how environmental (social) entrepreneurs, here referred to as sustainability entrepreneurs, work to change persistent economic institutions related to production and consumption, and to create environmentally sustainable economic organisations.

The entrepreneur, a character first described by Schumpeter, is hailed as having the potential to cause ‘creative destruction’, triggering large-scale change and innovation in the economy. Terms such as environmental or green entrepreneurs and ecopreneurs have appeared in the literature from about
1990, with definitions such as “a Weberian ideal type that refers to a person who seeks to transform a sector of the economy towards sustainability by starting up a business in that sector with a green design, with green processes and with a life-long commitment to sustainability in everything that is said and done. To become an ecopreneur is an existentialist commitment in which the entrepreneur knows he or she will never reach the ideal; but that very ideal of sustainability gives meaning to everything the ecopreneur does” (Isaak 1998, p.113). As such, these kinds of entrepreneurs, in this paper referred to as sustainability entrepreneurs, can be a key to societal progress by innovating on different levels to create more environmentally friendly processes, products and enterprises.

Research on sustainability entrepreneurship and entrepreneurs has evolved over the last two decades, within a wide range of disciplines; from business theory to innovation theory. However, there is a lack of empirical data on how such enterprises function in practice. This article addresses this gap by exploring how sustainability entrepreneurs craft their organisations in regard to institutional characteristics. It seeks to explore how they challenge traditional business models by changing institutional logics, adopting non-traditional legal frameworks and economic structures, and by promoting new norms related to production.

Sustainability entrepreneurs attempt institutional change on several different levels; they challenge our norms, our conventions as well how enterprises should be legally structured. We can define and analyse such challenges through the use of institutional theory. Institutions are here defined as conventions, norms and formal (legal) rules (see Vatn 2005). Institutional theory is a well-established theory for how organisations are developed and changes, and how institutions influence these processes. For this paper, the concepts of institutional entrepreneurship and change, as well as institutions as rationality context are especially central to the analysis. Institution are seen as not only rules; but as structures that can influence how actors are motivated to act and what becomes, in this case, acceptable norms and conventions related to sustainability entrepreneurship. Institutional theory is utilised to illustrate how actors can break with prevailing logics to create institutional change and ultimately social change.

The empirical data is based on semi-structured interviews with sustainability entrepreneurs, setting up environmental social enterprises across the United Kingdom. The interviews are currently being carried out (November 2016-January 2017) with 25 entrepreneurs; using a variety of organisational models. The enterprises operate within a wide range of fields (e.g. manufacturing, recycling, food production, renewable energy). They all share a fundamental commitment towards sustainability and challenging business as usual within their sectors.

This paper takes an institutional analytical approach to analyse how sustainability entrepreneurs work to create and uphold institutional structures and contexts related to sustainable enterprises. Preliminary results indicate that sustainability entrepreneurs create agency and act as institutional entrepreneurs on several different levels. This includes for example how they a) Raise awareness and educate consumers on the environmental dimensions of their products and consumption habits; b) Challenge business as usual by generating and distributing profits in unconventional ways, i.e. re-investing in environmental causes and; c) Create new (rationality) contexts for how decision-making is carried out in regard to environmental and social dimensions.

References:

Transdisciplinarity and thematic narrative analysis
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To understand and cope with the complexity in real life situations we need a research model that goes
beyond specialized scientific knowledge (Costanza et al., 1997; Capra and Luisi, 2014). Transdisciplinarity represents a fascinating and promising response to challenges on diverse levels by integrating different sciences and incorporate science and practice.

In accordance with this reasoning, ecological economics as a transdisciplinary field of science, seeks to understand life as life by creating the relationships between ecosystems, social systems and economic systems in the broadest sense. Ecological economics is an attempt to; “transcend the narrow disciplinary boundaries that have grown up in the last 90 years in order to bring the full power of our intellectual capital to bear on the huge problems we now face” (Costanza et al., 1997, p. 5). Although the epistemology of transdisciplinarity is rather clear its applicability as a methodology suffers from shortages. To elaborate on these deficiencies I introduce narrative research methodology as a gateway. Narrative research methods corresponds to the integrative ideas in transdisciplinarity since it focus on understanding the fullness of human existence (Polkinghorne 1995, p. 8), by retaining “the complexity of the situation in which action was undertaken and emotional and motivational meaning connected with it” (Polkinghorne 1995, p. 11). Therefore, one common characteristic of both transdisciplinary and narrative research is their emphasis on real life phenomena.

According to Leavy (2011) a transdisciplinary approach to research design considers problems holistically, as a whole. The research process is synergistic where all phases are integrated with each other. It is also an evolving and responsive methodology of iterative processes, a continuous process of adapting to new learning by practicing flexibility and innovation. This process requires recurring communication/reflection and fosters reflexivity.

According to Clandinin and Connelly (2000) narrative research is a process of continuous learning in seeing human lives as lived narratives. Narrative is a form of discourse composition where different events, actions of human lives and happenings are drawn into thematically unified goal-directed processes, ‘narrative configuration’ is “the process by which happenings are drawn together and integrated into a temporally organized whole” Polkinghorne (1995, p. 5). And even stronger, narrative meaning is “a cognitive process that organizes the human experiences into temporally meaningful episodes” Polkinghorne (1988, p. 1). Not only individuals, but cultures also maintain a sample of typical narrative meanings in their myths, fairytales and stories.

To illuminate and discuss how narrative research gives a kind of transdisciplinary understanding I have chosen qualitative development in Norwegian kindergartens as a case. As the “appropriate goal is to enhance quality of life” in ecological economics (Daly and Farley, 2011, p. 406), the Norwegian kindergarten field and its increased focus upon qualitative development is highly relevant. In White Paper no. 24 (2012-2013) a distinction is made between quality of structure and quality of process. The quality of daily life in kindergartens – quality of process – is continuously defined through research regarding children’s well-being and development of kindergartens. Particularly important is the quality of relationships and interpersonal interactions. Quality of structure is related to the employees’ educational level, staffing, group sizes and governmental funding. Practice reveals that the quality of process depends on the attitudes and knowledge of the staff (Government 2013). However, having a good quality of structure is no guarantee that children will thrive and develop.

One interesting question is how to transcend this duality into a holistic understanding of quality. According to Moss (2016) we live in the age of quality, quality is something all of us wants to have and wants to offer, in the sense that ‘quality’ is a thingy thing, objective and real, ready “to be discovered and measured by experts” (Dahlberg et al., 2013 p. 5-6). The concept ‘quality’ is originally developed as a part of management theory, and has been incorporated into Early Childhood and Care as part of the revolution of new public management and the growth of the ‘audit society’ (Power, 1997). In other words, quality is quantified by reductionist research methods.

My challenge is how to bring quality into a holistic context by using narrative research as a gateway to transdisciplinary understanding of the phenomenon.

Quality needs to be contextualized in time and space and consider cultural diversities, and the problem with quality is that there are as many meanings of the concept as to be effectively meaningless in discourse and useless as a tool of evaluation. This require a need to go ‘beyond quality’ (Moss, 2016). If ‘quality’ can be understood as one language of evaluation, Dahlberg et. al. (2013, p. 458)
112) offer a language of ‘meaning-making’, which is about “constructing and deepening understanding of the early childhood institution and its projects, in particular the pedagogical work – to make meaning of what is going on”.

Thematic narrative analysis includes four principles, which overlaps (Angelo 2012; Polkinghorne 1988, 1995; and Riessman 2008).

The first principle is searching for stories and constructing narratives. As humans, we possess the capacity of to perceive the connectedness of life, and experiences of this are articulated through our linguistic expressions. In this part of the process, I generated data material, based on dialogues with leaders in different kindergartens, and prepared the material for analysis. The second principle focuses on searching for themes in the stories and narratives. There must be an openness to the thematic threads that may lie in the text. It is important to take care of the thematic content in the data material, because a narrative analysis is a synthesizing process rather than a separation process. Polkinghorne (1995, p. 15) refers “to the configuration of the data into a coherent whole” when he use the concept ‘analysis’. I coded the text as close to what was actually said.

The third principle is about processing and transforming the data toward a complete research text. I follow Polkinghorne (1995, p. 5) who use the term ‘narrative’ “to refer specifically to texts that are thematically organized by plots”. Plot “is the narrative structure through which people understand and describe the relationship among the events and choices of their lives” (Polkinghorne, 1995, p. 6). Plots have the function of selecting the direct contributors of the narrative in the myriads of happenings. In this part I elaborate on the differences between an analysis of narratives and a narrative analysis (Polkinghorne, 1995).

The fourth principle is about searching for theoretical and philosophical reflection. In the process of narrative thematic analysis, the stories from each kindergarten are made into a chronological research text (narrative) which is discussed along three key dimensions. In this process I have continuously made effort of keeping “a story ‘intact’ by theorizing from the case rather from component themes (categories) across cases” (Riessmann 2008, p. 53).

In the processing of the data material, contradictory and interdependent themes emerged. What is perceived as binary opposites can rather be seen relationally with mutual respect, where what appears to be isolated dichotomies can be linked by discursive formations, where they draw mutual meaning from what separates them one from another.

The lessons learned from this study are correspondingly relevant for more complex questions within the field of ecological economics. In other words, my aim is explore to what extent narrative methodology are relevant for research in ecological economics on a more general level. I discuss the applicability of the methodology and the findings in relation to ecological economics as a transdisciplinary field of science.

Refrences:
Nature and Care from a Degrowth Perspective

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Ecological and feminist economics, despite having much in common, have to date only engaged with one another in limited ways. The potential for fruitful collaboration has already been pointed out over twenty years ago, when Bina Argawal (1992: 152) stated that “environmental and gender concerns taken together open up both the need for re-examining, and the possibility of throwing new light on, many long-standing issues relating to development, redistribution, and institutional change”. One topic that offers ground for cross-fertilization is the critique of the structural devaluation of nature and care by the “growth-based capitalist economic paradigm” (Perkins 2007: 228). Up to this point, however, this issue has mostly been approached separately and a shared analysis, according to Perkins (2007: 228) is long overdue.

Such an analysis could be based on criticizing the overemphasis of the formal economy in the status quo, while at the same time integrating concerns of nature and care. One approach which attempts to combine environmental sustainability with social justice while being critical of the status quo is ‘degrowth’, a growing movement that aims to combine academic research and political activism and has its origins in schools of thought such as ecological economics, social ecology, and economic anthropology (Martínez-Alier 2012: 54). Degrowth aspires “an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions at the local and global level” (Schneider, Kallis, and Martinez-Alier 2010: 512). It is crucial to distinguish degrowth, which is a voluntary and conscious shift, from “unplanned degrowth within a growth regime” (Schneider, Kallis, and Martínez-Alier 2010: 511). Thus, when we talk about degrowth we mean sustainable degrowth, which aims at a “socially sustainable and equitable reduction (and eventually stabilization) of society’s throughput” (Kallis 2011: 874). An essential part of the idea of sustainable degrowth is that it “does not mean across the board degrowth” (Schneider, Kallis, and Martínez-Alier 2010: 512). This means that certain sectors as well as regions may still selectively need growth.

With regard to regions, it must be acknowledged that degrowth is a concept developed by and for the Global North and thus – first and foremost – focuses on affluent Western societies. Degrowth thus recognizes that the ‘imperial mode of living’ in the Global North restrains the Global South and constitutes an impediment to global environmental justice (Brand and Wissen 2013: 699). According to Kallis, Demaria, and D’Alisa (2015: 5), degrowth should be pursued in the Global North “not in order to allow the South to follow the same path, but first and foremost in order to liberate conceptual space for countries there to find their own trajectories of what they define as the good life”. At the same time, there are sectors in the economy which still have to flourish, such as education, care work, health, or renewable energy.

The proposed paper synthesizes existing literature on the structural devaluation of nature and care within a growth paradigm, and based on that discusses in how far degrowth can offer ground for structurally revaluing both. It is argued that on the one hand, the growth paradigm perpetuates environmental injustices, since ‘green growth’ does not succeed to dematerialize production
processes. On the other hand, gender injustices are perpetuated by reinforcing dualisms and devaluing care. The paper points out how both approaches thereby, albeit originating from different analytical starting points, may arrive at the same conclusion: a critique of the current system of economic growth. Degrowth, in the sense of sustainable, selective degrowth, has the alleviation of environmental injustices at its very core. Since degrowth also aims at a re-centering of society around care (D’Alisa, Deriu, and Demaria 2015: 64), it can furthermore promote a revaluation of paid and unpaid care work, and thus potentially greater gender equality. These synergies, we argue, can be used to formulate policy proposals that are conducive to both environmental and gender justice.

Yet, when closely regarding a policy proposal that is often put forward by degrowth proponents, namely that of work-sharing, it becomes clear that often the feminist perspective is not consistently taken into account. Even though the degrowth discourse does on an abstract level consider feminist concerns (for example D’Alisa, Deriu, and Demaria 2015: 64), the concrete political proposals often “share the general blindness which dumps any caring reproductive responsibility onto the domestic space” (Picchio 2015: 210). The – in the degrowth literature very popular - “Fridays off” model (Kallis et al. 2013), for example, does argue to be especially beneficial to reducing environmental pressure through reducing daily commuting times. However, it does not target the feminist aim of distributing (daily) caring activities more fairly among the genders. We argue that in order to consistently take into account feminist concerns, these proposals have to be designed in a gender-sensitive way from the very beginning, rather than seeing gender as just another add-on. With regard to the work-sharing proposal, this suggests a working-time regime, which focuses on the working day rather than the working week, in order to acknowledge the day-to-day character of caring activities. We argue that this could not only alleviate women’s double burden, but rather could it liberate time for both men and women on a daily basis, which can then be used to distribute caring activities more fairly among genders.

All in all, this paper aims at contributing to the degrowth discourse, which admits that so far feminism remains a topic “that would require extensive elaboration” (Demaria, Schneider, Sekulova, and Martínez-Alier 2013: 201). In the Degrowth: Vocabulary For A New Era book, Feminist Economics is listed as an alliance, thereby being regarded as one of those schools of thought that “share a lot with the degrowth project but which have only had loose connection with degrowth up to now” (D’Alisa, Demaria, and Kallis 2015: xxi). With this paper, we hope to show that the degrowth approach does contain a large potential to move beyond seeing feminism as a loose connection only, and that an integration of the two discourses contributes to the aim of Ecological Economics as described in the Call for Papers for the 12th International Conference of the European Society for Ecological Economics, namely as advocacy for both environmental and social justice.

References used in the abstract:
A political economy view on the transformation towards a post-growth economy

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Within the recent literature on the transition towards a sustainable post-growth (degrowth/steady-state) economy, one aspect seems have received less attention than it would be due: what are the politico-economic barriers inhibiting the transformation? To be sure, there are specific studies pointing toward the interest constellations that render currently employed policy instruments ineffective (e.g. Spash 2012). Moreover, numerous rallying cries to build a strong resistance movement have been expressed (e.g. Klein 2014). But those analyses relating to transformation barriers are hitherto focusing on other barriers (e.g. Bleys and Whitby 2015); and those analyses coming from a politico-economic perspective are more concerned with historical-conceptual issues (e.g. Klitgaard 2013). Also, consider that proponents of the dominant conceptual framework to analyse sustainability transitions, the Multi-Level-Perspective, have only very recently acknowledged the need to pay more attention to the destabilization of current system configurations (Geels 2014), a notorious blind spot of this bottom-up perspective (e.g. Strunz 2014). This negligence is potentially dangerous as it may imply that there is lot of “preaching to the choir” (van den Bergh 2011: 886) without the post-growth movement actually addressing the transformation obstacles.

Against this background, this paper employs a political economy view to identify critical transformation barriers within different case studies. As conceptual framework, this paper draws on the assumptions of the political economy literature (e.g. Downs 1957, Stigler 1971, Niskanen 1971). This perspective focuses on the self-interest of different actor groups within institutional settings as main explanatory variable for the societal allocation of rents: through the co-evolution of actor groups and institutions,
the well-organized actors obtain more rents at the expense of the less-organized actors. The main argument put forward here is that distributional conflicts exacerbate the inertia and persistence of the growth-based economic system: within the current system logic, these conflicts are partly mitigated via distributing the material benefits of economic growth. In this way, actual re-distribution is often avoided. In consequence, overcoming these barriers would require head-on tackling of distributional conflicts. Note that there may well exist better, i.e. more just and ecologically viable ways of resolving these issues within a post-growth world; however, this paper focuses exclusively on the transition barriers emanating from within the current logic.

Specifically, the paper differentiates three ways in which looming distributional conflicts impede the transformation towards a post-growth economy:

The transformation
(1) may amplify existing conflicts which are currently being moderated by the distribution of welfare gains from economic growth,
(2) may lead to the outbreak of existing but not politically relevant conflicts which have been previously hidden or ‘frozen’,
(3) may raise new conflicts as it changes the relative position of stakeholders.

First, an example for the amplification of existing conflicts as barrier to a post-growth transition concerns possible labor market effects: As long as selling labor as a factor of productivity constitutes a major mechanism of distributing wealth in a society, an increased unemployment rate naturally aggravates the distributional conflict between those with and without a job. The political turmoil following the recent economic crises in southern Europe with its strong rise in general and especially youth unemployment attest to the tremendous size of this challenge (e.g. Crepaldi et al. 2014; Karafolas/Alexandrakis 2015). Furthermore, the “productivity trap” that arises from the systematic pursuit of labor productivity needs to be addressed within a non-growth economy (Jackson/Victor 2011).

Second, a case in point for intensified conflicts in a post-growth economy is the distributional dimension of public pension systems. In general, a growing economy permits the distribution of more goods and services towards the currently old generations without additional burden on the young generations. Thus, politicians may cater to the interests of older voters via growth-financed increases of pension payments or via enlarging the range of eligible persons. For instance, during the last German federal election, the Conservative Party promoted the introduction of a “mother’s pension” (Mütterrente), in effect a re-imbursement for child care times, as one of their main campaign pledges.

A further example of a “frozen” conflict consists in the management of public debt via economic growth: with zero growth, public debt-to-GDP ratios are likely to increase, which might not be financially viable in the long term. In addition, interest yields on government bonds are likely to further increase the current cleavage between owners of capital and those living only on labor income (Piketty 2014).

Third, new conflicts may arise. Substituting alternative welfare indicators for GDP as the dominant measure of economic performance (e.g. Kallis et al. 2012), creates resistance by those benefitting from the GDP as lead indicator: In China, for instance, a bold initiative for a “green GDP” failed in 2006 despite initial support from political leaders as it became clear that reassessing the economic performance including environmental damages produces fierce resistance from those regions which – under the new measure – turn out to be relatively less successful than before (Li/Lang 2009:52). Furthermore, an alternative indicator might lead to a power shift within bureaucracy in favor of environmental agencies, in which case other administrative bodies will oppose the change (Bleys and Whitby 2015: 168). Making environmental damages directly visible to the political system (especially voters) by using alternative indicators could produce even more severe conflicts regarding the distribution of political power when governments are suddenly faced with a critical re-interpretation of their political legacy.

These examples illustrate the persistence of current economic structures. The transformation towards a post-growth society cannot succeed without accounting for the massive interests tied to the status quo. In particular, evaluating the expected benefits and losses of transformative changes is a
precondition for effective conflict resolution. This paper aims at providing the first step towards that direction by outlining distributional consequences of shifting away from the current growth paradigm. Hopefully, further research will open up routes for mediation between those who profit and those who lose, thereby overcoming transformation barriers.

Literature


The first natural limit to GDP

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The goal of our study is to assess numerically the natural limits of growth and equilibrium, via sustainability indicators. We also try to assess whether certain models of capitalism show generic environmental, social and economic characteristics, and which model is the most comparable to the requirements of sustainable development.

Capitalism is a collective abstraction, showing differences in time and region. In the 21st century descriptive works of different models have multiplied in economic sciences. Specific research programs have been launched. Literature differentiates at least seven distinctive models of capitalism: the Scandinavian model, the continental welfare-state, the rightwing developmental states, neoliberal sates, off-shore countries, petro-states and the Mediterranean model.

Value judgments and beliefs of a society are reflected in the macroeconomic accounts. The range of alternative indicators to or amending the GDP has been flourishing since the 1970s. However, proposed solutions are as diverse as the faults of measurements. Well implementable routines and
surprising, out-of-the box ideas have emerged in the last four decades. Some made a world carrier (e.g. HDI – the Human Development Index), others are only known and calculated by fragmentic professional communities. Due to the world economic crisis, this is no more a playing field of alternative economists; political decision makers also admit that the current system of national accounts is not sustainable, not proper to assess country positions in pure monetary terms. As social and economic phenomena are interrelated, a reform of the measurement system is acute. The recently well-developed alternative indicators provide crucial extra information on the environmental and social status of individual countries.

In our study we first assess the widely accepted complex sustainability indicators for a wide range of countries, following different models of capitalism. Assessed indicators include EPI (Environmental Performance Index), CCPI (Climate Change Performance Index), the UNDP family of indices, focused on HDI (Human Development Index), and the HPI (Happy Planet Index), which also embraces the ecological footprint.

Finally we report on the progress of our primary research published in the journal Ecological Indicators. There are at least three „natural” limits to GDP growth in our understanding: 1. ENVIRONMENTAL: biocapacity limits, 2. ECONOMIC: dropping marginal efficiency of material wealth on human happiness, 3. SOCIAL: acceptable and bearable inequality. Based on the strong correlation of the ecological footprint and GDP we assess the footprint in historical perspective (for the last 12 thousand years), and we make conclusions on the Earth’s carrying capacity, and the bearable material level of the peak world population according to UN forecasts.

Analysis and forecast of Russian environmental pressure using Input-Output approach

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The paper analyzes the up-to-date ecological situation in Russia, which is characterized as a steadily negative. Russia accounts for 13% of total world emissions of major hazardous substances (solid substances, sulphurous oxide, nitrous oxide and carbonic gas). The country takes 4th place in the world for CO2 emission (after Chine, USA and India), 9th place for nitrogen oxides emission and 5th place for total greenhouse gas emission. Average per capita emissions exceed the levels of many developed countries. Sadly, the number of polluted cities is increasing. Only 15% of urban population lives on the territories where air pollution does not exceed hygienic regulations, with 1/5 of urban population living in environmentally harmful conditions. The quality of water deteriorated. There is also increase of the annual waste generation.

The forecast of the Russian environmental loading for the period 2016–2020 has been done. It was obtained using the dynamic Input-Output model with Ecological module. We think that traditional economic Input-Output modeling and analysis are most conveniently adopted in emission studies. Environmentally extended Input-Output analysis is the prevailing method for assessments of environmental pressures.

The scientific novelty of our research consists in the following. We present different types of environmental activities (capturing of atmospheric pollutants, polluted waste water cleaning and recycling) as separate economic sectors in the same module complex. We embed these sectors into the Input-Output model, which simultaneously simulates their activities, and as a consequence, we get the volume of the negative load on the environment.

Thus, in addition to traditional sectors of the economy we have some areas of environmental protection (air protection, water protection, recycling). For environmental activity the processes of formation of environmental costs are modeled in the Input-Output Model. The Ecological module describes the tangible indicators of ecological processes. The pollutants generated during the
production process, is determined by production output of the traditional sectors of economy. Thus, this model system allows us to forecast the level of pollution formation in industrial production depending on the economic development of Russia with the help of coefficients of pollution generation per unit of production output. Estimates of expenditures for reducing pollution help determine volumes of pollution liquidation and trapping. The difference between pollution formation and pollution liquidation gives us the amount of emissions.

We consider two scenarios of development of the Russian economy, one of which was developed at the Institute of Economic Forecasting of RAS (Moscow), the other at the Institute of Economics and IE of SB RAS (Novosibirsk). According to the forecast for both scenarios the conclusion is made about the further increase of the environment pressure.

To avoid the growth of this burden it is necessary to improve environmental government policy in Russia. The main task is to improve the economic mechanism of pollution taxes. In developed countries there is currently an increase in the rates of environmental taxes with the collected amount being 1% of GDP (in Russia it about 0.03% of GDP), despite the fact that the standards of pollution charges are 10 – to 100 times higher for various ingredients. For example, the tax for emission of SO2 was in France 27.4, in Italy – 53.2, but in Russia – only 2.6 euro per ton in 2005. The tax for emission of NOx was in France 38.1, in Italy – 105, but in Russia – only 5.5 euro per ton in 2005. Russian enterprises find it more profitable to emit harmful substances and to pay low taxes rather than invest in pollution abatements. The current level of pollution taxes does not provide for the necessary amount of investment or cover current expenditures for the purpose of pollution abatement. To make it worse, pollution taxes are declining quickly in real terms because of inflation. For instance, in 2014 average prices stage increased from the level of 2003 by 3.41 times, whereas the index of pollution taxes was only 2.33 times.

A raising the level of environmental taxes will allow to increase the environmental protection expenditures. Now the Russian economy spends intolerably little on these goals. The proportion of environmental protection investment in total national investments is about 1.2% –to 2.6% per year, in comparison with developed countries where this figure ranges from 6% to 25%. The growth rate of Russian environmental protection investment in 2013 constituted 76.2% of the 1995 level. The growth rate of the current environmental costs in 2013 constituted only 38.5% of the 1995 level. This situation in the field of environment protection costs has determined the dynamics of employing the production facilities for sewage treatment, for trapping and liquidation of hazardous substances in waste gases, for recycling. For instance, if in 1980 the capacity of installations for trapping and liquidation of hazardous substances in waste gases accounted for 18.4 million cubic meters per hour, in 2013 it was only 11.1 million cubic meters. So, there is obviously a necessity of increasing ecological expenditures.

In order to reduce the common tax burden under raising pollution taxes, a practice of granting tax relief and other financial incentives should be more widely used (offsets of environmental payments in the amount of the environmental costs incurred, provision of favorable loans, state guarantees for environmental loans, schemes of accelerated depreciation of environmental capital stock) to stimulate the implementation of advanced technologies, unconventional energy types, the use of recycled resources and waste management, as well as the implementation of other effective measures to protect the environment. Also the other ways of improving the government environmental policy will be discussed in the paper.

**Development of circular economy – a case study of Latvia**

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The circular economy is a fundamental change in the traditional economic model, and an important way to change economic growth pattern and achieve the balance among economy, resources and
Circular economy through ecodesign, waste prevention and increased reuse and recycling of products, provides that value of products, materials and resources is maintained in the economy for as long as possible. Europe 2020 strategy emphasises the policy objectives of sustainable development and is focused to resource efficiency and EU competitiveness. In end of 2015, the European Commission adopted a Circular Economy Package that seems to be a crucial turning point for further implementation of ecodesign concept into various economy sectors and will contribute to "closing the loop" of product life cycles through greater recycling and reuse. EU Action Plan for the Circular Economy establishes a concrete targets and measures for waste management and resource efficiency by 2030. Therefore, circular economy development initiatives create new challenges and draw up the new perspectives.

At the base of circular economy is life cycle thinking. Life cycle thinking means recognizing the various impacts that occur at all points along the life cycle of the product or material. It also means recognizing how certain choices – materials used, manufacturing process, energy sources, distribution channels, disposal possibilities – influence those impacts. In practice, life cycle thinking means evaluating the potential influences as part of the decision making process (UNEP, 2007). Life cycle thinking is a broad concept that facilitates an integrated assessment of the benefits and the burdens in terms of environmental, social, and economic aspects, for specific products and regions, etc. The application of life cycle thinking requires specific methodologies.

Therefore, circular economy is a very complex issue, involving resource extraction, transportation, production, consumption, distribution, waste management, social norms, biological and technological cycles etc. For developing of circular economy is necessary to explore the theory of circular economy and possible practical implementation, but to drive broader changes it is critical to collect and share data, spread best practice, invest in innovation and encourage consumers with adequate green product information.

The purpose of the research is to investigate basic principles and nature of circular economy, problems for the transition to a circular economy in Latvia and to propose relevant policies, possible solutions and constructive mechanism of promoting circular economy in Latvia.

The authors use theoretical and empiric study of issue, using European Commission and Latvian institutions documents, semi-structured interviews and analysis of personal experience. The results of the research show, that circular economy implementation milestones are: legal framework, administrative conditions, economic instruments and public education and awareness. The authors propose the following support measures, which could promote the implementation of CE development in Latvia:

1) Comprehensive concordance between Ministries, especially the Ministry of Environment and Regional development and the Ministry of Economy, should be established. That is a principal precondition for life cycle thinking and circular economy based industry and business development. As circular economy concept includes both waste management and eco-design oriented industry development, they should be realized under the supervision of both Ministries.

2) Development of cooperation between state and industry, including various support measures from the state, as well as development of industry related NGO institutions.

3) Further development of Green public procurement should have a principal catalytic impact due to promoting influence to eco-design successful implementation. Reversely, any obstacles for Green public procurement could endanger the CE development.

4) Facilitation of feasibility studies and research activities and projects focused on eco-design understanding in Latvia and necessary measures for successful eco-design development in country. Discovering and promoting successful examples of circular economy implementation in education and society in general.

5) Widespread implementation of circular-economy approaches would require deep transformation of production chains and patterns of consumption.
From conflict transformation to alternatives. Dimensions, scope and scales

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Sustainability science literature increasingly calls for a “transformation to sustainability” to address overlapping and converging social and ecological crises. This has led to increasing scholarship on transitions (Leach et al. 2007; Grin et al. 2010), viewed primarily as socio-technical managed approaches to move towards more sustainable futures, focused largely on technological innovation and governance approaches; as well as an increasing body of literature talking about “transformation”.

Unfortunately, while the political and contested nature of such transformations are acknowledged by some scholars (Stirling 2014; Jorgensen 2012), the literature on transitions as well as transformations remains primarily depolitized, technocratic and managerial. Terms such as the Anthropocene are used to turn attention and blame for the social and ecological crises away from particular political structures, interests, practices and false incentives, and towards the idea that it is humanity at large that is responsible, without differentiation to the interests, power relations and inequalities at play (Malm and Hornborg 2014; Stirling 2014).

Amidst this, a branch of “critical transitions” (Jorgensen 2012) and “decolonial” scholarship has raised the alarm, pointing to the political and contested nature of transformations; as well as to the agency of social movement, subaltern actors and marginalized groups in shaping socio-technical relations historically, as well as in the present (Stirling 2014). Some of these authors also emphasize the role of alternative sciences, local knowledge and engaged academic praxis in the creation of emancipatory alternative futures (Visvanthan 1997, Escobar 2003, Walsh 2005, Santos 2007).

This paper thus deals with the question of how to look into transformative forces in the context of ecological distribution conflicts and the political nature of transformations. We explore two complementary approaches that are currently being developed in the context of the ACKnowl-EJ project and we examine some key scalar dynamics at play in transformation processes. Different examples are used to illustrate the examined processes.

Firstly, we present an approach that addresses environmental conflict transformations which examines different types of transformation and their impacts based on an analysis of hegemonic power (Rodriguez et al. 2015). This framework looks at 1) Structural transformations such as changes in legal, political and institutional frameworks, modes of production. 2) Actor transformations at three levels: a) In their relations: changes in leadership, in political mobilization, in networks, partnerships, coalitions b) In the quality of their interactions: better communication, increased trust, increased feeling of respect, and improved recognition of the other, c) In the individual: changes in the self-esteem, emotions, perceptions and individual spirituality and 3) Cultural transformations: new narratives, discourses, world-views.

Secondly, we outline an approach that examines radical alternative transformations dissecting different spheres or pillars of transformation (Kothari 2014, Kothari et al. 2014). Five overlapping spheres are differentiated: 1) Ecological Integrity and Resilience 2) Social Well-Being and Justice 3) Direct and Delegated Democracy, 4) Economic Democracy and 5) Cultural Diversity and Knowledge Democracy

Thirdly, we highlight and discuss three key scalar dynamics at play in transformations processes: temporal scales, spatial scales and human scales. Temporal scales refer to the role of time in transformation processes and the methodological challenges to capture and address these processes. The spatial scale refers to the different levels at which change can occur and the spatial dynamics at play, such as networks and alliances. Sometimes a transformation process that takes place in a particular locality in a limited fashion can become the source of a radical transformation in others. The human scale examines transformations at the single individual (such as worldviews), to the social movements or communities, or even the human species or nature in more general terms.
The different processes signaled are illustrated and discussed with key case studies present in the Global Atlas of Environmental Justice (www.ejatlas.org). The Atlas presents near 1800+ cases, providing a repository of cases of diverse, radically-challenging and overtly-political agonistic forms of contestation of environmental inequality by subaltern social movements. It offers an opportunity to tune into the plurality of grassroots voices that are opposing specific economies, institutions, infrastructures and cultures that are at the root of the ecological crisis. In some cases these struggles propose and put forward their own visions of transformations.

While the atlas was originally designed to emphasize, make visible and dissect processes of environmental injustice, this article discusses how it can further serve an empirical base for examining what environmental justice looks like in practice. It also argues that framing EJ studies uniquely around forms and mechanisms of injustice limits the understanding of how power relations interplay on the ground and the recognition of the multiple and creative agency of EJ groups, as “altering” forces of the status quo.

The paper concludes pointing to the need for “critical transformations scholarship” in the search for sustainable and equitable futures. We therefore finally stress the importance of engagement with critical scholars, scholar-activists and activists and recognition of the epistemologies and ontologies of marginalized voices, for a co-production and reproduction of plural knowledges.

References


Household Willingness to Pay for Arsenic free drinking water in Bihar, India
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This paper estimates the willingness to pay (WTP) for arsenic free drinking water supply to the households in the arsenic contaminated area in Bihar, India. The primary survey of 420 households (388 affected and 32 controlled) is carried out in two blocks (Maner and Shahpur) of Bihar to collect primary data. The Contingent Valuation Method (CVM) is used to understand household’s preferences and linear regression is used to establish causal influence of socioeconomic factors on WTP. The results show that socioeconomic variables influence overall WTP. Income of the household and visit to doctor are two dominant variables, which determine the changes in the decision of the households regarding WTP. The results of the Multinomial model for the arsenic affected areas and controlled areas are similar in many findings. 84% of the surveyed households are willing to pay for arsenic free drinking water. The household’s income level and payment for the water supply are important variables which influence the choice between domestic and community water taps or reject both the options. The annual WTP is estimated as INR 17.1 million. The results of the study provide insight on estimation of costs to the policy maker if safe drinking water is not provided to the affected areas.

Enlarging the SES framework to serve more disciplines: Suggestions and trade-offs
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Allowing more disciplines to analyse their studies within the same framework provides novel socio-ecological insights, particularly if this is done jointly by these disciplines. Yet, in contrast to many studies that explore coupled socio-ecological systems focussing on effects from one social system on an ecological system and vice versa (Hull et al. 2015), implications of considering two ecological systems under a joint framework are not sufficiently discussed. We propose here enlarging the heuristic Socio-Ecological System (SES) framework (McGinnis and Ostrom 2014) in that respect. We will demonstrate it by joint consideration of land and water sectors which are inextricably linked (Meinzen-Dick and Mwangi 2009; Sjöstedt 2011) despite their significantly different physical nature (Hodgson 2004). In the land and water domains, the feedback loops between use and management practices of soil and water have been investigated more from ecological and hydrological perspectives. For instance, land use and cover change can affect water quality (Moss 2004) or land degradation can reduce water-use efficiency (Rosegrant et al. 2009). Increasing desertification impacts groundwater recharges and run-off, which is often interconnected with occurrences of floods. More economic perspectives discuss for example how lower water and soil quality decreases the value of the land property (Leggett and Bockstael 2000). We also need to take into account that whereas land resources are being increasingly privatized, irrigation water has been lately facing a transition in management from a state to a common property regime. With primary focus being on hydrological and ecological aspects, response to the governance interface between various resources and therefore exploration of an interdisciplinary exchange remains largely limited.

A joint, more comprehensive framework, that allows using a common language, would help facilitate discussion and open up disciplinary boundaries. We propose two options for adapting the SES framework integrating a nexus perspective: (option 1) to add a second-tier “governance nexus” variable within the first-tier governance variable of an irrigation system or (option 2) to add a “land resource unit” and “land system” outside the irrigation system. The latter would include considering two resource systems, each with particular resource units, system characteristics and selected further system-specific tiers. Compared to the former, the governance system box within the irrigation system remains unchanged. The actors become more central as they are the linking unit between the
ecological resource systems. It becomes also possible to assess the role of actor groups in the broader SES. For instance, in an irrigation system, the farmer clearly comes out to be as the main actor, as she/he depends on both, land and irrigation water.

We empirically break down the discussion to the case of Tajikistan, where irrigated agriculture represents a highly relevant economic activity. Since independence in 1991, a domestic rush for land emerged as a change from large-scale, state farming units to rather small-scale farming due to a forced privatization of former collective and state farms (Lerman 2012). There is an agricultural transition in the water sector, too. At local scale, this implies a change from state-managed to farmer-managed irrigation systems that require collective participation of the individual farm households. This participation basically consists of farmers’ payments for water and labor contribution to canal maintenance (Akramov and Shreedhar 2012). This is in turn affected by land reforms such as changes in farm sizes and organizational structures, which, as examined by Theesfeld (2004) in a post-socialist context, also challenge the remaining socialist irrigation systems.

Based on the empirical and theoretical background we formulate in total four hypotheses: two for each of the suggested options for enlarging the SES framework. These hypotheses are tested with the farm household data collected through a survey of 306 farmers in two lowland regions of Tajikistan. We run two logit regression models and estimate the marginal effects of explanatory variables on two dependent variables: (i) payments for water and (ii) labor contribution to maintenance efforts. In both models, we test for the link between land governance and cooperation in irrigation management. Hypotheses 1a and 1b refer to option 1 for adapting the SES framework, where the second-tier variable “governance nexus” is added within the irrigation system. Hypotheses 2a and 2b describe option 2 where another resource system, here agricultural land, is added and linked via the actors.

Hypothesis 1a: Secure (formal) land tenure increases the likelihood to cooperate in local irrigation management.
Hypothesis 1b: Perceived (non-formalized) land tenure enhances the likelihood to cooperate in local irrigation management.
Hypothesis 2a: The larger the farm the greater the likelihood to cooperate in local irrigation management.
Hypothesis 2b: Cotton cultivation correlates with the likelihood to contribute to local irrigation management.

Results indicate that land system variables likewise contribute to the willingness to cooperate in irrigation management. We identify attributes of land reform outcomes affecting new modes of irrigation governance after transition. Specifically, formal land tenure has a positive effect on farmers paying for water as well as on the likelihood to invest time and efforts in irrigation infrastructure. In contrast, different results are observed for irrigation system variables, such as being an upstream user, which has more influence on the likelihood to contribute to labour maintenance efforts. With this contribution, we do not want to point to only one solution to study the disciplinary interface. Bringing together the knowledge from disciplines specialized in land and water issues, we can discuss how decisions within the land sector could be designed in the future to facilitate cooperation in other resource sectors (e.g. forestry, biodiversity, energy). The two options to enlarge the SES framework demonstrated here are meant to further emphasize the need for a more interlinked consideration of resources, also on the conceptual level. We show that including a new resource system indeed challenges the simplicity of the SES framework. However, the framework would become more encompassing and thus fitting to more circumstances. Therefore, we would like to discuss the resulting trade-off: although the framework becomes more comprehensive, it is less diagnostic at the same time.

References
Developing an analytical framework for reconstructing the transformation of state-led water governance: illustrations from scalar reorganization in Europe

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Relying on theories of institutional change, a framework is developed to explain formal change in natural resource governance, in this case, formal scalar reorganization (re-scaling) of governance. Modifications of water governance are the outcome of interrelated changes in the determinants of actor-specific perceptions of costs and benefits of governance. To become effective, actors need to be able to bring their preferences to bear on constitutionally defined action situations where collective bargaining processes over governance take shape. Institutional change is conceptualized as being about whose economic interests are able to control the processes by which institutional change (as change in governance) is advocated and carried out and whose technically, economically, or politically oriented vision of water management prevails. The framework developed goes beyond the alternatives of either functionalist problem-solving approaches or approaches focusing on political bargaining. Its application is illustrated through a comparative case study of changes in water governance in Germany (Elbe river) Portugal and Spain (Guadalquivir). Based on extensive qualitative fieldwork in these cases, I conclude that changes in the interrelated values of the resources and technologies of production and exclusion of water users there have shaped preferred outcomes of specific actors along with their mental models, complemented by changes in interrelated institutions and ideologies. However, these contextual changes are, I argue, neither necessary nor sufficient for the processes of change observed. Rather, the prevailing vision of water governance is that of those actors who control winning coalitions in constitutionally determined negotiations over formal water governance. Additionally, in unitary states, scalar organization of natural resource governance seems to be more easily restructured. A detailed comparison between the cases investigated has revealed that the scalar reorganisation of water and natural resource governance appear to be the outcome of changing material problems and
negotiations regarding changes in actors’ perceptions of and approaches to best solving them. European regulations only seem to play a role where they are consistent with views of nationally dominant decision makers and their preferred views on water management. Constitutional rules of decision making over responsibilities in water management dominate which options are seen as feasible and the frequency of change. In unitary states, as a tendency, negotiations concerning natural resource governance take place at the national level, which can be regarded as being least adequate to ecological boundaries. At the same time, restructuring in such states experiences less possibility of inertia than in asymmetric or even symmetric federal states. Instead, as illustrated by the Germany case, great inertia to formally restructure because of a multitude of veto players may lead to informal, non-binding complementary coordination structures to take on board new scalar requirements of governance.

Overall, the emerging set-up in Germany points towards a functional differentiation of the country’s water management into a more polycentric system based upon the expectations of actors and changes in their ideologies and practices. For example, for functional reasons of basin planning and coordination between states the basin-level was informally upgraded. Merrey and Cook (2012) relate such a perspective to the notion of bricolage, where actors engage in an “active, conscious creative process of adapting norms, values and social arrangements to fit new purposes, while also reflecting and being shaped by deeply embedded unconscious principles” (Merrey and Cook, 2012, p. 8). In that sense, I would argue that the German bureaucracy has clearly aspired to compliance with European requirements concerning basin-wide coordination and provision of “good” ecological status. The German transformation strongly diverges from the ways the scalar organisation of water governance has been recently reconfigured in the cases of Portugal and Spain (Thiel, 2011; Thiel and Egerton, 2011). In the asymmetric federal state of Spain, a politics concerning who should determine the most relevant management problems seems to dominate. This development can be seen as an extreme case, illustrating recent dynamics across all of Spain (Thiel et al., 2011), where economic uses based on access to water seem to dominate over provision of “good” ecological status of surface waters. Large quantities of the surface waters of Southern Spain are, in fact, perceived to be fully in use already. Therefore, control over groundwater extraction has become one of the most important economic – and therefore also political – currencies. Consequently, Andalusia, once it gained independent responsibilities over water resource management reorganised it towards emphasising groundwater management neglecting surface water boundaries. Further, it seems that in Spain struggles over formal responsibilities for water governance have dominated over European requirements. Similarly to Germany, however, Falkner et al. (2007) suggest that also in Spain domestic politics decide if and how European legislations are implemented. A notable difference is that, in the case of Spain, the European approach clashed with domestic political and economic issues, leading to minimal consideration of European prescriptions, whereas the German administration aspired to accommodate European prescriptions. This finding contradicts research on the role of fit between supranational institutional prescriptions and national policy-making styles that other authors had highlighted (Huitema and Bressers, 2006; Börzel and Risse, 2003). At the same time, it highlights the role of domestic politics and policy entrepreneurs (cf. Bressers and Kuks, 2004; Huitema and Meijerink, 2010).

In Portugal, water governance was reorganised in a problem-oriented way, shifting from a territorial approach, integrated with overall environmental management, to a basin-focussed approach which specifically laid stress on achieving “good” ecological status for surface waters. The case also confirms Young’s (2006; cf. Thiel, 2010b) suggestion that negotiations having to do with environmental regimes are scale (of analysis) dependent, as in Portugal, basin dynamics did not affect positions in negotiations in contrast to the German and Spanish cases. In Portugal, the European WFD provided a useful justification for the Portuguese community of water experts to introduce long-desired basin authorities. Nevertheless, bound by constitutional rules, in Spain as well as in Portugal, water governance was drastically reconfigured once again soon after following a sentence by the constitutional court in the case of Spain and a change in government in Portugal. In contrast to these Iberian cases, constitutional constraints in Germany led early on to alternative, non-binding ways of
catering to coordination as required by the WFD without re-allocation of formal responsibilities for water management. Besides the problems of poor performance hampering Southern European water management, the constant changes in Spain and Portugal did not facilitate compliance with European directives. The German approach, on the other hand, seems to be caught up in the overriding complexity of overlapping formal and non-binding, multi- and cross-scalar coordination requirements. Correspondingly, administrators involved often refer to coordination fatigue. On the whole, it seems as though further change in the scalar organisation of water governance as a result of the WFD, changes in use patterns, and windows of opportunity for specific actors groups will lead to further overhauls of water management in the case-study countries and across Europe, in accord with a dynamic that I would suggest to paraphrase as ‘social, co-evolutionary politics of problem-solving’ (cf. Kallis and Norgaard, 2010).

Incorporating Environmental and Natural Resources within Analyses of Multidimensional Poverty

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How can multidimensional poverty measures – that currently encompass social and economic dimensions – be extended to include environmental deprivations that strike the poor? And can such extended measures foster environmental and social justice by better informing effective and integrated policies? This is the topic of our contribution.

Poverty-environment linkages are complex (Barbier 2010; Dasgupta et al. 2005; De Sherbinin, et al. 2007; World Bank 2008;) and asymmetric: poverty may cause damage to the environmental and natural resources (ENR) to some extent, but the degradation of the ENR exerts a disproportionately large impact on the poor (Shah 2009). Studies addressing social vulnerability suggest that a household's socioeconomic status tends to affect its level of vulnerability to ENR degradation (Adger & Winkels 2014; Akter & Mallick 2013; Cutter et al. 2009; Martínez-Alier, 2002). A number of studies support the idea that poor people are extra vulnerable to environmental hazards (Agola et al. 2014; Masozera et al. 2007). Poor communities are also argued to be ecologically marginalized (Sen 2003; von Braun et al. 2013). A majority of the world’s poorest still live in rural areas (Alkire et al. 2014) and a sizeable proportion of these rely upon natural resources and ecosystem services for subsistence and income generation (Barbier 2010; Barrett 2005; Sjaastad et al. 2005).

While research on joint ENR and poverty issues is rich and has contributed to bringing the poverty-environment nexus to the fore, one important gap seems yet to be filled: no widely-used multidimensional poverty measure identifies who and how the socio-economically poor people are affected by ENR-issues, at a large enough scale, and in ways that can inform public policies over the medium term. This paper sets out how such a measure could be built. In particular, it studies how to include indicators of ENR deprivations into the profile of the joint deprivations people experience. These deprivation profiles could then be used to compute multidimensional measures using the Alkire Foster (AF) method (Alkire & Foster 2011), such as the Multidimensional Poverty Index (MPI). The communication is structured as follows. Section 1 presents the methodology and properties of the MPI (Alkire et al. 2015). The MPI is built upon the AF method, which relies upon Sen's conception of poverty as capability deprivation (Sen 1992, 1993). The aim of the method is to shed light on the joint distribution of multiple deprivations the poor experience within a society, to reflect the breadth, depth and severity of multidimensional poverty. These three aspects of multidimensional poverty are respectively reflected in three measures, whose generic formulation is given by $M_{\alpha} = \mu(g_{\alpha}(k))$ for $\alpha \geq 0$. In these three measures, the AF method uses a dual cutoff identification strategy: 1) the deprivation cutoff identifies whether a person is deprived with respect to a specific dimension; 2) the cross-
dimensional poverty cutoff defines how widely deprived a person must be in order to be identified as poor. The MPI is an application of $M_0$ (called adjusted headcount ratio): it multiplies the proportion of the population identified as multidimensionally poor by the average share of weighted dimensions in which people are deprived.

Section 2 outlines the conceptual, computational and data requirements underlying the methodology and properties of the MPI. At the conceptual level, one must ascertain that the ENR variables relate to capability poverty. At the computational level, the ENR data should accurately reflect the deprivations of interest, such that a measure or an analysis employing them satisfies the properties of the AF methodology. The third set of requirements relates to the data: do data exist to obtain the joint distribution of MPI and ENR variables for the same units? Are sampling designs compatible? While the above-mentioned requirements help delineate the ENR dimensions and indicators that could consistently be integrated within an enhanced MPI, they do not constitute a legitimate basis for justifying the normative choices underlying the selection of ENR variables. Though, values and normative conceptions regarding poverty and its relation with ENR will guide the (non-neutral) selection. Therefore, section 3 makes explicit and transparent the normative purposes and judgements underlying our joint poverty-ENR analysis.

Section 4 builds upon former sections and the study of a broad literature on the poverty-ENR linkages and of eight institutional frameworks that have attracted enduring consensus in the field of ENR and livelihoods. This section proposes a taxonomy of ways that ENR affect people’s capabilities and functionings. The taxonomy encompasses three recurrent components of ENR that seem pertinent for a multidimensional poverty analysis. First, the “livelihoods” component relates to the means of subsistence provided by nature to people. We subdivide it into three subcomponents: the material subcomponent of livelihood refers to the means of subsistence provided by nature; the institutional component relates to the ways access to the means of subsistence provided by nature are institutionally organized (e.g. collective local management system or land rights); the skill subcomponent relates to the cognitive and practical knowledge people have to sustainably manage ENR. The second component is “environmental health”, that we subdivide into a household subcomponent (e.g. indoor pollution), a workplace subcomponent (environmental quality at work), and an ambient subcomponent (related to the broader living environment, e.g. outdoor pollution). The third component is “vulnerability to natural hazards” and is subdivided into exposure, coping capacity and response and adaptive capacity.

Section 5 offers an overview of the possible methodological options to concretely jointly analyse ENR and MPI. These options fall into two broad categories, depending on whether ENR is integrated within the MPI or is analysed alongside the MPI. Regardless of whether ENR is integrated within the MPI or analysed alongside it, a plethora of potential sources of environmental data exists, which can be grouped into two options: 1) incorporating ENR-related data stemming from household surveys into the MPI; 2) using ENR data from sources other than household surveys. In a nutshell, four options are possible: data can stem from household surveys or non-household-survey sources, and both can potentially be integrated (under strict conditions) as new indicators within the MPI or analysed alongside the MPI.

In section 6, we propose methodological avenues for each option and we study the opportunities they create as well as the methodological, normative and ethical issues they raise. Particular emphasis is put on the possible ways to integrate ENR within the MPI.

Section 7 suggests further steps and research avenues. One necessary next step is to create a taxonomy of potential indicators, and relevant datasets, for joint studies of MPI and ENR. The taxonomy would need to argue how the ENR indicators satisfied the design criteria mentioned in this paper, and also propose alternative ways in which the ENR indicators could be transformed in order to be used in poverty studies. More broadly, the proposed ENR-MPI methodology could be worked up within the context of a series of technical workshops and larger deliberative processes. Ground testing of the proposals will be essential in order to move from the theoretical review to practical implementation of an ENR-enhanced MPI.
References

Emergy Accounting of Circular Economy Patterns
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The emergence of circular economy (CE) concepts and their implementation in the industrial, agricultural and urban sectors calls for more suitable ways to monitor resource quality, process performance and policy success. Well-designed, CE-oriented, performance indicators are much needed to manage environmentally sound development of economies and to provide guidelines for CE policies.
A large number of performance indicators for processes and economies have already been developed and tested (CED-cumulative energy consumption, MFA-material flow analysis, LCA-life-cycle assessment, carbon and water footprint as well as economic returns). In spite of their undoubtful usefulness, these indicators do not optimally fit CE assessment needs because they were not originally designed for the systemic, closed-loop, feedback features that characterize CE. None of them was
designed to assess the environmental quality of resources and the characteristics and complexity of interactions between the natural environment and socioeconomic systems (1). Most often, conventional indicators and assessment frameworks only focus on one parameter per time (commercial energy demand, specific waterborne or airborne emissions, economic value) by means of a linear relation between flow and impact (be it product or burden). The value and role of natural capital and ecosystem services is most often not accounted for, which leads to incomplete assessments of the interplay of economies and surrounding ecosystems. More than that, linear approaches and indicators call for policies that aim to optimize an individual resource or flow, instead of tracking diverse, nonlinear interactions between human society and the natural system in which economic processes are embedded. Finally, emissions and waste are considered as an unavoidable burden to be treated and disposed of instead of potentially valuable resources within a CE-designed network.

The gap between linear and CE frameworks and the insufficiency of conventional indicators are even more evident at the national and macroeconomic level. Although many indicators prove effective at the scale of specific products and processes, they are limited when considering the broader context and network of CE resource flows. The more complete role of natural systems as a source, sink, and regulator is missing as well as the value of preventive eco-design and information development and use.

We discuss in this study the applicability of the EMergy Accounting (EMA) approach as a valuable and by now well standardized method to address the CE’s broad systemic aspects, by means of a set of environmental accounting indices and ratios capable of capturing both resource generation (upstream), product (downstream) and systems dimensions. By accounting for environmental resource quality, time for resource generation, self-reliance and interaction with surrounding environments, role of ecosystem services, information and know-how, labor and services, resource trade and trade fairness, environmental resource demand for GDP generation; by keeping track of interactions among system components across scales, and by identifying environmental costs and savings of loop-closing strategies at all levels, emergy provides a systemic framework to assess the performance and sustainability of CE, as well as to monitor specific CE implementation processes (6).

Finally, the special EMA “memory algebra” and diagramming technique deal with internal flows, feedbacks, savings, resource exchange, resource and burden allocation, in a way that enhances the improvements and the advantages of CE patterns compared with conventional linear processes. An emergy-based CE framework provides characteristics to be integrated into other evaluation methods, for synergic results:

(i) A comprehensive focus that goes beyond mono-dimensional indicators and looks at optimization strategies across scales and across species;
(ii) A “supply-side” evaluation system, focused on the work performed by the biosphere to generate resources and services;
(iii) A systems-oriented allocation method (memory algebra) capable to track the entire environmental supply chain and assess the “production costs” of a product more fairly by also discouraging inefficient and unnecessary resource depletion.
(iv) Inclusion of the environmental dynamics (natural capital generation and turnover; ecosystem services; time) within economic assessments, which a CE strategy cannot ignore.
(v) Mimicry of natural patterns, where resources are routinely recycled, reused, converted, upgraded, and stored for future use. In so doing, resources are not depleted, and waste does not accumulate.

References and Notes
Measuring environmental inequality: insights from the segregation literature
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Environmental inequalities often display a geographic character. In particular, unequal expositions to environmental burdens as well as unequal accesses to environmental goods have been documented in many cities in relation to the urban segregation of low income and minority groups. Yet, the many conceptual and methodological advances that have taken place in the segregation measurement literature have never been considered for being transposed to the measurement of environmental inequalities. This paper fills this gap by proposing several novel “segregation-based” environmental inequality indices. These indices are applied to the metro area of Grenoble, France, and compared to prevailing analytical approaches.

1. Introduction
The overarching goal of environmental justice studies is to inform environmental justice policies, whose objective can be stated as follows: “Environmental justice policies seek to create environmental equity: the concept that all people should bear a proportionate share of environmental pollution and health risk and enjoy equal access to environmental amenities” (Harnier et al., 2002, cited by Carrier et al., 2014).” Many environmental justice studies thus primarily aim to uncover the interactions between a spatialized environmental factor (e.g. air pollution or vegetation cover) and a population - or population groups- unequally distributed among spatial units (neighborhoods, states...).

In a recent paper on “Measuring environmental inequality” published in Ecological Economics [124, 114-123 (2016)], J. K. Boyce, K. Zwickl and M. Ash present several inequality measures originally developed to appraise the distribution of income and wealth that are currently applied in -mostly international- environmental justice studies. Nonetheless, a great number of environmental justice studies are steered at the city or metro area scales and most of them do not make use of such measurement methods. Instead, their diagnoses on environmental inequalities are based on correlations or regression approaches, highlighting some statistical relationships between the environmental and population characteristics of spatial units.

In urban settings, it appears quite likely that environmental inequalities be related to residential segregation, a multidimensional phenomenon with respect to the spatial distribution of population groups across urban locations, well conceptualized by Massey and Denton (1988). The segregation measurement has been abundantly and thoroughly discussed by sociologists, geographers and economists for the past half-century and more. There is thus an opportunity to consider the many conceptual and methodological advances that have taken place in the segregation measurement literature, so as to gain new insights into the measurement of environmental inequality. This paper takes advantage of this possibility and proposes novel “segregation-based” environmental inequality indices, which have the potential to improve environmental justice diagnoses. These indices are applied to the metro area of Grenoble, France, and compared to prevailing analytical approaches.

Section 2 provides a short comment on methodological-ideological options attached to the measurement approaches prevailing in the environmental justice literature. Section 3 proposes the “segregation-based” environmental inequality indices for areal (e.g. vegetation cover) and punctual (e.g. hazardous sites) environmental data. Section 4 presents our case study. Section 5 concludes.

3. Segregation-based Environmental Inequality Measures
In this section we propose to conceptualize vertical environmental inequality as the “environmental segregation” between a population and an environmental good or bad, and horizontal environmental inequality as the departure between two population groups as for their respective degrees of “environmental segregation”. Accordingly, we consider the rich literature on residential segregation measurement to gain insights for environmental inequality measurement.
In this examination, we bear in mind the distinction between areal and punctual environmental data. Environmental justice data are often areal data, for instance the vegetation cover (Wen et al., 2013), the tree canopy cover (Schwartz et al., 2015), or the ambient load of air pollutants (Carrier et al., 2014; Boyce et al., 2016). But many other environmental data are punctual, such as the location of parks (Wen et al. 2013), or hazardous plants (Laurian, 2008).

The first subsection presents the multiple dimensions of residential segregation and an overview of what they can bring to environmental inequality measurement. The next three subsections detail the environmental inequality indices we propose, respectively for areal, punctual, and both types of environmental data.

3.1. The Dimensions of Segregation-based Environmental Inequalities
Residential segregation is a multidimensional phenomenon, generally conceptualized along the five dimensions proposed by Massey and Denton (1988): evenness (inequality in regard to population group distributions among spatial units), exposure (potential contacts between members of similar/dissimilar groups within spatial units), clustering (group interactions across spatial units’ borders), centralization (group distributions around the area’s center), and concentration (inequality in regard to the physical space occupied by groups). A thorough consideration of each of these dimensions and the many indices associated to them in the segregation literature leads us to propose a new set of measures for environmental inequality measurement (Table 1).

- Evenness & Concentration
Boyce et al. (2016) present measures of vertical inequality drawn from the field of economic inequality measurement, the Gini coefficient and two measures of the Generalized Entropy (GE) family. These measures have for long been involved in segregation measurement (see Duncan and Duncan, 1955; Theil and Finezza, 1971) and relates to the evenness dimension of segregation. But another index related to the Gini is probably the most widely applied index for measuring evenness: the dissimilarity index (Duncan et al., 1955a,b). This index has also been used to grasp the concentration dimension of segregation (Duncan et al., 1961). Our first contribution is to propose the dissimilarity index for the measurement of environmental inequality for areal environmental data. This index has two strengths: its ease of interpretation and the possibility to be adjusted for local spatial interactions (see below).

- Evenness & Clustering
The cornerstone of the clustering dimension is that people interact across spatial units’ borders, especially in urban contexts. Therefore, the geographical configuration of the spatial units matters and should not be ignored by the segregation measures. One way to account both for interactions within and across spatial units is to adjust the values of an evenness index for local spatial interactions. This is what Morill (1991) and Wong (1993) have proposed for the dissimilarity index, with various formalizations of the spatial interactions component. Following them, we adapt the adjusted dissimilarity indices to the case of environmental inequality measurement for areal environmental data. Another simple clustering index introduced by White (1983) is the spatial proximity index, which measure the mean proximity between members of the same group (or alternatively of two different groups), accounting for distances between spatial units’ centroids. This index can easily be transposed to the measurement of the proximity between a population and an environmental good or bad. The advantage of this index is that it can be applied both to areal and punctual environmental data, and also for punctual data that it allows to weight the environmental factors (e.g. size of the urban parks).

- Centralization
The relative centralization index proposed by Duncan and Duncan (1955b) measures the extent of a group’s centralization relative to another. It encompasses by definition a punctual data: the city center. This index can easily be extended to the measurement of environmental inequality with respect to an environmental “point”. But environmental justice studies generally need to consider several points, such as the many hazardous sites or public parks of a metro area. We thus develop a generalized index of relative centralization for the measurement of polycentric environmental inequality. Contrarily to
our previous propositions, this index cannot be used for vertical inequality measurement and is from
the beginning a between-group (horizontal) inequality index.

Our study region is the Grenoble-Alpes metropolitan area, which hosts about 450,000 inhabitants, in
the South-East of France. Socioeconomic data are delivered on (irregular) census tracts and on a grid of
200*200m. The environmental data are the vegetation coverage of the metro area (measured by
satellite based on an NDVI indicator) and the distribution of hazardous installations (provided by the
French government). We will apply the most common place-based and people-based methodological
approaches for environmental inequality assessment and compare their results to the one obtained
with the new segregation-based measures of environmental inequalities presented in the previous
section.

Relative willingness to pay for ecosystem services in Scotland: A comparative
analysis.
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The environmental history of estuarine ecosystems in the UK highlights the relevance of understanding
the distribution, magnitude and values attached to estuarine ecosystem services (EES). Environmental
valuation studies have frequently analysed EES provided by a particular ecosystem in isolation from
each other, and in isolation from EES provided by other systems. More recent efforts have accounted
for the complexity and feedbacks in ecosystems by valuing several EES at the same time. However,
there are few studies comparing EES across and within systems in a rigorous way.

This research aims to estimate value trade-offs of three important estuaries in Scotland: the Forth,
Clyde, and Tay. We used a comparative approach to explore how environmental preferences can be
influenced by a study site characteristics and by user characteristics. We developed a discrete choice
experiment (DCE) for each study site to estimate society’s willingness to pay (WTP) for improving flood
control, recreation and biodiversity through a restoration project operating throughout the catchment
area. All three versions of the DCE were randomly assigned to respondents and delivered through a
web-based online survey. A representative sample of 600 individuals living in Scotland was
interviewed.

After correcting for 1.8% protest individuals, Multinomial logit (MNL) and Random Parameter Logit
Models (RPLM) were estimated. Three types of ESS users were considered, namely residents, residents
visiting the area, and visitors. Models with interactions were estimated to assess the effect of these
variables on respondent’s environmental preferences. Our results allowed for a robust estimation of
the marginal values and revealed a disparity between annual WTP values for all EES, across regions
and between user types.

The Tay restoration project has the highest mean WTP for slight and large improvements in two of the
EES; biodiversity (µ = 124.8-173.1 £/yr.) and flood control (µ = 106.6-138.9 £/yr.). On the other hand,
Clyde restoration present the lowest average WTP values for the same EES (µ = 100.6-125.2 £/yr. and
µ = 97-84.3 £/yr., respectively). Results indicate that overall, flood control is the most highly valued
EES. Large improvements in flood control are associated with the greatest mean WTP and standard
deviation (µ = 142.5 £/yr., σ = 76.7 £/yr.) of all EES, followed closely by the stated WTP for small and
large improvements of biodiversity (µ = 112.5 £/yr., σ = 21 £/yr. and µ = 123.2 £/yr., σ = 53.4 £/yr.). In
contrast to flood and biodiversity, recreation values are at least a factor of two smaller (µ = 41.5 £/yr.,
σ = £39.3 £/yr.). The ASC coefficient is negative and significant when interacted with the visit variable dummy. Findings show that preferences for the status quo vary significantly between those who have visited and those who have not visited a site, and for residents compared to visitors. Finally, we identified a general trend of higher annual average WTP values for
visitors when compared to residents, and residents visiting the areas.
Understanding possible sources of heterogeneity in environmental preferences allows us to identify whether the benefits of environmental management policies vary across individuals or space. This information is convenient for designing optimal and more appropriate environmental management policies. Our study found positive and significant annual average WTP for developing a restoration project to increase EES provisioning in all study sites. The smallest WTP values are associated with the Clyde catchment area, which is the area with the lowest income and the smallest proportion of people perceiving a worsening in the environmental status. In general, Scottish citizens are more likely to favour environmental improvement scenarios when they declare themselves as users of the area for outdoor recreational activities, regardless if they reside in the area or not. At the same time, all respondents stated that their least preferred policy would only target the quality of and access to recreational activities. On this basis, it is suggested that decision-makers choose restoration policies which focus on improvements to flood control and increasing biodiversity. Environmental management should also be compatible with the promotion of sustainable outdoor recreation. For example, the development of environmental management policies could be complemented with environmental education schemes which encourage citizens to participate in outdoor recreational activities for improving their wellbeing. In this way, all users would develop what is often defined as a sense of “place attachment”, which has been suggested to promote pro-environmental behaviour. Boosting a sense of place could increase the willingness of society to fund policies to enhance the environmental quality of estuarine ecosystems.

Water cycle and urban sustainability in growing Latin America cities
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This work is the first part of my PhD thesis proposal. It is about the literature review of water and urban sustainability focusing in growing Latin America cities. There are two main objectives of this job: 1. To present and discuss the current literature on water cycle sustainability in Latin American cities, specifically focusing on intermediate cities due to their rapid growth. 2. To contextualize the sustainability of water resources through a case study of the city of Santo Domingo de los Colorados, Ecuador.

Knowing that seventy percent of the surface of the Earth is water, but only 2,53 percent is freshwater (CONAGUA, 2011). Of the total freshwater, only a little more than one percent is found in surface water; of which, rivers represent only 0,49 percent (U.S. Geological Survey, 2016).

In the world, water demand is increased by population grown, urbanization, food and economic processes (United Nations World Water Assessment Programme (WWAP), 2015). Looking at the World Development Indicators, the percentage of urban population is, since 2008, higher than the percentage rural at the global level; in Latin America and Caribbean, this happened in 1962 (World Bank, 2016).

In 50 years, the urban population of Latin America has almost doubled. In 1950, 42 percent of habitants lived in cities; in 2000, it increased to 75,6 percent (Comisión Económica para América Latina y el Caribe, 2016; Lattes, 2001). Nowadays, eighty percent of the population is located in urban areas (United Nations Human Settlements Programme, 2012). According to ECLAC (2016), in 2050, the urban population of Latin America will be around eighty seven percent.

Based on the percent of population in urban areas established by ECLAC (2016), in 1950, only five countries of Latin America had more than fifty percent of population living in urban areas (Uruguay 76,9 percent; Argentina 64,7 percent; Chile 58,4 percent; Cuba 56,5 percent; and, Venezuela 53,6 percent). Since 2015, all countries of Latin America have a greater percent of population living there. The dynamic of urban settlements is changing their natural environment (Inoguchi, Newman, & Paloetto, 1999). The relationship between cities and their immediate physical environment should be understood as a complex holistic system where multiple sectors are involved (Banco Interamericano
Framing in water sustainability and urban sustainability debate, we develop a framework to examine the water cycle sustainability in Latin America. For this, water will be studied through two interconnected elements: city and sustainability.

We can understand the first element is the outcome of a continuous evolutionary process motivated by economic, political, demographic and social changes (Hough, 1995). For that reason, we present of analysis about drivers of change and the typology of cities. Beside into this element, the analysis of water is presented through to identify how the change of cities affect to the water cycle and what problems this causes.

For that, we study three aspects: water cycle, relationship water resource-city, and water equity. (1) In the water cycle, the hydrological cycle has been affected when replace natural elements such as trees and soil for buildings, asphalt and concrete. It causes two effects: flooding and thermal modification of the city (Faulkner, 2004; Howard & Sopper, 1969; Mishra, Ganguly, Nijssen, & Lettenmaier, 2015; World Bank, 2012). (2) The relationship between water resource and urban dynamics is in two ways. First, water from environment to the city (like input), such as supply water for industry and housing. Second, water from the city to environment (like output), such as wastewater. Finally, (3) water equity as a consequence of a fragmented model of socio-spatial structure (Bähr & Borsdorf, 2005; Buzai, 2014; Hidalgo & Borsdorf, 2005), where there are social, economic, cultural and political exclusion (Sachs-Jeantet, 1995). An example of this is an inadequate distribution of water resources.

On the other hands, like the second element, sustainability is studied through each of its dimensions: environmental, social, institutional and economic, focusing on both environmental and social welfare. The dimension of environment presents the water in Latin America, demand, uses and quality. The social dimension talks about water supply and sanitation. Institutional dimension is about water management. Finally, economic dimension shows the coupling between economy and water and, the investment done in water issues.

The result of this study shows that each municipality of intermediate Latin America cities has the responsibility the provision of potable water and sewerage services (Lentini, 2015); but for them, it is difficult to give people the service due to, on the one hand, the lack of update records and the quality of water information that they have. On the other hand, they are economically and politically weak, and highly dependent of each state (Altomonte & Sánchez, 2016).

Although that on average, each of person of Latin America would have the possibility to use more water annually per capita than the rest of people on the planet (Programa de las Naciones Unidas para el Medio Ambiente (PNUMA), 2010), in Latin America is evident that access to drinking water through network is 96 percent and in the case of intermediate cities this water supply is 88,2 percent. On the other hand, although households have a high percentage of connection to the sewerage network, wastewater could not receive any treatment (Baum et al., 2013). In Latin America, only 5 percent of the water withdrawn for consumption is treated and in the case of intermediate cities that percentage is even lower.

The results just discussed during this work demonstrate the relevance of the influence of the cities and the hydro-social cycle. The intermediate cities, in case of Latin America, grow to larger rhythms of growing of their capacities responsiveness like local government, as is the case of our case study: Santo Domingo de los Colorados.

The originality of this study has been to use an empirical example to illustrate the situation found in the literature review.

The analyses of the interaction of the elements that make up the sustainability through the water resource provide the necessary technical knowledge that is required for the management of it. In this way, for the second part of this study I propose to incorporate the water accounting at city level like at tool to study the urban sustainability.

Bibliography


United Nations Human Settle
Analyzing Multi-Scale Sustainability Transformations: The Role of Bottom-Up and Top-Down Initiatives for Change

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To face the persistent challenges of our time, such as climate change and energy demands, a radical transformation to a low carbon economy is necessary across sectors (Grin et al. 2010). The research in transition theory has elaborated a profound understanding on how transitions occur and how to overcome barriers (Geels, Schot 2010). However, this field of research has two shortcomings: In empirical studies, usually only transitions from one sector to another are considered, while larger scale transformations are not regarded (Markard et al. 2012). Moreover, studies in transition research have widely focused on the national scale, while neglecting more local or regional perspectives (Coenen et al. 2012). As has been highlighted by the research on Multi-Level and Polycentric Governance (Biermann et. al 2009; Ostrom 2012), though, action needs to be taken at all scales instead of relying solely on top-down approaches. Also in practice, sub-national initiatives are becoming more and more important and often act as pioneers in advancing processes of change (Bulkeley, Newell 2010).

This paper contributes to the research on sustainability transformations by pursuing the research question what roles top-down and bottom-up initiatives play in transformations. For doing so, a framework is developed to evaluate the sustainability of comprehensive transformation processes, while accounting for the contextual factors and multi-scale dynamics in which they are embedded. More knowledge on this relationship is essential, both for niches at local or regional scales when considering how to upscale their efforts, and for policy makers at the EU or national scale for designing effective policy instruments to support transformations. In a second step, the results from a comprehensive case-study of the transformation efforts to a low carbon economy in the region of Rohrbach in Austria based on the framework are presented.

A process-oriented understanding of sustainability is followed, using the criteria for Empowering Designs for Sustainability by Leach et al. (2010) as a basis for evaluation. A process is sustainable, when it is open-ended, inclusive and empowering to marginalized actors and ideas, and when it accounts for the transformation’s embedding in contextual factors and dynamics. The Institutional Analysis and Development Framework (Ostrom 2010) and the Multi-Level Perspective on Transitions (Geels 2004, Geels, Schot 2010) are briefly presented and reviewed for their suitability to analyze the sustainability of transformations. While the IAD is helpful for assessing collective decision making processes and their embeddedness in contextual factors, the MLP presents a dynamic framework to understand how locked-in regimes can be challenged. Both approaches are integrated into a common framework and combined with a multi-scale perspective. For doing so, an advanced IAD is developed, incorporating the concepts of niches, regimes and landscapes. In order to account for the specific setting of a particular area in a multi-scale context, the frame differentiates both regimes and niches into being endogenous or exogenous. In this way, it is on the one hand possible to specify in which context an action situation takes place, and on the other, which structural level is affected by generated outcomes. On this basis, the author of this thesis creates the process-oriented Framework for Analyzing Multi-Scale Transformations, which helps to retrace different phases and steps during a transformation, and places the advanced IAD in a dynamic context. Thereby, it is possible to analyze the role and interaction of different actors and scales in a transformation process.

In the following step, the author of the paper gives an overview of a comprehensive case study that has been conducted with the help of the developed framework of the transformation dynamics in the Austrian region Rohrbach during the last 20 years. First, the procedure and the employed empirical methods that have been used for data gathering are explained. The region is then briefly described and some of the central phases and initiatives of the transformation are retraced. A survey of key elements as highlighted by the framework, such as initiating actors, power dynamics, the embedding in a niche or regime context and the spatial scale, is given for some of the central phases.
initiatives for the sustainable development of the region were the Local Agenda 21, the LEADER program, the Climate and Energy Model Region or the Bioregion Mühlviertel. The sustainability of the transformation phases is assessed with special regard to their inclusiveness, their embedding in local or regional context factors and dynamics and their potential for empowering marginalized actors. Finally, a discussion reflects on the central empirical insights and theoretical implications, such as the potential and limitations of the new framework. From the results of the case study, more general hypotheses on the role of scales for the sustainability of transformations are generated. The case study highlights the positive effect an interaction of different scales can have on the sustainability of transformations. Moreover, within a multi-scale setting, a strong influence of local or regional actors, and the previous existence of niches on both the local and regional scale can have beneficial effects. Overall, the Framework for Analyzing Multi-Scale Transformations has proven to be suitable for the analysis of transformation processes in specific areas embedded in multi-scale dynamics. Both the framework and the derived hypotheses can provide a starting point for future research and should be tested further in empirical studies.

CO2 Content of Value Added in Trade: Turkish Case
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Global warming is one of the most challenging environmental problems affecting the whole world. Consequently, there have been several policies designed and implemented for the reduction of greenhouse gas (GHG) emissions both by the governments and the international organizations. In line with these developments a vast literature has emerged in this area. In the literature besides different proposals for the measurement of GHG emissions and policies designed for their reduction, there are different views about the responsible party from the emissions. Intergovernmental Panel on Climate Change (IPCC) argues that mainly the producers are responsible from greenhouse gas emissions. On the other hand, "consumer view" asserts that responsible body is the consumers. The literature in this area looks primarily into GHG emissions embodied in supply and demand chains of final goods. The emission reduction policies in general focus on the production side, specifically aiming to reduce each country’s emissions associated with production. However, the pioneers like Wyckoff and Roop (1994), Lenzen (1998) and Munksgaard and Pedersen (2001) argue that in calculating greenhouse gas emissions of countries, the emissions embodied in imports should be taken into account. The well-known pollution haven hypothesis mainly asserts that countries which have stringent environmental regulations specialize in clean industries and export those goods. At the same time they move carbon intensive industries abroad to countries with less stringent environmental regulations and import such goods. Boiter (2012) employs WIOD Input-Output Tables and Environmental Accounts to measure the CO2 emissions embodied in international trade both from production based and consumption based perspectives. He utilizes the MRIO method developed by Peters and Hertwich (2008) which allows both intra and interregional analysis. The results of the analysis confirm the general findings in the literature. In 1995-2009 period, mainly developed countries are CO2 consumers with greater content of CO2 imports than their exports while the opposite is relevant for developing countries. It is also found that the gap between developed and developing countries has been widening during the period.

Most of the studies which test pollution haven hypothesis focus on GHG emissions of final goods subject to international trade. However, this problem becomes much more complicated with globalization, since globalization allows more and more parts of final goods to be produced in different regions of the world. Therefore, the emission responsibilities are masked by the "value added chains" of final goods that are traded. To be able to evaluate the greenhouse gas responsibility of countries more accurately, emissions embodied in value added chains should be traced. In this context Cadarso et al. (2012) discuss “shared responsibility concept” instead of producer responsibility or consumer
responsibility. They argue that with shared responsibility it is possible to identify emissions of activities through their global supply chain, depending on the value added at each stage. The study is conducted for 46 Spanish industries for 2000-2005 period. According to the authors the main advantage of this approach is that from the industry to the final consumers the emission reduction responsibility can be shared which will stimulate better policies to mitigate pollution.

Liu et al. (2015) construct an input-output model to calculate the carbon emissions embodied in VA chains of Chinese economy for 1997 and 2007. The main finding of the study reveals that although the carbon embodied in regional value added chains has increased, the net inequality in carbon emissions transferred within different regions of the country has shown a declining trend.

Since 1980s, Turkey has increasingly participated to global value chains. According to OECD (2013), based on OECD-WTO Trade in Value Added (TiVA) database, Turkey’s Global Value Chains Participation Index reveals that the use of foreign intermediaries in Turkish exports is higher than the use of Turkish intermediaries in other countries’ exports in 2009. On the other hand to our knowledge, there is no study about the GHG emissions embodied in value added of internationally traded goods for the Turkish economy.

In this study we investigate the CO2 emissions embodied in value added content of Turkish international trade. For this purpose as a commonly employed method, we construct an input-output model which accounts the bilateral trade flows between Turkey and the EU, the biggest trade partner of Turkey. With this model it is possible to trace both the direct and indirect emissions along the value added chains. In this way it is possible to design environmental policies about CO2 emissions of Turkey. The basic data sources for this study are OECD Trade in Value Added Statistics and World Input-Output Database. The analysis is conducted for 35 sectors for the years 2000 - 2011 due to data availability.

Related Literature:
Making commons under a state of (environmental) emergency: Quest for energy-water alternatives in Turkey

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Demand for water and energy resources under a carbon-constrained world means that these two critical systems are increasingly interdependent, and intersect in ways that create challenges (and some opportunities) for the management of socio-ecological commons. On one hand, water is widely used in energy production (either as a process input or as a waste/effluent stream), and energy is consumed during the production, purification and transportation of water. Water scarcity, on the other side, can create vulnerabilities in energy systems, while energy resource development has impacts on the quantity and quality of water resources on top of its impacts on coastal zones. This ‘energy-water nexus’ forces us to think in a transformative manner about the way in which we shape and explore environmental policy.

Although technical and engineering perspectives on this nexus provide us with valuable inputs when left to their own devices, technical solutions are unable to address key issues for environmental governance, such as what the goal of management should be, how the risks and benefits of management should be distributed, and who should have a voice in decision-making. In response to such concerns, there is a growing interest in the concept of ‘transformation’ among environmental...
change researchers and sustainability scientists (Hajer et al. 2015; Gillard 2016). In contrast to transition or incremental change approaches, transformation suggests a break with the status quo and seeks ground for new societal, technological and political possibilities. In this sense, transformation strives to contest the inevitability of environmental change (O’Brien 2012) and enables “fundamental changes in structural, functional, relational, and cognitive aspects of socio-technical-ecological systems that lead to new patterns of interactions and outcomes” (Patterson et al., in press). As such transformation “conveys something more radical than mere change or even transition to a new world” (Tschakert et al., 2013). This radical change requires a strong will both in formal policymaking and implementation as well as in prefigurative politics. Therefore it entails going beyond pursuing or simply protesting business-as-usual to actively constitute new meanings and experiments. Yet, radical diversion from existing environmental governance pathways, as Burch et al. (2014) assert, may only occur with intentional action in the realms of policy and practice. Scoones et al. (2015), for example, identify four emerging types of transformation in managing the water, climate and energy challenges based on their different guiding logics: technocentric transformations, marketized transformations, state-led transformations and citizen-led transformations. In each of these realms, a transformative approach goes beyond the limiting conditions to envision something bold and different from the potential and possible futures. No doubt, such transformative practices also build bridges across different environmental challenges in water and energy and help us reveal interlinkages, interdependencies and feedbacks.

Following this analytic framework, this paper undertakes a practically-engaged social science approach at the interface of environmental science and policy in Turkey. In doing so, it focuses on the 3D of transformation: distribution of environmental risks and benefits of energy resource development, the diversity of participation in decision-making, and the direction (i.e. ultimate goal) of environmental policy. In particular, it focuses on the case of a grassroots community movement in Yeni Foça in Aliaga Bay through its anti-coal mobilization (energy) and re-commoning of coastal commons (water) at the western coast of Turkey.

Aliaga is a key industrial site in western Turkey, transformed into an ecological sacrifice zone for shipbreaking, smelting facilities, oil refineries and massive coal-fired power plants since late 1970s. Being a town with a population of 70,000 inhabitants located 60 km to the north of Izmir, the 3rd biggest city in the country, approximately 36% of Turkey’s crude oil production is processed in Aliaga. However this continues to have serious environmental implications. Ambient levels of VOCs (volatile organic compounds) were found to be 4 to 20 times higher than those around suburban sites in Izmir metropolitan area. A recent study found out that cancer risk in this region is 4 times the levels considered acceptable by US EPA (Environmental Protection Agency) (Civan et al., 2015). New plans to build 7 additional coal-fired power plants and an associated ash residue dump site nearby made a great upheaval among the residents in surrounding settlements. This led to an increased community mobilization against new fossil fuel investments in the region, making the region also one of the hotspots of global Break Free mobilizations in May 2016. Amidst this ‘carbon rush’, Yeni Foça Forum as a grassroots community organization emerged in the region as an offspring of Gezi Park Protests of 2013 (Özkaynak et al, 2015).

In July 2016, Yeni Foça Forum occupied an unused privatized beach (which constitutionally needs to be public) and started establishing/practising coastal commons. This act not only created awareness with regard to environmental problems at large but also raised significant questions in the community as regards the interlinkages between the use of water in energy production, ownership of coastal resources, privatization of commons and reclaiming community power (ie. re-commoning) in managing those commons. In this paper, we argue that such transformative acts help the local movements to go beyond a lock-in to its opposition to fossil fuel investments and reveal new questions and challenges on the water-energy nexus. By focusing on this case study and by employing scenario/backcasting methods, our research postulates that knowledge exchange among various stakeholders as well as researchers and local stakeholders helps to shape the transformation of environmental governance. We also argue that such transformative processes also provide leverage points for micro-transformations and community empowerment in particular when macro political
transformations are constrained from within such as in the case of on-going state of emergency in Turkey.

References:

Green versus grey solution for flood control of Leuven city (Belgium)
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As the city of Leuven and the University campus is prone to flooding, there is public demand for flood protection. Two options were considered among involved agencies during the 1990’s: an infrastructural solution (i.e. the construction of three reservoirs), or a nature-based solution (i.e. using the natural floodplains of the Dijle river for flood control). The hydrological models showed that both solutions could provide the same protection for a peak storm which happens only once in 100 years. The societal costs and benefits of both solutions were however very different: the costs of the infrastructural solution were much higher than the natural solution (5.6 million€/30 years), while on the societal benefit side, the natural scenario scored much better than the infrastructural solution (difference in benefits between 29 and 330 million €/30 years). As the water table and the landscape aesthetics would be different for the two solutions, also the ecosystem services would respond differently, especially denitrification, nutrient-removal, carbon sequestration, air quality improvement and recreation. Finally, the natural flood control option was implemented in combination with one downstream reservoir. This solution is also favourable for the biodiversity of the valley, although there are trade-offs.
These findings are heavily dependent on the local context, e.g. legal status of the area (in the Dijle case: protection by European Habitat Directive), presence/absence of houses and infrastructure in the
flood area, geomorphology, demand for outdoor recreation, etc. Therefore, the findings cannot be generalized without verifying the costs and benefits.

Residential Energy Efficiency: Turkish Case
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Energy is undoubtedly one of the most important inputs in the production process. Therefore, the abundant and uninterrupted supply of energy has a vital importance for countries attaining sustainable economic and social growth. It is projected that worldwide energy demand will at least double by the year 2050 (World Energy Council, 2013). Considering the difficulty of meeting today’s growing energy demand by existing scarce resources, the situation in the future seems uncertain. Therefore, this pessimistic scenario forces countries to take urgent measures regarding energy efficiency which are absolutely crucial for dealing with this issue. The conventional definition of energy efficiency is to use less energy in order to provide the same service. International Energy Agency regards that energy efficiency is the world’s most important “fuel” (IEA, 2013).

As a country heavily dependent on the foreign energy sources, Turkey has also taken important steps in promoting energy efficiency in recent years. Having considerably high energy consumption per capita and energy intensity, Turkey initiated her efforts for instigating energy efficiency measures by the enactment of Energy Efficiency Law in 2007. The purpose of this law was to increase efficiency, to avoid waste, to ease the burden of energy costs on the economy and to protect the environment. Later in 2012, The Energy Efficiency Strategy Document came in to force which targets to improve the energy intensity from 2011 to 2023 by %20. Moreover, in the Tenth Development Plan covering the years 2014-2018 energy efficiency improvement program is discussed and some important goals like encouraging efficiency in different sectors such as industry, dwellings, transportation are set.

The purpose of this study is to investigate the residential energy efficiency of provinces in Turkey in terms of electricity use. Although the energy use in dwellings constitutes a considerable portion of the total energy use, energy efficiency studies concentrating on the residential sector are very scarce in the literature. The current study is the only energy efficiency research on the residential electricity consumption in Turkey. The main reason for focusing only on the electricity use of the residential sector is due to data availability. Since our research aims to conduct an analysis at the province level it is not possible to find data for other energy resources such as coal and natural gas. Therefore in this study we focus on the electricity use as the source of energy.

According to Electricity Generation - Transmission Statistics of Turkey for 2013, shares of coal and natural gas, the main non-renewable natural resources in producing electricity, are approximately 27% and 44%, respectively. On the other hand the share of renewable resources is only 5% (Turkish Statistical Institute, 2014). Being the main source of electricity production, there is a high level of foreign dependence in natural gas amounting to 98% in 2013. (Energy Market Regulatory Authority, 2013). According to the Electricity Distribution and Consumption Statistics of Turkey the share of residential sector in total energy use is roughly 23% in 2013 (Turkish Statistical Institute, 2014). It means that nearly one fourth of total electricity production is consumed in dwellings. These outstanding numbers show that analyzing residential electricity consumption will produce important policy implications for decision makers in this area.

Turkey as a developing economy still heavily depends on non-renewable resources in the production of electricity such as natural gas and coal as mentioned before. However, each one of these resources has its own deficiencies. Coal, although mainly produced locally, emits more pollutants than other non-renewable resources. On the other hand as natural gas supplies depend on the foreign sources, this creates the problem of supply security. One solution to these problems is to promote renewable resources. Nonetheless, these remedies do not seem to be realistic for Turkey in the near future. Therefore, today the goal of reducing energy use and attaining energy efficiency is vital to the main
energy consuming sectors, especially the residential sector which consumes almost a quarter of total electricity production.

As energy efficiency has gained importance, different methods to measure it accurately have also been developed. These methods in the literature are generally divided into two groups as parametric and non-parametric techniques. These parametric and non-parametric methods are further divided into two parts as frontier and non-frontier approaches. The well-known parametric and non-parametric methods are Stochastic Frontier Approach (SFA) and Data Envelopment Approach (DEA), respectively. SFA, widely used in the efficiency analysis today, was introduced by Aigner et al. (1977) and Meeusen and van de Broeck (1977) as follows:

\[ Y_i = \beta_0 + \sum \beta_n X_{ni} + \epsilon_i \]

where \( Y_i \) represents the observed output, \( X_{ni} \) is the vector of the given inputs, \( \beta_n \) is the vector of the unknown parameters and \( \epsilon_i = v_i - u_i \) is the disturbance term consisting of two parts \( v_i \) and \( u_i \). \( v_i \) is the error term to capture the measurement error and external shocks and \( u_i \) is the non-negative inefficiency term to capture technical efficiency.

Later, the structure and the assumptions of the initial model have been altered. For the normality of the inefficiency terms, different distributions have been offered such as truncated normal, exponential or gamma distribution. Moreover, beside the models assuming the inefficiency terms as time-invariant, the ones allowing the inefficiency terms to change over time have been used in the literature (Pitt and Lee (1981), Schmidt and Sickles (1984), Kumbhakar (1990)). Hence, in the SFA methodology not only the cross-sectional studies but also the panel ones have been carried out.

To measure the technical efficiency in SFA, firstly the production or cost function needs to be determined. There are many different suggestions for functional forms of the production or the cost function such as linear, quadratic, normalized quadratic, and trans-log. After taking some assumptions or the sample size restrictions for the model into consideration, the inefficiency terms are estimated through different statistical methods such as Maximum Likelihood Estimation (MLE) or using stochastic distance functions.

SFA enables researchers to distinguish between the inputs and inefficiency factors affecting the observed output and to gain an insight into whether distances from the efficient frontier occur due to the inefficiency or the error part (Auci et al., 2011).

In our research we decide to use SFA since we aim to specify the functional form of the residential electricity consumption and non-inclusion of some factors which can affect the electricity use may have an impact on the results of the analysis. Moreover, while obtaining the efficiency scores, it will be important to determine the factors affecting the electricity use and their extent.

Residential energy demand model we use in this analysis is inspired by Filippini and Hunt (2012). In this research, energy is treated as a production factor with other inputs, and “underlying energy efficiency” is estimated by using SFA. The minimum amount of energy to produce any given level of output constitutes the “energy demand frontier” and positive deviations from the frontier are regarded as “inefficiency” in the use of input energy (Filippini and Orea, 2014).

We extend the model by adding variables regarding household and dwelling characteristics besides the standard energy demand variables. Using this energy demand model we aim to measure the residential electricity efficiency scores of 81 provinces in Turkey between the years 2008 and 2013. The general form of our model is:

\[ E_{it} = E(P_t, Y_{it}, POP_{it}, AGE_{it}, AHS_{it}, SH_{it}, ADS_{it}, HDD_{it}, CDD_{it}, LEG_{it}, D_t, EFit) \]

where \( E_{it} \) is aggregate residential electricity consumption in kwh, \( P_t \) is price of the electricity, \( Y_{it} \) is real income, POP_{it} is population, AGE_{it} is average age of households, AHS_{it} is average household size, SH_{it} is share of detached houses, ADS_{it} is average dwelling size in m^2, HDD_{it} is number of heating degree days, CDD_{it} is number of cooling degree days, LEG_{it} is proportion of the residential electricity leakage, \( D_t \) is time dummy variable and \( EFit \) is level of underlying energy efficiency. The minimum level of the residential electricity use to produce any given level of output comprises our “electricity demand frontier”. Using the SFA under certain assumptions, we will try to find out whether the deviations from the efficient frontier for each province result mostly from the inputs regarding the structure of the economy, the household and dwelling characteristics or the inefficient use of the
REFERENCES

Incidence of pollinators decline on the international trade: Welfare and food security analysis
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The pollination service contributes heavily to the quantity and the quality of crops production. Indeed, the insect pollination service participates up to 67% of global crop production in volume, representing 35% of cultivated species (Klein et al, 2007). The quality of the crops is measured in terms of nutrients provision. Then, the production of nutrients depending on pollinators worldwide is estimated at 40% (Ellis et al., 2015). Nevertheless, this dependence is observed mainly in countries with high rate of undernourishment (Eilers et al., 2011). Consequently, it is an essential ecosystem service for the well-being of our society.

However the abundance and diversity of all pollinators are declining. The causes of that decline are manifold, comprising agricultural intensification and habitat conversion (Aizen & Feinsinger 2003; Brosi, Daily, Shih, Oviedo, & Duran 2008; Kremen, Williams, & Thorp 2002; Quintero, Morales, & Aizen 2010; Steffan-Dewenter & Tscharntke 1999), the use of pesticides (Brittain & Potts 2011; Johansen 1977), invasive species (Ghazoul 2004; Schweiger et al. 2010), introduced pathogens (Cameron et al. 2011) and climate change (Hegland, Nielsen, Lázaro, Bjerknes, & Totland 2009).

Questions in the scientific literature raised on the consequences of this decline all over the world. Breeze et al. (2014) demonstrated that the supply of pollinators in Europe was becoming increasingly inadequate due to the increase in production itself supported by public policies, including stimulating the production of biofuels.

These results underlie the needs to analyse this decline at a large scale. Many studies value the pollinator contribution at large scale (e.g. Gallai et al. 2009, Lautenbach et al. 2012, Leonhardt et al. 2013) but they do not consider the market consequences of the pollinator decline. Indeed, a lower provision of pollination would decrease the yield and consequently increase the marginal cost of production (Winfree et al. 2001). As a consequence, the market equilibrium would change: the market prices will increase while the demand and the production would decrease. These variations in the market equilibrium would impact 1) the social welfare and more precisely the consumer and producer surpluses and 2) the provision of nutrients.

In this paper, we study these phenomena at the world scale in concentrating our analysis on the impacts of pollination declines on the international trade of crops. Some studies exist that take into
account the international trade as the one of Kevan et. al (2001). He analyses theoretically the impacts of pollinators decline on the international trade of crops and shows the ambiguous effect that it would have on social welfare. Indeed, he shows that some countries would gain as a result of such decline by developing agriculture that does not depend on pollinators. However, his analysis does not take into account the potential loss in nutrients, which is embedded.

We propose an international trade model to improve estimates of pollination service impacts on human needs. Emphasis is placed on international trade mechanism to simulate effects of pollinators decline on quality and quantity of food production and consumption. We estimated these changes in taking into account variations of the prices and the quantities exchanged, but also the nutriments delivery.

We developed an analytical model of world trade of crops integrating pollination service in the production function of famers. This model allows estimating different indicators as the regional and world prices, the quantities exchanged, the producer and consumer surpluses, the world trade balance in ton and in euro and the nutrient losses.

For that, we decomposed the world into sub-regional pattern, where each sub-region, i, has its supply and demand of a crop, j. The supply function is derived from the profit and the production of farms, including the pollination service. The demand function is the result of the maximization of consumer utilities of a sub-region under the revenue constraint of this region. From these regional market, the model simulate a World market price of crop, j, (Pwj), imports and exports.

To simulate the impacts of pollinator declines, we used a scenario assuming full pollinator extinction in the world. Consequently, the nutrients intake, the producer surplus (PS) and consumer surplus (CS) change accordingly. In fact, a pollination service decline in crops supply is a shock in production. As a result, supply and demand at the new equilibrium will decrease.

Furthermore, we matched the crops demand of sub-regions with their corresponding nutrients ratios, to measure the nutritional impacts distribution in the world assuming a global pollination declines by using the “rule of three”.

This study is divided into 22 sub-regional units, following the FAO classification including 193 countries and based upon 2010 data from the FAO database (http://faostat.fao.org/). The data sampled are crops production limited to 121 most known crops as food products (Klein et al; 2007, Gallai et al; 2009). The data of revenues spent on food and beverage are collected from World Bank, Eurostat and United Nation Statistical databases. Other data collected were nutrient content ratio in crops (Vitamin A, Vitamin C, Folate, Iron, Protein, Vitamin B6) and crop dependence ratio (D) on pollinators, those are collected from the papers (Klein et al., 2014 ; Becky et al., 2014 and Klein et al. 2007; Gallai et al. 2009). Furthermore, in order to compare the results between countries and societies, we calculated the per hectare (ha) and per capita indicators. We found these data on the FAO database (http://faostat.fao.org/).

In 2010, we estimated that the economic value of world edible crops was 6524 billion US dollar. The economic value of pollinators per capita was 193 US$ and per land and permanents crops was 863 US$ per Ha. A global ratio of vulnerability on pollinator decline was 20%, however, in sub-regions this ratios is heterogeneous. For instance, in Europe only eastern was above the global ratio. In a global pollinator loss, the overall worldwide price increase in domestic market and international trade cases could be 232% and 993%, respectively.

As a result on the impairment of international trade due to this decline effect, our finding shows a global decrease of the initial value of trade. However, Asia’s pulse total trade value may increase by 47%, and Southern Europe may increase it trade value of oil edible crops by 60%. Yet, Western Africa may suffer severely the decrease in trade value of its stimulant crops by -81%.

Moreover, the overall world social welfare may decrease -3337 billion US$ in total, -481 US$ per capita, and -2 157 US$ per hectare. Globally, consumer surplus loss is four times greater than producer surplus loss. However, for Southern Asia and Western Africa, there is an exception, producers will lose greater than their consumers will. Indeed, regions and crop categories are impacted differently. For instance, eastern Asia may have high deficit, around one third of the global deficit, of -1231 billion US$ in social welfare compared to southern Africa that will lose -12 billion US$. As for the social welfare provided
by crops, that for fruits will decrease almost a half of the overall loss in all crops. Finally, our findings show that a per capita average demand of Vitamin A, Vitamin C, and Iron, Folate, Protein and vitamin B6 will decrease respectively by 9.8%, 8.3%, 5.5%, 5%, 3.9%, and 0.2%.

Our model can predict what can happen in different scenario of pollinators’ density, from zero declines to extinction. In addition, it considers the substitutability. In this work, we assumed that a crop, j, can be substituted between countries (for instance if price of apple increase in France consumer can by an apple in Spain) but we do not assume that a crop j could be substituted by a crop i (e.g.; bananas vs strawberry). The reason is mainly due to the complexity of the mathematical program at this world scale with this quantity of variables.

In conclusion, the general welfare loss suggests that governmental interventions coupling international and local policy responses to pollination service decline effects become necessary. As for malnutrition, is unfortunately already present in certain sub-regions, the pollinators decline could increase this gap. In addition, the model shows also that the comparative advantage, for a country, can be created by a sustainable pollinator’s management.

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Cross-time and cross-boundary effects in the Index of Sustainable Economic Welfare (ISEW)
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Daly and Cobb (1989) developed the Index of Sustainable Economic Welfare (ISEW) in an effort to respond to the different criticisms on the use of GDP as a measure of economic welfare. The authors included, for instance, the value of household labor in the ISEW to overcome GDP’s narrow focus on market activities that excludes household activities such as cleaning and cooking meals. Other adjustments were made within the ISEW framework to account for the welfare losses from income inequalities, the costs of environmental degradation and the depletion of capital stocks. However, as the ISEW was compiled as an empirical exercise to correct GDP, it was largely developed without having a sound theoretical framework to start from. This was soon pointed out by ISEW critics (e.g. Neumayer, 1999 and 2000). Lawn and Sanders (1999) developed an ex post framework in which the ISEW is established as a measure of the optimal physical scale of the economy, looking at both the
costs and benefits of economic activities. Lawn (2003) elaborated on this framework by highlighting how the different ISEW components are in line with Fisher’s (1906) concept of psychic income - the psychic flux of services derived from the consumption of these goods and services. However, it has been argued that not all components included in the ISEW are in line with this theoretical concept (e.g. Bley, 2008) and several authors have highlighted potential problems with ISEW’s approach to measure psychic income (e.g. Harris, 2007 and Brennan, 2013). Next, it has often been illustrated that no two ISEW studies use the exact same methodology, and the resulting lack of comparable data has been identified as a major barrier to the index impacting on policy-making (Bley and Whitby, 2015). This paper sets out two potential interpretations of the ISEW. The first regards the ISEW as a measure of current economic welfare, in line with the notion of psychic income. The second looks at the ISEW as the outcome of a macro-economic cost-benefits analysis of the current economic activities in a country. Depending on the interpretation one gives to the ISEW, components that include cross-time effects, should be monitored and valued differently. For instance, in the current economic welfare interpretation, the costs of climate change should focus on the current services lost due to climate change, while in the cost-benefit analysis interpretation, this component should monitor the present and future costs of the current emissions of carbon dioxides. It is shown that most of the current ISEW studies do not explicitly state what exactly the index is measuring as vague terms such as economic well-being, sustainable income and others are often used. As a result, most studies today combine valuation methods for the different ISEW components that are not exclusively in line with either one of the interpretations. In the GPI* for the US (Talberth et al., 2007), for instance, the costs of climate change are estimated using (a) cumulative emissions of carbon dioxides since 1964 (only that part that exceeds the sequestration capacity of our planet) and (b) a time-varying marginal damage cost estimate that includes future damage costs. This methodology aims to estimate the current costs of climate change, yet it is prone to multiple counting.

Next, this paper looks at how cross-boundary effects are included in the ISEW. Some ISEW studies stick to the nation’s geographic borders to include the costs of environmental degradation and the depletion of non-renewable natural resources. In the ISEW for Greece (Menegaki and Tsagarakis, 2015), for instance, the environmental degradation and mineral and energy depletion estimates from the World Bank’s (2011, 2016) Adjusted Net Savings are used. These focus on emissions of particulate matter and the depletion of energy resources and minerals within the borders of the country, as if nations operated as closed economies. In a context of international resource trade, this type of accounting allocates the costs of resource depletion to the resource-extracting countries while resource-importing countries enjoy the benefits of these resources and this at no apparent cost. In this regard, Clarke (2007) points out that ISEW compilations should care more about the ownership of the costs and benefits of economic growth than about the physical location of these costs and benefits, while Makino (2008) argues that studies could be improved by letting resource-importing countries bear the user cost of imported resources. It should be noted that most ISEW studies that have been compiled for resource-poor countries do look beyond national borders for certain components. Such studies typically include the consumption of non-renewable energy resources instead of the depletion of the nation’s capital stocks (e.g. Diefenbacher et al., 2013) to take into account the effect of economic activities within the country’s borders on the global energy stocks. This approach is similar to the methodology of the Ecological Footprint where the environmental impact of consumption is not restricted to national borders. For the ISEW components related to environmental degradation, the within-borders approach is adopted in most ISEW studies – focusing, for instance, on the emissions of air pollutants within the borders of the country. One can argue that a footprint-type approach can also be used – for instance, including the carbon dioxide loads of imported consumption goods. Here, environmental input-output models can provide useful data to take into account the costs of environmental degradation that can be linked to international trade. At the moment, however, most ISEW studies lack a consistent approach to include or exclude these cross-boundary effects.

Finally, it is argued that the different interpretations of the ISEW should be regarded as complementary, rather than competing with each other. Both interpretations yield different insights in the important issue of how a country should rethink economic welfare and progress beyond the
traditional view of GDP growth. Furthermore, one set of underlying indicators can be collected that allows for the compilation of two measures (one in line with each interpretation). The same holds for the choice as to whether or not to include cross-boundary effects. The ISEW can be compiled both from a traditional within-borders perspective and from a footprint-like perspective. However, the two problems with most ISEW studies to date are that (a) they do not explicitly state the approach they take when it comes to including cross-time and cross-boundary effects and (b) they are inconsistent in their treatment of these effects. Being explicit and consistent would greatly benefit the value of this type of exercises.

* The Genuine Progress Indicator, GPI, is a variant of the ISEW that uses a similar methodology to monitor economic welfare. This name is mostly used in the United States and in the Asia-Pacific region.

Bibliography
Costs and benefits of ecosystem services provisioning. A donor-side evaluation in marine protected areas
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Over the past few decades, efforts were addressed to the understanding of the link between ecosystems and human well-being. Gradually, humans began to perceive that changes imposed to nature by their activities provoke effects, direct or indirect, on all components of well-being. From this perception, the concepts of Ecosystem Services (ES) and natural capital arose and it became urgent the definition and application of metrics and assessment frameworks able to define and quantify ES provided by nature. This is even more important where a protection regime is established (such as in marine protected areas - MPA) in order to evaluate the efficacy of undertaken measures. Nonetheless a reliable evaluation of ES lays on the estimate of natural capital value since only if natural capital is preserved the providing of services in the future at the actual level can be ensured. In this framework authors developed an integrated methodology, based on emergy analysis, specifically addressed to the evaluation of (1) the value of Marine Protected Areas natural capital, (2) the benefits in terms of ecosystems services provided and (3) the costs associated to the ecosystem services enjoyment. The methodology was applied to the Asinara MPA (Sardinia Region, Italy) in the context of a national project financed by Italian Ministry and aimed at the MPAs environmental accounting. The Asinara MPA occupies a total surface of 10920 ha and is subdivided in zones with different protection degree. The calculation of surfaces occupied by each habitat composing the MPA together with the evaluation of the biomass stocked in each habitat represent the basis for the assessment of MPA natural capital value. These information allow modelling the trophic network of each habitat to obtain the values of productivity amounts that both generated the biomass and keep annual fluxes. From productivity values, all resources required to feed the system, representing the item of emergy table, are calculated. Once expressed in emergy terms items can be summed up and translated in monerary units. From the application of this approach it is possible to: 1) identify the role played by different habitats in a system perspective; 2) recognize more valuable habitats; 3) to analyse the MPA self sufficiency or the need of external resources and, as a consequence, 4) develop management strategies about MPA structure and size.
Together with the analysis of natural capital, emergy analysis is applied also to the evaluation of human activities associated with ecosystem services enjoyment aiming at the assessment of direct and indirect environmental costs (e.g. resources intake, resources consumption) and in turn introduce a sort of ecological balance for the evaluation of management strategies and limitations.

Investigating the potential of cooperatives to re-embed the economy: a multiple case study with food cooperatives in Belgium
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Over the past decade, in a dialectic between a critique of “globalization” and a practice of “glocalism”, citizen initiatives which structurally question the commercial relations between producers and consumers and operationalize these along principles of community-involvement and cooperation, have gained traction on the ground and interest as objects of study. In particular, food cooperatives have gathered citizens, producers, entrepreneurs, distributors and/or other actors to build alternative, sustainable and local food systems (Starr, 2010) along the entire food supply chain.
These alternative organisations – formal and informal ones – can be related to the concept of “new social economic movement” (Gendron, Bisaillon & Rance, 2009), in that they use economic means of action – and thus somehow instrumentalize the economy – to achieve community-oriented economic, social and environmental outcomes. To shorten: economic action as a practice of economic critique.

Our paper strives to improve our comprehension of such organisations’ capacities to question and colonize the economy, and redefine it according to their ethics and societal goals. Analytically the paper concentrates on identifying and characterising such economic activism on the ground by driving an investigation into a set of food cooperatives of different natures (i.e. producer cooperatives, citizen/consumer cooperatives) and different objectives (i.e. distribution, production). The empirical aim being to concentrate on how these cooperatives play in the market (i.e. set their selling prices, set their remuneration scale).

The wider theoretical context of our paper can be enlightened with Polanyi (Polanyi, 1944/2001). He argued that non/pre-capitalist societies organize around principles of the economy and the market (i.e. the institution regulating the exchange of good and services) while being “embedded” in larger social systems. Whereas in capitalist societies, social relations are embedded in the economic system while the market is largely autonomous:

“In a market economy the production and distribution of material goods in principle is carried on through a self-regulating system of price-making markets. It is governed by laws of its own, the so-called laws of supply and demand, and motivated by fear of hunger and hope of gain. Not blood-tie, legal compulsion, religious obligation, fealty or magic creates the sociological situations which make individuals partake in economic life but specifically economic institutions such as private enterprise and the wage system.” (Polanyi, 1957, pp. 67–68, cited in Machado, 2010)

The paper will interrogate how food cooperatives both strive (intentions) and contribute (practice) to “re-embed” the market in society, or more precisely how they re-embed certain parts and aspects of the market. In other words, in which manner are their economic mindset and action determined by non-economic considerations?

Being part of an on-going PhD research, this paper aims to provide a typology of cooperatives, in relation to how they contribute to “re-embed” parts of the market, grounded in empirical data on existing cooperative food systems.

Cooperatives distinguish themselves through the set of core values and principles they share and operationalize. Seven cooperative principles have been defined by the International Co-operative Alliance, which federates cooperatives worldwide since 1895 (International Co-operative Alliance, n.d.). In this paper, we explore the hypothesis that cooperatives contribute to the “re-embeddedness” of parts of the market by translating these seven principles in their own values and practices. Cooperatives implement indeed each of these principles to different degrees, through different dimensions and vehicles. We examine in which manners the seven cooperative principles were translated in the economic activities of the cooperatives and to what extent these activities are “embedded” or “dis-embedded”. For each principle, we investigate one or several dimensions:

- Voluntary and open membership: how is the capital of the cooperative formed?
- Democratic member control: is the decision power in the cooperative determined by economic factors?
- Member economic participation: how do they remunerate the capital and allocate the surplus?
- Autonomy and independence: how do they relate to other economic organisations and to the State?
- Education, training and information: do they invest in social and cultural capital?
- Cooperation among cooperatives: do they give advantage to cooperation mechanisms instead of competition among economic actors?
- Concern for community: how do they define the prices of their products? What is the rationale behind their sourcing policy?

Using a Grounded Theory approach (Glaser and Strauss, 1967; Charmaz, 2006), we explore these questions by comparing three food cooperatives in Belgium: (i) Agricovert, a cooperative that gathers organic farmers and consumers around a project of local production and distribution of fruits and vegetables; (ii) Färm, a chain of organic shops started by entrepreneurs and organized as a cooperative;
and (iii) Bees Coop, a participatory supermarket and organized as a non-profit consumer-based cooperative. Empirical data will be collected through in-depth interviews of cooperators actively involved in these cooperatives.

References

Institutional economics – the economics of ecological economics
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(This presentation is included in the proposal for the special session ‘Developing consistent theory for social ecological economics – where do we stand’. The title is slightly changed. The title in the proposal was: ‘Using institutional economics to build an alternative model for an ecological economy’) The aim of this paper is to explore what insights institutional economics – especially its classical branch (Vatn 2005) – could offer to a consolidation of the economics of ecological economics. On its home page, ESEE describes that ecological economics has brought together economists, social and natural scientists in the endeavor “to formulate new approaches to questions of economic development in response to environmental challenges, increasingly framed as the problems of sustainable development”. A key debate in this respect regards whether neoclassical economics is a good platform for this tremendous endeavor. The paper is based on the understanding that it is not and aims to show what institutional economics – as an alternative – can offer.

Neoclassical economics fails largely for two reasons. First, its emphasis on the maximizing, selfregarding and strictly autonomous individual offers an understanding of human action that is empirically flawed. Second, it builds its analyses on ‘solved political problems’ (Lerner 1972) – e.g., distribution of (property) rights – while sustainability issues are typically unresolved political problems.

Classical institutional economics (CIE) deviates from its neoclassical counterpart first of all because it sees humans as socially constructed – e.g., that our perceptions, values and preferences depend on which societies and cultures we are part of. Hence, they are not given, but formed through enculturation. Here institutions – understood as conventions, norms and formal rules (Scott 2014; Vatn 2005) – play a crucial role. They protect the values a society prioritizes and outline which actions are appropriate. Through changing institutions, we can facilitate not only new constraints for ‘egocentric
individualism’, but create new meaning for ourselves and support various forms of collective and responsible actions.

CIE emphasizes that people are interdependent as they act within common environments. Traditionally, proponents of CIE were mainly focused on common cultural and political environments. Introducing CIE to ecological economics implies expanding the focus to also include physical interdependence. Such interdependence implies both conflict and need for coordination. CIE emphasizes the role of institutions as defining whose interests are/become protected and how easy/demanding it will be to coordinate actions that are interdependent.

Given the above, the paper will expand on the following key aspects of CIE as applied to ecological economics:
1) Property rights are key institutional structures in a society as they define whose interests get protection through specifying who gets access to which resources. This is a political question raising several issues regarding the normative basis of a society – e.g., its understanding of justice – and is key to sustainable development as being about ensuring access to resources over time. Equally important is the way interaction between resource holders/users are institutionalized – e.g., as trade, command or cooperation. Rights to resources and interaction rules form resource regimes. CIE emphasizes how such regimes influence distribution as well as shaping human action through influencing the costs of interaction (transaction costs), people’s perceptions and motivation structures.

2) Costs of interaction (transaction costs) depend on the kind of institutional structures established. Environmental degradation is the result of myriads of independent actions with implications for our common physical environments. Establishing sustainability demands facilitating coordination and make coordination possible – not too costly – as well as meaningful for people when acting.

3) CIE also emphasizes that what we perceive depends on how and what we have learned to ‘see’. How we perceive problems – even what is a problem and why – depends on how we have been trained to interpret information. Including this aspect is crucial for a theory that aims at supporting sustainable development.

4) Last, but not least, CIE understands rationality and motivation as plural concepts. It sees humans as able to act self-regardingly as well as socially responsible – i.e., act in ways that are better for the group one belongs to or for others. Institutions are important in that they define expectations regarding when individual as opposed to social rationality is expected.

When emphasizing the above, CIE draws on experiences across the social sciences. By expanding economics and shifting the understanding of human action in the above direction one moreover creates a productive basis for engaging in developing institutions that could move societies on a sustainable path – towards fostering cooperation and finding ways to handle the interdependencies faced. Hence, the paper will explain the above defined relationships, show their empirical basis and highlight possibilities it offers for future development of ecological economics.

Exploring the biophysical value of Ecosystem Services for sustainable appropriation by human processes
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The whole human economy is sustained by stocks of natural capital and flows of ecosystem services, without which only the economic capital and human labor could not ensure human well-being. Disregarding the biophysical constrains to human economy in the long run can result into an extreme impoverishment of natural resources and severe problems of environmental degradation. The definition of ecosystem services, as the benefits humans receive from Nature, is fundamentally anthropocentric. According to this definition, it was possible to assign an economic value to these
benefits, by means of different user-side approaches. However, ecosystem services to humans are only a portion of all ecosystem functions that exist independently by human-controlled processes and are enjoyed by all species on the planet. A proper management of natural capital allows a bigger feedback to the economic processes and human welfare by means of the different ecosystem services supporting it, or at least it could open the way, to a sustainable development of the investigated area. The Emergy Accounting method (EMA), introduced by H.T. Odum provides a unique donor-side perspective, that links the value of resources to the work of biosphere to generate resources and support life. EMA, a unified measure of the provision of environmental support, has been widely used to evaluate flows of energy and other resources (matter, information...) supporting the biosphere dynamics, including the economy of humans. In so doing, EMA provides an ecological donor-side value of the ecosystems services in terms of the cumulative work done by the biosphere to generate them.

The purpose of this paper is to review the efforts in the assessment of ecosystem functions and services by using the EMA, to show the extent it provides new insight and understanding on environmental value, and finally to further refine a suitable calculation procedure, described by means of specific case-studies. The evaluation of natural capital and ecosystem services in terms of their emergy equivalents could be the basis to build a powerful tool to help environmental policy decision-making.

It can be used as a reference to appraise the worth of investments, projects and incentives for conservation, management and recovery of natural capital, beyond reliance only on market dynamics and purely economic. For these aspects to be properly addressed, the traditional categories of economic value and/or energy cost must be integrated by other approaches capable to highlight the “human footprint” in terms of use and misuse of natural capital and ecosystem services, as well as to quantify the importance of the environment in the stability of human societies. No payment is provided by the main economy to nature for such services. Economic growth has been strongly constrained in the pre-industrial era by the scarcity of available energy resources and human societies had to adapt to the existing natural constraints in order to be sustainable. When economies started to be supported by fossil fuels, most of the scarcity limits disappeared, since fossil fuels provided and still provide the ability to go beyond the natural constraints, grow exponentially and exploit natural capital as if it were unlimited and fully replaceable. Only in recent times it is becoming again clear that there are services that cannot be replaced by increasing GDP or massive use of energy. As a consequence, the sustainability of human societies is again questioned and it becomes imperative to better understand if and to what extent is our survival linked to the existence of natural capital or if we can replace all kinds of ecosystem services by means of technological devices (and therefore, if we can disregard the conservation of natural capital, until we are able to replace its services by means of fossil resources.) Therefore, new questions arise. What is the value of natural capital and ecosystem services? How to use and integrate market and non-market values? How can these values be measured and quantified? Is natural capital conservation worth of important economic investments? What is the relation of economic activities and protected areas? We claim that EMA is bold enough to provide a new quantitative and qualitative tool for the inclusion of natural capital and ecosystem services value within the framework of environmental policy making of nations and internationally. Despite the large uncertainty associated with computing the environment’s contribution to human society, results from EMA are sufficient to prove that investing in natural capital conservation is a profitable strategy. In so doing, policy makers may better address the increasing concerns for environmental integrity and environmentally sound economies.
The paper discusses the potential role of the abductive approach in social policy research for promoting transformative change towards sustainability. The sustainability of western welfare systems is going through a deep crisis of three kinds: ecological, occupational, managerial (Fitzpatrick 2011; Koch and Mont 2016; Lawn 2009; Starke et al 2013). These are connected to the modes and speed of technological development and of production, consumption and exchange transformations, and are related to way the keynesian and neoliberal paradigms have shaped the role of the states in the capitalist accumulation and the social protection (Jessop 2008). Current political answers to the crisis appear biased and entrapped into-the-box of the enduring neoliberal thinking and the “tide of pre-emptive austerity” (Hemerijck et al. 2013; Schmidt and Thatcher 2013), and incapable to overcome the apparently unsolvable dilemmas between further vicious cycles of deprivation or unsustainable growth (Gough and Meadowcroft 2011; O’Riordan 2014; van den Bergh and Kallis 2012).

In this scenario social policy research has provided both an analysis on the different countries’ capabilities to adapt to the new challenges, and a new paradigm for policy making: the Social Investment Welfare State (SI, Esping-Andersen 2002, Hemerijck 2013). However, the central idea of SI to move ‘from compensation to production by investing in human capital and its efficient use’ has been critically debated precisely in respect of the sustainability issue (Boström 2012; Gough et al. 2008): for the persistent primacy of the individual chain (unlimited) preferences/wants – production – (limited) redistribution – satisfaction (Gough 2014), the eroding capacity of the employment-work-insurance-based social protection system (Gnesutta 2014; Janoski et al. 2014), the further risk of creaming-out effects for people hardly employable, as well as the protracted role of welfare as part of a business as usual (BAU) mode of development (Bailey 2015; Lawn 2011).

Less debated issues are the economistic and administrative rationales of managerial approaches (Clarke and Newman 1997) which tend to rigidly program the policy implementation upon a few over-simplified assumptions, and the limits of universalistic and category-based policy measures in dealing with the territorial differences (Fitzpatrick 2011). On these bases, institutional processes easily tend to be ecologically parasitical, boosting monotone values, fostering schismogenic mechanisms of growth and deprivation and flattening the contextual diversity and multiple determination, hence dissipating the ecosystems flexibility, the social and bioenergetic uncommitted potentialities for change, learning, adaptation, preservation and development (Bateson 1972; Georgescu-Roegen 2003; Krall and Klitgaard 2011).

Here, while large-scale social policy researches have brought a wider knowledge on policy and welfare regimes, they seem less effective in understanding how such mechanisms produce specific changes and outcomes, to whose benefit and expense, particularly in the poor/fragile contexts and communities at risk of being hit harder by the combined effects of socio-economic and environmental degradation and among the people “who would benefit the greatest” (Esping-Andersen 2009). In particular, it seems difficult to grasp the rooted characteristics that partly concur to the problems and partly can be sources for possible answers (Matarrita-Cascante and Brennan 2012), and to include the actors experiences, their ways of dealing with ongoing issues and creating solutions, their theories on why they work or fail, as well as the ways in which these processes are embedded, translated and contested (Avelino and Wittmayer 2015; Clarke et al. 2015). On the other hand, case studies commonly can help on the matter, but the immediate usability of the data is often limited to the research field. Hence, there is a need to move between the extremes of universalistic totally context-free approaches and strictly contextually-bounded ones, and between the risks of over-simplification and excessive complexification of the object of analysis (Hantrais 2006; Kennet 2006; Mabbet and Bolderson 1999, Saraceno 1999, Øyen 2006).
To this aim, the paper discusses a possible application of the abductive approach in social policy research. Abduction is the process of forming/selecting hypotheses in situations in which the previous ones fail, appear disconnected or biased (Nubiola 2005; Swedberg 2014). It is based on the plausible reasoning that involves extending beyond what is directly observed or consensual to form ideas and visions that give some confidence (Isemberg 1986, Plutynski 2011). It may be seen as a double or multiple description that enables recognizing, reconstructing and comparing patterns, regularities and variations in complex systems (Bateson 1979). It is not merely concerned with testing or confirmation but rather with the extended strategic process of investigation (Minnameier 2010): while abduction introduces/selects new or not-established hypotheses and conceptions, subsequently, deduction can help to form testable abstract tautologies based, e.g., upon ideal types, and induction allows verifying them through testing. Hence, it opens up the possibility to use context-based, open-ended and participatory researches for the purpose of trans-contextual investigation and comparison (Mangen 2006), blending pragmatist observations with systemic analysis (Lewin 1951).

In this framework, action-research (AR, Reason and Bradbury 2007) works well for the purpose of including unrecognized resources, engaging social actors as active subjects, enhancing actionable knowledges, creating out-of-the-box modes of comprehension and transformative action (Bartels and Wittmayer 2014). Indeed, with AR, outcomes originates from the interaction between observer and observed in the environment, on the bases of one or more cycles of informational exchange through action and reflection, where theory and practice become a source for one another and the inquiry becomes a learning process for those who partake in it (Marshall 2011). Therefore, case studies can be used to identify hypotheses and contribute to the formation of abstract tautologies, not for merely classifying objects, but observing and capturing characteristics of the processes that generate the differences we can summarize and compare through the tautologies (Bateson 1979).

The paper analyzes this perspective introducing few methodological premises and critically discussing practical examples of action-research and community organization processes, in urban and rural areas, employed also for comparison between local welfare systems. In particular, the case studies explore the bottom-up and top-down dynamics that create specific socio-ecological conditions as well as opportunities for transformative changes towards sustainability. On the one hand, some bureaucratic and dissipative modes of action, some pros and cons of the universalistic- or category-based policy system, and some effects of the cost cuts are discussed to analyze the limits of the policy systems in dealing with the ongoing transformations. On the other hand, case studies are used to identify few practices and methods that can work through both context-based peculiarities and systemic regularities, in particular to avoid the extreme exploitation of the residual local and trans-local resources and the dissipation of the public ones, to better preserve or even enhance some uncommitted potentiality for change, as well as shifting the welfare system goals from mere compensation or production to sustainable compensation and production (Bonetti and Villa 2014; Villa 2016).

Social movements and common pool resource management: a systematic review

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The new international consensus about the benefits of local community stewardship to promote sustainable management of natural resources is confronted in the field with the struggle of communities, policy makers and scientists to promote and consolidate such stewardship (Blakie 2006). This contrasts with the mobilization capacity showed by many of those communities in the context of environmental justice conflicts (Martinez-Alier 2003). Despite the contrast, these two issues are related and shall be studied as a single phenomenon. Environmental justice conflicts involving local communities are an endemic phenomenon of our societies, with more than 1,000 instances registered (EJOLT 2014), and potentially thousands of them unregistered and in constant evolution all over the
world. Although initially disrupting, many of those conflicts have great potential to improve the governance of natural resource management if channelled properly.

Community-based natural resource management (heretofore CBNRM) and social mobilization are two paradigmatic instances of collective action, the interaction of which has been barely explored so far. As a matter of fact, the study of collective action in these two versions has evolved through separated theoretical traditions. The common pool resource (CPR) tradition emerged in the 1960s to understand the conditions under which natural resource users can cooperatively manage their shared resources, and has become since then a central piece of the current consensus about the benefits of CBNRM (Poteete, Ostrom et al. 2010). The resulting CPR theory, however, has been recently criticized for its almost exclusive focus on collective action problems and cooperation factors (Agrawal 2001). The social movement (SM) tradition can be traced back to the beginning of the 20th Century, and currently includes a number of strands concerned with different mobilization aspects and the impact of mobilization on policy (Snow, Soule et al. 2004). Despite its long tradition, SM theory has been unable to unfold into middle-range bits that apply to the uniqueness of environmental contexts, where grievance formation and movement consolidation is affected by both ecological aspects (Martinez-Alier, Kallis et al. 2010).

Recent developments in the environmental justice (EJ) scholarship can facilitate the dialogue between CPR and the SM theories to better understand CBNRM. Conceptual developments such as that of “environmentalism of the poor” (Martinez-Alier 2003), illustrate the uniqueness of the environmental justice movements as a phenomenon that involves the participation of local resource use communities. In the same vein, an increasing number of empirical studies have started to shed new light on the contribution of environmental justice mobilizations to the autonomy, and stewardship resource management communities. Well known examples include the rubber tappers’ movement in Brazil against logging and large-scale cattle ranching, which eventually led to the creation of collectively-owned “Extractive Reserves”; and the social movements of the Mau Mau tribes in Kenya and Nigeria, which used land occupations and built on customary land use institutions to reclaim historically common lands from agribusiness and oil companies. Despite the growing literature, no systematic review has been carried so far. Similarly, theory development has been rather absent. This paper aims to fill that gap and offer a preliminary set of propositions linking social mobilization and CPR management.


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Since several decades ago the importance that ecosystems’ health has on human welfare has been recognized. The socio-ecological systems approach studies the relationship between ecosystems and society through three channels (Collins et al., 2011; Örjan Bodin and Tengö, 2012). First, it analyses the incidence of ecosystems in the satisfaction of human needs through the services provided by the former. Second, it studies how the social dynamics modifies and determines the ecological integrity of ecosystems. Third, it addresses the way in which both social and ecological systems respond to endogenous and exogenous drivers of change. (Beier et al. 2008, Collins et al. 2011, Burkhard et al. 2012, van Oudenhoven et al. 2012).

In the first two channels, the consolidation of Ecosystem Services (ES) concept supports the development of different research areas like identification, evaluation, mapping and economic valuation of ES (Costanza et al. 1997, Millennium Ecosystem Assessment -MA- 2005). These research areas have provided useful tools for the design of policy instruments for conservation and management of ecosystems. However, there are still challenges in the ES approach. For instance, it is still not clear how to assess the cases in which multiple spatial scales, stakeholders and perceptions...
are involved. Additionally, the analysis of how ecosystems functions and services change under different land management scenarios and how this affects social systems has not yet been studied in detail (Balvanera et al. 2012). In the case of soil, there have been attempts to define the kind of services that it provides. Recently, the concept of Soil Natural Capital (SNC) has risen as a way of recognizing the contribution of soil in the provision of ES (Herrick 2000, Millennium Ecosystem Assessment 2005, Lavelle et al. 2006, Barrios 2007, Palm et al. 2007, Swinton et al. 2007, Zhang et al. 2007, Robinson et al. 2009, Dominati et al. 2010).

Regarding the response of the socio-ecological system to drivers of change, during the last decade there have been advances in understanding the behavior of the socio-ecological systems in the face of climate change and natural phenomena, establishing the conceptual basis for the analysis of the vulnerability of these systems. At the same time, there is a need for developing models to evaluate how the ecological and social systems respond to processes like land use and land cover change. The first studies of the vulnerability and the risk that socio-ecosystems face in relation to climate change use a linear approach. Such studies evaluate the effect of climate change on the ecological integrity and the impact of this transformation on social systems (Adger, 1999, 2006, Turner et al. 2003a, 2003b, Luers 2005, Metzger et al. 2005, 2006, Eakin and Luers 2006, Janssen and Ostrom 2006).

Despite of the advances in understanding vulnerability in the context of socio-ecological systems (Luers 2003, Turner et al. 2003b), there are still some challenges associated to the conceptualization of social and ecological vulnerability in order to effectively incorporate vulnerability in integrated risk assessment models. Turner et al. (2003a) point out that it is necessary to consider the following aspects for inclusion in any vulnerability analysis: (i) Multiple interacting perturbations or stressors and their sequence, (ii) understand exposure beyond the presence of the driver of change analyzing how the socio-ecological system face the threats, (iii) evaluate the sensitivity of the socio-ecological system to the threat, (iv) establish the reaction capacity of the socio-ecological system to the change, (v) analyze the structure of the socio-ecological system after the adaptation and finally, (vi) evaluate the effect of spatial scale in the risk index.

In the traditional approach for the integrated analysis of social and ecological vulnerability, three main aspects have been studied. First it has been analysed how the ecosystems are transformed and respond to different types of threats (Lindner et al. 2010, Petrosillo et al. 2013, Shoyama and Yamagata 2014). Second, some authors have studied the impacts that such modifications have on the welfare of social groups and how some socio-economic characteristics in the social system determine its capacity to adapt to the changes (Adger 1999, Luers et al. 2003, Eakin et al. 2006, Dechazal et al. 2008, Crona et al. 2009, Depietri et al. 2013). Third, some authors have analyzed the impact that climate change and change in land cover vegetation have on forest ecosystems to then study which are the benefits society loses with such changes (Adger 1999, Luers et al. 2003, Metzger et al. 2005, Eakin and Luers 2006, Depietri et al. 2013). In these studies there is not an explicit identification of threats and variables like exposure, sensitivity and adaptation capacity that determine the vulnerability of the socio-ecological system. In consequence, several questions arise: Is the land cover change the threat for both the ecological and social system? Are there differentiated threats for the ecological and social systems? Is the land cover change the threat for the ecological system and which would be that for social system? What is the exposure of the ecological system? How to define the exposure of the social system?

The way in which a driver of change causes changes in the ecological integrity of an ecosystem is analyzed in the ecological sphere. In these studies, there has not been yet included an explicit analysis of ecological vulnerability defined as the capacity that the ecosystem has to guarantee its functioning when facing a driver of change, a stressor or perturbation (threat). Explicitly analysing ecological vulnerability would help to explain how different properties of the ecosystem define its response capacity when facing a threat and to determine the critical natural capital and resilience of the ecosystem (Gunderson and Holling, 2002, Brand 2009, Turner II 2010). In the traditional approach when a threat is materialized on the ecological system there are impacts on the social system. However, it has not been analyzed how those materialized threats are translated into changes in the Intermediate Ecosystem Services (IES), their incidence in the provision of Final Ecosystem Services.
(FES), and how the responses that social sphere has to those impacts influence the ecological system. In this approach the sensitivity of the social system has been analyzed only by considering the loss in benefits. However, key aspects as the existence of substitute sources or substitute ES provision areas, and the type of need that is satisfied (i.e., basic or luxury need) have not been addressed in the analysis. Additionally, the analysis of the capacity to adapt has not considered the capacity that beneficiaries have to implement adaptive strategies that depend on their economic status, the degree in which they depend from the service and their risk perception (Gunderson and Holling 2002, Brand 2009, Crona et al. 2009, Turner II 2010).

In the paper we would like to present at the conference we present a conceptual framework for the definition of ecological and social vulnerability with an application to the service of erosion control provided by soil natural capital that addresses the above-mentioned challenges.

References.

User-innovators as a producers of advancements in vegan markets
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Plant-based diets and especially veganism have gained a lot of media attention lately in Western affluent societies. Veganism is a practice where people abstain from the utilization of animal products,
not only in food, but also more generally, for example in clothing. The media attention and the general rise in the interest towards veganism is understandable in the discursive context in which as veganism and vegan diet is augmented to have multiple benefits from the perspective of sustainability, including environmental benefits as well as benefits to animal welfare/rights (Vinnari and Vinnari 2014). For instance, it has been estimated that a substantial proportion of greenhouse gas emissions originate from the livestock sector. The link between the expansion of animal agriculture/farming and the loss of biodiversity is also well documented (Machovina et al. 2015). Hence, multiple calls to lower the consumption of animal-derived foodstuffs have been made (e.g. Goodland 1997; Deckers 2010; Wirsenius et al. 2011; Vinnari and Tapio 2012; McMichael et al. 2007). The available statistics suggest that the number of vegans is still relatively small in the Western world, but it has been speculated that the number of vegans would be in the rise in Europe (Ruby 2012). Current trends however implicate that the consumption of animal-derived foodstuffs will continue to grow unless political actions are taken to promote more sustainable consumption patterns (Steinfeld et al. 2006).

In the context of innovation research, it has been argued that individuals can increasingly develop new products and services, since they are better able to use their creative potentials for instance through new communications technologies (Von Hippel, 2005). These “user-innovators” can then also act as active participants in the sustainability transition (Hyysalo et al. 2013). In this paper we are interested in the ways that individual vegans, i.e. user innovators, are actively helping others to adapt vegan diet by diversifying the image of not only veganism as a diet but also the public image veganism/vegans. We identified three different ways that vegans have been active in diversifying the public understanding of the content of vegan diet: social media campaigns to inform about selection of vegan foods, creating vegan food receipts that remind “traditional” omnivore foods, and information gathering to help the transition for the non-vegans. Societal media campaigns include for example information of the diversity of vegan food and the fact that it can include enjoyable foodstuffs. A variety of cooking books and food blogs have been published, where the target has been to create vegan alternatives of the “traditionally” omnivore receipts. In addition individual vegans have created webpages where they collect information about all the vegan foodstuffs that become available within the country in order to make the information easily accessible and the transition to vegan diet easier.

We also analyzed the ways that the work carried out by these forerunners have paved the way for the public to change their understanding of the social identity of vegans, for instance who is a vegan or what a vegan looks like. One way of transforming this image is providing examples in the social media of vegan families, strength athletes and other “untypical” vegans. Also popular chefs are recruited to prepare vegan foods in different events to show that veganism is the “new normal”. By so doing the vegan innovators are trying to make veganism more acceptable to more people. They make an effort to show that there is no more just one type of a vegan and as such they are dismantling the stereotypical image of vegans. In this paper we will present examples of these user innovations and discuss how these actions could be scaled up on societal level to achieve a large scale sustainability transition. We argue that user innovators are not only transforming the vegan products, but they are also transforming the public image of veganism. This is something that the policymakers should note: the transition to veganism requires not only technological or economic solutions such as better and cheaper products on the market, but also a transition in the public image of vegans/vegan diet so that veganism becomes culturally normalized and habitualised as a practice.

References

**Today's bioeconomy: "the new age of wood" of Nicholas Georgescu-Roegen?**

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During the 1970s and 1980s, when the Society discussed on the energetic transition to go beyond oil era, Nicholas Georgescu-Roegen (1982, p. 19) highlighted carefully the advent of “a new age of wood, different from the past, because our technical knowledge is more extensive today”. Thirty years later, the concept of “bioeconomy” takes part in the agenda of the major existing international institutions, like UE (EC, 2012 ; SCAR, 2014) and OECD (2009), thanks to scientific progress and technical knowledge, especially in green chemistry. These institutions also call for a "new age" of plants by substituting fossil carbon by carbon from biomass. Yet, are those “bioeconomies” the same? Considering both actor strategies involved in the transition to a biomass economy and the scientific and technological trajectories they are implementing, we demonstrate that there is not only one bioeconomy as expected, but three ones.

The first type of bioeconomy starts with Georgescu-Roegen himself (1975) and René Passet (1979) who proposed an economy focused on the limits of biosphere. They both considered that economic development is an extension of biological evolution. Basically, this bioeconomy questions social controls of technological evolution and the respect of environmental constraints. Yet, Passet (1996) agrees with the concept of sustainable development, whereas Georgescu-Roegen (1975) calls for more radical positions based on degrowth paradigm (Martinez-Alier et al., 2010).

A second bioeconomy can be related to the promises of the “biotech revolution” claiming since 1950-1960 that it will lead to new ways of dominating life for mankind. Life sciences are seen as a techno-economic complex which is able to deeply transform our way of life and our relations with biosphere. This definition is the backbone of the OCDE (2009) approach of the bioeconomy. Two economic paths are then explored. The first one is biomimicry which considers biological entities such as a process of development of complex structures to be industrially produced and substituting traditional processes thanks to genetic engineering. The second path is synthetic biology that recombines DNA, uses chemistry and computation claiming to fully industrialize biology, as stated by the US Report “Industrialization of Biology” (NRC, 2015). The goal of this second bioeconomy is finally to conceive and produce on-demand biological systems that don’t exist in nature.

The third bioeconomy aimed at producing organic carbon. It can be understood by referring to the way in which the European Commission (EC, 2012; SCAR, 2014) institutionalized it, linking all activities related to sustainable management of renewable resources (agriculture, forestry and fisheries) and mobilizing its technological platforms and administrative divisions, starting from the 6th PCRD. It proposes a bioeconomy with two branches, one working on the quality of food, the other dedicated to the non-food production of biobased materials for health, industry and energy. This food/no-food articulation is rooted in the efforts made in the 1980s by agricultural and food producers, whose
objective was to remove surplus situations through non-food outlets (in agrofuels, in particular). The core of these industries is biorefinery, which is developed through the extension of existing agro-industrial sites. It is possible to show that the industrial actors involved in this 3rd bioeconomy seek to integrate certain aspects of the two previous bioeconomies.

References

Measuring responsibility for ecosystem collapse through over-harvesting
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Ecosystems provide humans with numerous vital ecosystem services. In particular, provisioning of water, food and fiber is essential for human survival. Human societies have always been using these services, through harvesting them from natural or cultivated ecosystems.

As a result of over-harvesting, the ecosystem which provides such a service may collapse. This may entail severely negative consequences for the human societies relying on the ecosystem services. Examples throughout history are many, and include the deforestation of Easter Island with a subsequent collapse of the civilization, or the collapse of the Newfoundland fishery in 1992 with a subsequent depression among local communities.

As ecological-economic systems are dynamic and subject to many stochastic influences, e.g. from weather or ecological interactions, collapse is not a deterministic consequence of a particular, too high harvesting level. Rather, it is an uncertain consequence of harvesting, that may entail with higher probability for higher harvesting levels and lower probability for lower harvesting levels. As with all stochastic events, actual collapse may even come about as a consequence of harvesting at a low level which would imply collapse only at a very low probability (“bad luck”). And vice versa, harvesting at a high level that would imply collapse with a rather high probability, does not necessarily bring about actual collapse (“good luck”).

In this paper, we measure the extent to which an actual collapse of an ecosystem can be attributed to the harvesting of an ecosystem user. In other words, if the system should actually collapse, to what extent can this collapse be attributed to the harvesting of the ecosystem user? That is, we are concerned with measuring the causal-descriptive responsibility of an actor. In contrast, we are not concerned here with assigning normative, forward-looking responsibility to an actor. But measuring
causal-descriptive responsibility is essential as a factual basis for then normatively blaming or praising the actor for harvesting “irresponsibly” or “responsibly”.

We study this issue based on a stylized ecological-economic model where an ecosystem user harvests an ecosystem service from a dynamic and stochastic resource stock, say, fish or timber. The dynamics of the resource stock is described by logistic growth with a minimum viable population size. For a population size above the minimum viable population size, the resource stock naturally tends towards its carrying capacity; for a population size below the minimum viable population size, the resource stock naturally tends towards a level of zero, i.e. extinction. We assume that the natural regeneration rate of the resource is a random parameter, normally distributed with given mean and variance. This captures stochastic ecological effects in our model, and implies that the consequences of harvesting are stochastic.

As for harvesting, we consider different harvesting strategies: harvesting a constant absolute amount in each year, with different amounts; and harvesting a constant relative share of the existing resource stock, with different shares. We assume that a given harvesting strategy is applied in each year throughout the time horizon of 100 years.

For each harvesting strategy, including no harvesting as a benchmark case, we assess the probability distribution of the resource stock level after 25, 50, 75 and 100 years. From this, we calculate the probability that the resource stock is below the minimum viable population size in that year (which would eventually lead to extinction of the resource). From this, we calculate the ecosystem user’s responsibility for collapse when applying a given harvesting strategy, as the difference in the probabilities of collapse with and without harvesting. That is, we measure the ecosystem user’s responsibility for collapse when applying a given harvesting strategy by the answer to the question: by how much has the probability of collapse increased when applying this harvesting strategy compared to no harvesting. The answer is a number between 0 % (harvesting is not causally responsible for collapse) and 100 % (harvesting is fully responsible for collapse).

With this concept of measuring causal responsibility, we study how the responsibility of collapse of the ecosystem under a given harvesting strategy depends on the different ecological model parameters (minimum viable population size, carrying capacity, mean and variance of the natural regeneration rate of the resource) and how it develops over time. We also compare the different harvesting strategies in terms of how they differ in the extent to which they are causally responsible for the collapse of the ecosystem.

Our contribution here is to develop a sound and clear conceptual and quantifiable idea of how to measure the causal responsibility of ecosystem users for the “good” or “bad” state of the ecosystem when ecological-economic interactions are dynamic and stochastic. This is a fundamental prerequisite for judging individual or collective actors and institutions in regards to whether or not they live up to their normative responsibility of good stewardship of ecosystems. Our method developed here can and should, therefore, be applied in a wide range of different ecosystem management problems.

Substitutability of Man-made Capital and Water Resources in China's Economic Growth: A Case Study of Guangzhou

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For over thirty years, along with China’s rapid economic growth and the rapid increase in urbanization, serious environmental problems have also been brought out. The GDP of Guangdong province, an important representative area for China’s rapid economic growth, over the same period has increased by nearly 60 times, and its population rising from 52.27 million in 1980 to 106,44 million in 2013. Linked with this is that water resources in Guangdong are facing tremendous pressure —— shortage of resources, deterioration of water quality, degradation of river ecosystem.
In recent years, although there is some improvement after treatment, in the case of economic growth mode having not been completely changed, it remains an issue to be examined that whether the enormous pressure faced by water resources can be entirely dealt with only by relying on man-made capital investment.

In this paper, it is targeted at man-made capital and water resources for the study in the process of Guangdong’s economic growth over 30 years with analysis of replacement of man-made capital for water resources.

I. The basic situation of Guangdong’s economic growth and wastewater discharge

From 1980 to 2013, Guangdong’s GDP rose from 23.51 billion to 1.395362 trillion yuan; investment in fixed assets grew from 3.829 billion to 2.277722 trillion yuan, and wastewater emissions are also rising from 1.513 billion tons to 8.625 billion tons. Pearl River water quality also has a significant change.

Ⅱ The relationship between investment and wastewater discharges in the process of economic growth

1. long-term trend of substitution relationship for investment and wastewater discharge

Diagram 5 long-term substitution trend of investment to emissions As from Figure 5, a substitution relationship between the total output of Guangdong Province and investment capacity and wastewater emissions in the process of industrial production can be seen. The changes in the majority of the years basically have minor fluctuations around a horizontal axis. Nearly a quarter of the time, investment and wastewater discharge are having a complementary relationship which is a positive substitution with changes both in the same direction.

Calculate GDP supported by units of wastewater emissions, namely the utilization efficiency of wastewater purification capacity for economic production to ecological environment. This may explain, after utilization efficiency in resource – economy comes to a certain extent, the replacement of investment to resources will gradually become more extreme.

2. long-term changes in investment and wastewater discharge flexibility

According to GDP of Guangdong province 1980—2013, changes in investment and volume of wastewater emissions, investment’s elasticity of output, wastewater discharge’s elasticity of output and investments are calculated respectively. From which it can be found that the investment elasticity of output is all positive, and elasticity values in years are between 0.4-4.2, showing fluctuation around the horizontal axis of the means of 1.5. Wastewater discharge’s elasticity of output and the elasticity value of investment, except for a few years, are less than 1 in most of years, with some years in negative, fluctuating around horizontal line of the means between 0.5 and close to 0.

Diagram 7 long-term change in trend about the elasticity

3. Water throughput in the the industrial production

Diagram 8 In 2004–2012, the water throughput over time has an overall downward trend

Figure 9 Industrial investment replacing water throughput and changes in water throughput consumption for unit industrial GDP

Figure 9 shows the water throughput for unit industrial output has a gradual decrease over time, and the replacement changes of unit industrial investment to water throughput overall decrease over time.
Shifting intraday electricity usage through time-of-use tariffs
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Solar energy production takes place at times when demand for electricity is not necessarily high. This mismatch might be reduced in several ways: electricity might be transported and consumed elsewhere, it might be stored for later consumption, or households could be encouraged to align their consumption with solar energy production. While the first two solutions imply high installation costs, the latter might prove relatively inexpensive and quick to implement. The relevance of such a study is enhanced in the context of the energy transition, as renewable energies are bound to gain importance in the energy mix. In this study, we implement a randomized control trial, in which we encourage households to shift their consumption towards the period of the day when production of solar energy takes place. Our intervention consist in two types of modification in the pricing scheme faced by households.

For the first treatment group, the price of a kilowatthour is lowered from 11am to 3pm (and increased from 3pm to 11am) for the entire duration of the intervention. Statistically, the period 11am-3pm is
when most solar radiation takes place and hence when most electricity from solar sources is produced. Also, fixing the low-price hours should allow households to plan in the long run and schedule their activities easily, which might yield to a larger shift of their electricity usage than with moving periods. This group also serves as a check for results obtained in a former study (Weber et al. 2016), which shows that monetary incentives have sizeable impacts on the proportion of electricity used during the period 11am-3pm. However, this former study provided only indirect financial incentives to shift electricity usage, through a tournament between households. Thanks to alternative pricing scheme we implement in this experiment, the savings that a household can realize are directly linked to its reaction and completely independent of the actions of other households. Each household is properly rewarded for its actions, even minimal, and the uncertainty related to the tournament disappears.

For the second treatment group, the hours of solar production are fixed on a day-to-day basis, based on the day-ahead local weather forecasts. Every evening at 5pm, households participating in the experiment are notified by SMS of the time slots corresponding to the high and low prices for the following day. Compared to a dynamic pricing in which tariffs would be adjusted in real time according to current solar radiation, this way of doing simplifies considerably consumption management for the households, since they are able to plan their activities the day before instead of having to react at the last moment, as would be the case with information given in real time. The standard price faced by households is 22 cents (of Swiss Francs) per kilowatthour. In order to incentivize changes in consumption patterns, a substantial decrease of 15 cents per kilowatthour was introduced during solar hours (i.e., 11am-3pm for group treatment 1, and a period varying on a day-to-day basis for group treatment 2) while an increase of 4 cents per kilowatthour was set for the non-solar hours. For households in the control group, the price remained flat at 22 cents. As a result, we expect our treatment to induce a shift of electricity usage stemming both from a decrease of consumption in the evening and an increase during the day.

Before July 2016, a sample of around 100 households responded to an online survey. In order to guarantee the internal validity of our study, households have been randomly assigned to one control and two treatments using a stratification procedure, which consists in creating groups that appear as similar as possible with respect to selected characteristics. More precisely, we considered two characteristics: pre-experiment electricity usage and age of the respondent. The alternative price schemes were implemented since July 2016 and will remain in operation for one year. At the end of every month, households in the treatment groups receive their electricity bill, which states how they fared. A detailed daily account of their electricity usage is printed and households are informed whether they benefited of savings thanks to the alternative tariff compared to what they would have paid compared to the flat tariff.

Overall, it is expected that households will face some barriers to adapt their electricity consumption patterns. Consuming during the day supposes either that someone is home or that devices can be programmed to start at a given time. However, in (relatively) short interventions like ours, it seems unlikely that households undertake “structural changes” such as replacing old devices by more recent ones that possess such a feature. Going one step further, suppose you can start your washing machine using a smart phone or set the thermostat of your heating through a web application. Such improvements would render load shifting even easier. As technologies (related to the internet of things) evolve, one can imagine a system in which devices decide by themselves when to start or to switch off. Absorbing large amounts of renewable energy whenever it is produced would thus become much easier. Also, dynamic tariffs would become useful because consumers will have the means to respond in real-time to tariff changes. Our study thus also intends to shed some light on such current barriers.

In most previous contributions in the literature (for a recent review, see Faruqui et al., 2010), the main goal of feedback provision was to promote electricity conservation. Instead, our goal here is to induce load shifting across hours of the day without requiring any decrease in total usage. To the best of our knowledge, the present study is thus the first contribution using time-of-use tariffs in order to target load shifting toward some specific hours instead of electricity conservation. In that sense, our
intervention is opposed to the usual paradigm of peak shaving and in fact seeks to create a consumption peak that coincides with the peak of solar energy production.

Applying structural production layer decomposition to analyse differences between MRIO databases: A carbon footprint comparison using EXIOBASE, EORA, GTAP and WIOD

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Recent empirical assessments revealed that carbon footprints calculated with various MRIO databases deliver deviating results. The application of inter-model structural decomposition approaches helped to better understand how the various elements in the databases effect on the resulting footprints. In this paper, we propose a new method which complements the existing analytical approaches, called structural production layer decomposition (SPLD). SPLD enables differentiating between effects stemming from specific parts in the technology matrix, e.g. trade blocks vs. domestic blocks, while still allowing to generalise the results by linking the various effects to the total sector or region footprint. We analyse the differences in the carbon footprint of the EU-28 for the year 2011 between EXIOBASE, Eora, GTAP and WIOD. Identical environmental data are used across all MRIO databases. In all model comparisons, variations in the domestic blocks have a more significant impact on the carbon footprint than variations in the trade blocks.

Background

Several global environmentally extended MRIO databases are available today: WIOD, Eora, GTAP, EXIOBASE and OECD ICIO. Empirical assessments revealed that the carbon footprints calculated with the various MRIO models deliver deviating results (Arto, Rueda-Cantuche, & Peters, 2014; Inomata & Owen, 2014; Owen, Steen-Olsen, Barrett, & Evans, 2014; Owen, Steen-Olsen, Barrett, Wiedmann, & Lenzen, 2014; Wilting, 2012). However, in order to play a decisive role on the policy stage, findings derived from different MRIO models should deliver similar overall messages and seek to minimise contradictory outcomes. Therefore, a range of analytical methods, such as structural decomposition analysis (SDA) (Owen, Steen-Olsen, Barrett, Wiedmann, et al., 2014) or structural path decomposition analysis (SPDA) (Owen, Wood, Barrett, & Evans, 2016).

SDA has been applied to investigate carbon footprints, allowing the decomposition of the differences in total footprints into effects stemming from the differences in the Leontief inverses, the final demand vectors and the environmental extensions (Owen, Steen-Olsen, Barrett, Wiedmann, et al., 2014). In the course of such an analysis, the Leontief matrix remains a single entity. As Owen and colleagues (2016) pointed out, it would be interesting to consider whether differences in the Leontief inverse are due to the domestic transactions or the imports to intermediate demand. The further exploration of the effects stemming from the differences in specific parts, i.e. trade blocks versus domestic blocks, of the transaction matrices would bring MRIO comparison work one step closer to the basic data of MRIO models. This type of information would therefore be of high value for ongoing comparison and harmonisation efforts of existing MRIO databases.

Subsequently, structural path decomposition analysis (SPDA) has been applied in order to split the Leontief inverse into the transaction matrix and total output (Owen et al., 2016). This approach structurally decomposes SPA results. However, deriving conclusions on the macro level through the application of SPDA would be difficult. First, it is conceivable that differences on the level of single paths cancel each other out on the higher sector-level. While precise path results may vary significantly between the MRIO databases, it is not clear how variations on the path-level affect the more
aggregated sector footprint. Second, due to the high level of detail, a large number of paths would need to be investigated in order to derive conclusions for the more aggregated sector or region footprint.

Therefore, in this paper, we propose a new method, structural production layer decomposition (SPLD), which complements the existing approaches of SDA and SPDA for identifying sources of differences of macro-level footprints. The proposed method decomposes the various effects not on the level of single paths, but on the level of production layers. The central idea of SPLD is therefore a structural decomposition which uses the transaction matrix instead of the Leontief inverse. In its core, SPLD structurally decomposes a set of PLD (production layer decomposition) results (Giljum et al., 2016; Lenzen & Crawford, 2009; Llop & Ponce-Alifonso, 2015; Wiedmann, Lenzen, & Barrett, 2009). To implement this, we apply the S-S-approach (Sun, 1998) which is analogous to SPDA that structurally decomposes a set of SPA results. Put differently, the SPLD calculus uses matrices, i.e. the transaction matrix and the resulting technology matrices of various orders, thus reflecting the different production layers, instead of scalars (level of paths) as used in SPDA.

Results
The analysis undertaken in this paper showed that the domestic blocks have a stronger effect on the carbon footprints of the EU-28 than the trade blocks. This observation holds true for all six model pairs. On average we find the domestic blocks are responsible for around 56% of the absolute carbon footprint variations which stem from differences in the technology matrix. Our results therefore contrast earlier findings based on SDA. SPLD can therefore provide a complementary picture on the question, which parts of the MRIO system cause highest deviations in the footprint results. We have illustrated that the noticeable trade effects observed through analysis of the \( L \) matrix actually root in the deviations in the domestic tables of these countries and regions. With regard to the question which sections of the technology matrices yield the highest return on investment in terms of carbon footprint harmonisation efforts, we identified key hot spots. The top six domestic blocks impacting most on the EU-28 carbon footprint are those of China, Germany, RoW, UK, Italy and Russia. China’s domestic block effects are foremost a result of the differences in the electricity input coefficients. The effects of the domestic block of Germany are basically produced by differences in the input coefficients of mining products to the petroleum sector.

Conclusions
We have demonstrated that SPLD is a very useful technique in determining the difference between MRIO databases. Its ability to trace cause of difference to individual cells within the technology matrix is a clear advantage over traditional SDA which treat the Leontief inverse as a single entity. We believe that SPLD has potential application beyond this paper. For example, when used for a year-on-year decomposition assessment, SPLD will be able to determine the contribution that an annual change to the production recipe of a specific product has had on the overall product footprint.

Being able to trust MRIO model results is key for the uptake using consumption-based carbon accounting as evidence in the design of targeted policy responses. Policy makers need to be able to understand the level of robustness in the information they are using to derive policies. Results here suggest that even when country level consumption-based accounts are similar between models, the distribution of impact at various stages of the supply chain differs. This would have implications on policies which are designed to intervene at important points along a product supply chain. For example, evidence from one MRIO database might suggest that a material efficiency policy focussing on reducing the rolled steel in cars would have negligible effect, whereas a different database might imply that this stage in the supply chain produces a large portion of product’s overall emissions impact and the policy would have a useful effect. We suggest that evidence based on calculations of the impact embodied in trade, or the impact of the final good are more robust than calculations made at single production layers. This implies that evidence from MRIOs could be used for trade policy and for demand-side strategies such as reducing food waste, dietary changes and changes in individual mobility, such as the promotion of public transport and car-sharing.
Sustainable development: from the birth of the United Nations’ green era of development to the emergence of the age of Anthropocene

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Using content analysis, conceptual discussion and empirical study, this article explores the ethical shortcomings and the failure of the Brundtland concept of sustainable development in promoting a sustainable world. It is contended that the failure lies fundamentally in its motive in environmental conservation which is anthropocentric in nature. This human-centred approach to environmental protection removes the ethical justifications or moral incentives needed to engage with various unsustainable development issues confronting us today. Using concepts drawn from environmental philosophy and empirical evidence gathered from field research conducted among indigenous forest-dwellers in Malaysia, the article reaffirms the importance of integrating environmental ethics with sustainable development to guide us in dealing with our relationship with the natural world in a sustainable way. It is concluded that for sustainable development to become a useful concept, an ethical transformation must be effected from an anthropocentric approach to an ecocentric philosophy of environmental preservation. This would allow us to design morally justifiable and adequate environmental policies towards constraining the present ecologically destructive path of development.

Structure of analysis
1. The Stockholm Conference (1972) and the birth of the United Nations’ green era of development

Achieving sustainable development means protecting the ecological integrity of our ecosystems which

Literature
is important for long-term socio-economic prosperity. To achieve this, it is imperative to exercise prudent use of natural resources and to refrain from overstressing the critical life-support functions of ecosystems. For the past four decades, the United Nations have convened many international environmental meetings such as the Stockholm Conference (1972), the Rio+10 Conference (1992) and Rio+20 Summit (2012) to promote this vision of environmentally sustainable development. At these conferences, hundreds of multilateral and bilateral environmental treaties and agreements covering every aspect of sustainable development have been adopted to guide the world towards a green era of progress. These include Agenda 21, the Rio Declaration on Environment and Development, Convention on Biological Diversity, the U.N. Framework Convention on Climate Change and the Kyoto Protocol, just to name a few. Furthermore, the publication of the Brundtland Report (1987) popularizing the concept of sustainable development has also contributed to strengthening the global green initiative. Indeed, the Brundtland concept of sustainable development, defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, has become the dominant leitmotif for shaping international environmental and development policies.

The United Nations has set the stage for rapid expansion of environmental controlling regimes worldwide. Across the globe, environmental legislations have been passed and many agreements made to strengthen implementation of sustainable development, heralding the birth of a green era of development. The number of environmental documents passed since Stockholm is indeed more than enough to ensure protection and stewardship of our planet.

2. The state of global environment in the Anthropocene epoch
However, environmental optimism has faded with the recent revelation of the state of our global commons. For example, the 2010 World Wildlife Fund Living Planet Report reveals that the global ecological footprint exceeded the Earth’s biocapacity by 50 percent in 2007. According to the Global Footprint Network, humanity today is using the equivalent of 1.6 planets to provide natural resources and environmental services to satisfy human needs. In comparison, in 1961, the world used just over slightly more than half of Earth’s biocapacity for socio-economic sustenance.

Furthermore, as reflected in the Fifth Global Environmental Outlook (GEO-5), the overconsumption of nature’s bounty has resulted in dire consequences such as deteriorating air quality and rising atmospheric concentrations of greenhouse gases, fresh-water scarcity, and biodiversity loss. For example, carbon dioxide emission has surpassed the Kyoto Protocol 1990’s baseline year level of 22.7 billion tonnes to 39.2 billion tonnes in 2014. In addition, the Millennium Ecosystem Synthesis Report (2001-2005) and the International Union for Conservation of Nature (IUCN) 2008 indicate that 10-30 percent of the mammal, bird and amphibian species are threatened with extinction and 60 percent of our life-support systems are degraded. Between 2000 and 2012, the world lost 2.3 million square kilometers of forests (230 million hectares). The United Nations’ failed effort at building a sustainable world is clearly reflected in GEO-5 which reported that significant progress has been made on only four out of 90 areas on environmental problems assessed, namely, ozone protection, drinking water, lead and marine pollution.

All these anthropogenic utilization and transformation of our Earth’s systems indicate that the human race has now become a dominant geological force in its own right in shaping the global environment. In other words, we have entered into a new geological epoch—the Anthropocene or the geology of mankind.

3. The paradox of sustainable development
Despite the fact that for the past four decades, sustainable development had been forefront in framing the global development discourse, in the real world system, the distinction between economic growth and environmental protection vanished at the implementation stage. Viewed particularly from the Asian perspective, sustainable development predominantly took on an active meaning as sustaining economic growth rather than sustaining the environment. Indeed, it is common among the Asian developing countries that sustainable development connotes economic growth that lasts indefinitely. With this conceptual shift, the environment becomes the victim of growth ad infinitum. The Brundtland concept of sustainability apparently no longer commands credibility. The core issue is
that central to its sustainability framework of analysis, the ethical justification for environmental protection rests on protecting the socio-economic wellbeing of present and future generations. In other words, human beings are at the centre of concerns for sustainable development and the protection of the natural systems is important because of the instrumental values they provide to satisfy human needs and demands. The explicit focus for environmental protection is on the promotion of development which underpins the socio-economic prosperity of the present and future generations, and the ethics as embedded in sustainable development is the utilitarian obligation to the future generations.

This self-serving interpretation of sustainable development is thus anthropocentric in nature and is inconsistent with the environmental philosophy of acting with care when interacting with the natural systems. The anthropocentric focus of sustainable development raises profound questions about our moral engagement with and ethical responsibilities to nature, and this is one of the main reasons why, despite 40 years’ of environmental protection efforts, sustainable development has failed to make real progress in addressing pervasive and profound human-driven changes to our environment.

4. Sustainable development revisited
The article argues that managing sustainable development is concerned with human moral aspirations and ethical reflections of environmentalism rather than the ethical justification for intra- and intergenerational equity as embedded within the anthropocentric frame of Brundtland sustainability analysis. This is bolstered by the fact that the human race is presently the single most important geological force in shaping the future of our planet. It is only human beings themselves who are able to halt further large-scale anthropogenic modification of the earth’s system. It thus follows that sustainable development must embody a set of ethical principles that can constrain human behaviour and serve to guide more balanced extraction, production, and consumption patterns. Here, it posits that the debate over the extension of moral considerability to non-human entities could be brought to bear upon the question of sustainable development as this will encourage policy-makers or society to advocate sustainable use of the natural environment.

Drawing from empirical evidence on indigenous land ethics and ecocentric philosophies gathered from field research conducted among the indigenous forest-dwellers in Malaysia, the article reaffirms the importance of ethical concerns for and responsibility to the natural environment in promoting sustainable development.

5. Conclusion
It is concluded that the anthropocentric environmental ethics on which the concept of sustainable development is based cannot offer our planet true protection because it only treats the natural system instrumentally as a resource base to fulfil the needs of present and future generations. It is this anthropocentric view of nature that is the root cause of the current environmental quagmire. For sustainable development to become a useful concept, it must refocus its environmental conservation motive away from anthropocentrism to ecocentrism.

Climate change, energy and poverty: degrowth perspective. Case studies from Kazakhstan
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The common scientific understanding that climate change is happening and anthropogenic contribution plays the major role in it was summarized by the IPCC Fifth Assessment Report (IPCC, 2014). The last two decades has shown a big shift in the discussions of climate change. Since the adoption of UNFCCC in 1994, climate change issue has become one of the most controversial and discussed topics in the international agenda. Industrial revolution and use of fossil fuels to produce energy and products have been the major cause of climate change. According to IPCC, CO2 emissions from fossil fuel
combustion and industrial processes contributed around 78% of the total GHG emission increase from 1970 to 2010. Energy supply alone contributes 47% of annual anthropogenic GHG emissions. On the other hand, energy is currently considered to be the core condition for human well-being and economic development. There are still millions of people in the developing countries lacking access to energy hindering socio-economic development of these countries. Thus, being aware of the necessary changes at the policy level and multiple dimensions of societal development (Escobar, 2015), energy constitutes one of the keys to the solution of eradicating poverty. However, providing universal access to energy services further increases energy production and use, consequently leading to greater GHG emissions.

The current policy models are based on economic growth trying to solve raising problems from the perspective of further economic development. Sustainable development, recently being accompanied by such terms as green growth or green economy, is still based on the capitalist values of economic growth which implies further increase of use of resources and energy.

The paradigm of sustainable development has been largely discussed and challenged in terms of its implications for environmental protection and climate change. Researchers are arguing whether current concept and strive for economic growth and subsequent increase of consumption is compatible with sustainability and balanced human-environment interaction.

The alternative paradigm, degrowth (related to buen vivir or sumak kawsai, approaches coming from Latin America) is a relatively new policy term being used in the international research forum though its conceptual roots are found as early as in 1970s, in the Limits to Growth report (Meadows, 1972) and consequent publications and discussions. In general, the term degrowth is defined as transition to environmentally sound, less-consuming economic model that will sustain the planet and its resources (Kallis, 2011). Degrowth does not imply neglecting the development or economic stagnation. It is based on economic downsizing, development of locally sustainable solutions and balance of available resources and consumption. From the energy perspective degrowth seeks to optimize the use of energy in such way that it will not hinder the development and at the same time will not lead to further growth of greenhouse emissions. Degrowth involves approaches on energy conservation, energy efficiency and use of renewable energy sources and more stringent approaches as decentralization and defossilization of energy sector (Bayod-Rújula, Martínez 2010).

The main question is: To what extent can degrowth be able to contribute to the solution of the problem of access to energy for the poor and reduce greenhouse emissions from energy? Using the case studies from Kazakhstan, this paper seeks to answer this question. Kazakhstan is the mainland country situated in Central Asia, rich by fossil fuels and highly dependent on the incomes from the vast oil exploitation and realization. Being one of the biggest countries in the world (ninth place by its territory) it has the energy heavily supplied from coal and gas and the largest energy transmission network in Central Asia. According to statistics, Kazakhstan is the biggest emitter of GHGs in the region, it also shows one of the highest numbers in the GHG emissions per capita in the world (Zoi, 2009). The share of renewable energy is less than 1% in the total energy balance of the country (Statistics of Kazakhstan, 2015). The energy sector is responsible for almost 80% of total CO2 emissions of the country (The III-VI National Communication, 2013).

Though the official statistical data demonstrates that there is almost 100% of population having access to the energy (World Bank, 2012), there are serious problems associated with out-dated coal plants and poor maintenance of electricity transmission lines that does not provide guaranteed and stable energy supply. These problems are multiplied when it comes to the distances between settlements and delivery of electricity to remote rural areas. Significant losses and current condition of the transmission lines leave the population in remote areas lacking the energy and forced to burn biomass for household heating and cooking.

There were several initiatives taken both at the national and local level trying to introduce sustainable energy solutions. Due to the broadness and scale of the projects, this article presents case studies under some limitations. First of all, for the analysis the author has chosen small-scale projects in rural areas taking into account that the rural population in developing countries is more vulnerable to the the effects of climate change. Another limitation is that the analysis specifically covers projects
implemented by the Small Grants Program of Global Environment Facility (SGP GEF) since the Program had more than 60 projects from 1997 to 2015 dedicated to climate change mitigation and local sustainable energy projects which provides a sufficient and continuous feedback on such projects. The majority of SGP GEF projects are focused on the solar energy, solar dryers, thermo-modernization, wind energy, green lighting and education. The main features of these projects are low GHG emissions, affordability of technical solutions, easy maintenance, participatory elements, independence from the central electricity system, educational and awareness-raising component, replication potential. However, some projects due to the lack of coherency and support had no further development and replication in other areas. This is also related to economic devaluation and recession of recent years which negatively influenced the whole agricultural sector and general lack of interest because of centralized welfare distribution (UNDP, 2009).

In addition, according to preliminary analysis and interviews with local experts these projects highlighted one significant problem when introducing local energy solutions: centralized decision-making and energy systems that do not allow local communities to get proper ownership of these projects and to create local energy production and local markets. Analysis of theses case studies shows that:

locally based solutions could serve as the starting point to improve energy access at the local level and to generally increase economic well-being of rural areas while reducing GHG emissions;
consistency of projects and government support and decentralization is key to success of these pilot projects (a significant number of projects were not replicated further due to the lack of support of local authorities and centralized decision-making system);
there is a big potential to employ local sustainable energy solutions but it is necessary to make systemic changes so the bottom-up approach can benefit local communities;
degrowth requires certain level of decentralization of decision-making (specifically on local climate change and energy solutions) and it also aims at changing behavioral paths. Therefore, looking at the nexus climate change-energy-poverty through degrowth perspective suggests practical and effective solutions at the local level helping to reduce GHGs, increase access to energy services and set up a platform for bigger system changes and for greater local participation.

Bibliography:
From a grammar of sanctions to a grammar of incentives: implications for the design of Payments for Ecosystem Services (PES) in Quebec

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Agri-environmental programs have gained considerable attention in the Canadian province of Quebec in recent years. Initiatives to encourage the implementation of sound agri-environmental practices that improve water quality, sequester carbon, and enhance biodiversity through the implementation of riverbank buffer zones are being encouraged through sanction-based regulations, provincially funded subsidies such as Prime Vert, and more private pilot initiatives such as the Alternative Land Use Services (ALUS) program which offer payments to farmers to encourage land-use stewardship. This latter initiative introduces for the first time a payment for ecosystem service (PES) arrangement to the Quebec agricultural policy landscape.

While PES schemes are often considered as market-based initiatives, they hardly if ever fulfill the criteria which define markets for ecosystem services since the majority of ecosystem services targeted do not possess the economic characteristics of rivalry or excludability and are thus imperfect public goods less amenable to market exchange (Sandbrooke et al., 2013; Muradian and Gomez-Baggethun, 2015; Wunder, 2015). More often, PES programs operate through government-based subsidies and rely on non-voluntary means such as taxes or user fees which reward the application of specific land-use proxies rather than the delivery of well-defined ecosystem services (Kallis et al., 2013).

In considering PES as a fundamentally regulatory-based mechanism which relies on establishing the appropriate legal and institutional environment for the transfer of incentives, it is possible to explore how incentives are designed and implemented according to value-articulating institutions (Vatn, 2010) which encompass both individual and social norms and rationalities for natural resource management. Accordingly, the institutional design of new PES arrangements requires closer attention to the institutional, historical and political aspects of previous regulations and programs aimed to encourage the adoption of sound agri-environmental practices in Quebec and the improvement of the quality of the targeted ecosystem services.

PES mechanisms are described as policy mechanisms that allow moving beyond command and control sanctioning rules towards flexible market incentives. However, in practice, agri-environmental governance relies on a variety of policy instruments and depends on a combination of community-based institutional arrangements, market tools and governmental command and control (Muradian and Rival, 2012). Thus, this research proposes closer engagement with the institutional complexity of how agri-environmental governance develops in practice. Specifically, we postulate that PES should rely on the coordination of three institutional pillars: the regulatory, the normative and cognitive (Scott 2008). At times one pillar will dominate the others, but in robust institutional frameworks they create synergy. The regulatory pillar involves “the capacity to establish rules, inspect others’ conformity to them, and as necessary, manipulate sanctions [...] in an attempt to influence future behaviour” (Scott 2008:52). The normative pillar recognizes that institutions have a prescriptive, evaluative and obligatory dimension within social life (Scott 2008). The normative system includes values and norms, which define goals or objectives, and designates appropriate ways to pursue them. Finally, the cognitive pillar refers to the individual and shared conceptions of social reality, creating the frames through which meaning is produced.

The aim of this paper is to identify the synergies and gaps between the regulatory, normative and cognitive dimensions of the current agricultural institutional framework in Quebec, by comparing the language of regulations to the language of incentive-based programs, and suggesting institutional considerations for the design of future PES initiatives within agricultural policy. This paper draws on...
the Grammar of Institutions (GoI) framework developed by Ostrom and Crawford (1995) to identify how the use of particular language influences policy implementation and outcomes. The Grammar of Institutions (GoI) framework allows for the categorization and organization of rules, norms, and strategies to identify key institutional components and to classify them according to their strategic inclinations in association with the grammar used to articulate them (Crawford and Ostrom 1995). The grammar of institutions framework has been applied in other institutional and policy analyses. For instance, in the area of multi-agent simulation, Smajgl et al. (2010) applied the framework to model changes of rule statements in the context of water usage. Ghorbani et al. (2012) contributed to the use of the grammar for the MAIA framework, a translation of Ostrom’s Institutional Analysis and Development (IAD) framework into an agent-based model. Other studies have identified both challenges and the development of guidelines for the application of the GoI, notably in the characterization and analysis of institutions (Siddiki et al. 2011, Schluter and Theesfeld 2010, Basurto et al. 2009).

The GoI methodology has been applied in a previous institutional analysis of a major agro-environmental regulation in Quebec (e.g. the Agricultural Operations Regulation) showing a lack of clarity and gaps in the language affecting the attribution of responsibilities and sanctions and thus, influencing the coordination between the institutional pillars (Zaga Mendez et al., under revision). In the proposed article, we aim to analyze the grammar of the Prime Vert programme, which is the only agri-environmental incentive program in the province, in order to characterize the current institutional language of incentives and to compare it to the grammatical characteristics of sanctions in terms of effectiveness and deficiencies. Additionally, through a historical analysis of how institutional changes have influenced agri-environmental practices, this paper extends the GoI framework to consider the normative, cognitive and regulatory aspects of incentive-provision to implement practices such as buffer zone management along water courses, reforestation, and the establishment of wind breaks to prevent soil erosion.

The results of this research will identify salient institutional opportunities and constraints for future incentive-based mechanisms such as PES for agri-environmental management in Quebec, which still lack a theoretical grounding to justify their application in Quebec. This research pays special attention to the analysis of the normative and cognitive role of institutions and their dynamics in order to go beyond a focus on legally binding rules and command and control policies towards more diverse and hybrid institutional frameworks.

References
For most of its history the academic discipline of ecological economics (EE) has focused on the integration of the natural environment and ecological conditions into economics. The seminal analyses of Nicholas Georgescu-Roegen (1975) and Herman Daly (1973) have provided a sound basis for a particular perspective that understands economic activity to take place within fixed boundaries provided by physical laws or resource scarcity. Numerous other authors have built upon this foundation and developed initial arguments further (e.g., Heinberg, 2007; Spash, 2010). In this process EE has established itself as a critical voice against the mainstreamed neo-classical school of economics which understands different factors of production to be substitutable by one another (Stern, 1997). Examples include the critique of the transfer of ecosystem functions into ecosystem services provided by Gómez-Baggethun and Ruiz-Pérez (2011) or the critique of contemporary value theory provided by Biesecker and Hofmeister (2010) or Immler (1995).

In this development of EE as an academic discipline a slight variation of focus has occurred with nonetheless relevant consequences. In the call for papers for their 2017 conference in Budapest the European Society for Ecological Economics (ESEE) establishes EE as an academic field concerned with sustainability. According to the often cited triple-bottom line (Norman & MacDonald, 2004) the concept of sustainability consists not only of ecological and economic but also social aspects. However, these deliberations present an understandable blind spot in previous EE analyses. Thus, the call of papers also “seek[s] to open up disciplinary boundaries through collaboration and discussion with conservation biology, environmental psychology and sociology, political ecology, social anthropology (amongst others)” (ESEE, 2016, p. 1). This paper is one such attempt to provide a link between social concerns of sustainability and social justice with those attempts made by EE. Specifically, I will outline and present a critical position on the social institution of prisons as the dominant form of punishment and discipline in modern societies.

Decolonising the Imaginary

Serge Latouche, representative of the culturalist division in the study of degrowth, has provided academics with the helpful concept of (de)colonising the imaginary (Latouche, 2014). The imaginary consist of “representations that mobilize feelings” whose implementations form social reality (Ibid., p. 117). In contemporary, modern, “developed” societies this imaginary is colonised by ideas of uninterrupted growth, market mechanisms, and competition among others. These factors lead to the exploitative status quo regarding social cohesion and ecological integrity. However, not only these factors have been colonised, but also the topic with which this paper is mostly concerned: prisons.
The imaginary and discourse of prisons has been colonised by a certain interpretation of prisons as useful institutions providing security, safety, and an adequate place to change misconduct. Next to barbaric practices, torture, and cruel death penalties of the 15th century prisons appear as “humane” forms to punish and discipline (Foucault, 1991). However, this interpretation of prisons is highly contested and far too one-dimensional. Instead, the topic of punishment and prisons is a multi-faceted one which can be discussed from various perspectives. Philosophically and historically, the emergence, role, and institutionalisation of punishment can be analysed as done by Nietzsche (1868 [1887]) in his Genealogy of Morality or in its more concrete form of prisons by Foucault (1991) in Discipline and Punish. Here, prisons represent one way to uphold order and discipline society at large. Socially, prisons can be seen as bastions to foster inequalities along class (Wacquant, 2001) and racial lines (Davis, 1998). Economically, prisons in many countries provide a cheap and constrained working force and have in some instances become privatised generators of profit. Hence, the term prison-industrial complex has been coined to discover this connection (Davis, 1998). This debate is also morally loaded, because the introduction of market mechanisms might undermine the institution of punishment apparent in some U.S.-States where prisoners can upgrade to more exclusive and well-furnished cells in exchange for money (Sandel, 2012). Lastly, prisons can also be interpreted as a form to organise society. Welfare-oriented societies tend to imprison less than neoliberal ones (Cavadino & Dignan, 2006) suggesting a trade-off between control and care from the state’s side.

The starting point of this analysis is the following. Prisons are at the core a social justice concern. They create and foster social and economic inequality, and additionally marginalise already marginalised groups. The question of who gets imprisoned and repressed by law enforcement for what action is a fundamentally just and social one as the “Black lives matter” movement in the U.S. demonstrates (Lowery, 2016). While many degrowth and EE articles stress alliances to movements from the global south (e.g., Martinez-Alier, 2012) only Gilmore (2013) explicitly addresses racial inequality. Thus, the topic of prisons will also spark connected debates missing from the degrowth and EE discourse. Simultaneously as prisons create and foster inequality they are a central part of the globalised, growth-oriented, and capitalist order. The anarchist ex-workers’ collective CrimethInc (2011, p. 143) argues “[p]risons are necessary not to preserve order so much as to protect and enforce the inequalities produced by the market. The coercion and control they represent isn’t an aberration in an otherwise free society, but the essential precondition for capitalism.”

These deliberations, all critical perspectives on prisons, present the first part to “decolonise the imaginary” (Latouche, 2014). From them I arrive at a clear stance against imprisonment. As a second step I will propose several alternative strategies to handle dissocial, deviating, and socially unwanted behaviour. This will firstly open the degrowth and EE discourse to other allies in the struggle against a repressive and exploitative order (e.g., decarceration movements, social justice groups), and secondly offer alternative paths. Examples of alternative handling with socially unwanted behaviour include restorative justice and mediation (Braithwaite, 2002; Umbreit, Coates, & Kalanj, 1994) or African Ubuntu philosophy (Elechi, Morris, & Schauer, 2010).

References
What civil society needs from science and how to use this to aid EU and national biodiversity policy implementation?

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CEEweb for Biodiversity, as an international advocacy NGO network working for more than 20 years in CEE and EU level, has been building bridges among decision-makers, science, public and the civil sector. Our focus has been on biodiversity and sustainable policies, with a centre of interest on the EU Biodiversity Strategy 2020’s Target 2, which also includes the MAES process. To advocate for its implementation, we have lent various tools from science.

The Target 2 of the EU Biodiversity Strategy 2020 states that "By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems" (Our life insurance, our natural capital: an EU biodiversity strategy to 2020). According to Action 5 (Mapping and Assessment of Ecosystems and their Services (MAES)) under Target 2 of the strategy, by the end of 2014, Member States - with the assistance of the European Commission - should have mapped and assessed the state of ecosystems and their services in their territories. By 2020 they should further assess the economic value of those services and integrate it...
into national and EU accounting and reporting systems. The MAES process is also inevitable for achieving further actions under Target 2, namely the Green Infrastructure Strategy, the Restoration Prioritization Framework and the No Net Loss Initiative providing information on where we stand in terms of ecosystems and their services and where to focus our efforts on.

So far under Target 2, a coherent framework and methodology have been developed for the MAES, an EU-wide strategy on Green Infrastructure has been adopted and a public consultation on the No Net Loss Initiative was completed to allow for developing an impact assessment on possible policy options. The 2015 mid-term review of the strategy and its Target 2 states that although progress has been made on policy and knowledge improvement and certain restoration activities were carried out in Member States, this has not yet stopped the negative trend of losing ecosystems and their services. There is an urgent need for Member States to promote restoration while green infrastructure need to be planned, integrated and implemented. Therefore, the completion of the MAES process of member states are very much needed - not only for Target 2 implementation but also to tackle all the processes behind the loss of ecosystems and their services.

From the perspective of a conservation and advocacy NGO, the question is how to enable that EU, Member States or other actors to really follow up on their commitments within and beyond the Biodiversity Strategy. First, we certainly need to make them aware of the importance of ecosystem services so they take them, their mapping and integration seriously enough to make actions. In these times, when priorities are all about jobs and growth what can we say and show that sticks enough for decision-makers to actually regard it as a priority and make actions for this? What knowledge and information we may need from science?

During our project, "Mapping and assessing ecosystem services in Natura 2000 sites in the region Niraj-Târnava Mica" we looked for such answers. Three organisations came together representing different sectors - MTA ÖK representing science, Milvus Group, the local conservation NGO knowing the locals and the local social and environmental processes and CEEweb to work on the communication and advocacy sections. We assessed and mapped 91 thousand hectares of Natura 2000 areas along the rivers Niraj and Tarnava Mica in Romania and quantified the most important ecosystem services. We considered as a key for success that the research itself should be with the involvement of the local people so that their views can be accurately taken into consideration in the decision-making process. Thus, we also involved locals to qualify ecosystem services and to understand their contribution to the main economic sectors, like agriculture, forestry, tourism, fishing and hunting. To understand the local context and the region’s most important features we elaborated an extensive policy study as well as metrics to selected services based on the knowledge of the locals and we drew up long-term future scenarios. Based on all of the results, we provided recommendations for the local and regional social, economic and land use policies.

What we learnt from the project is that 1. we need science, local knowledge and advocacy-communication work at the same time; 2. we need both quantitative and qualitative assessments - numbers look convincing and involvement of locals really “speak to” the local decision-makers; 3. scientific reports are must, but the hard job starts when it is done with making sure it is communicated and it is consumable and convincing enough for decision-makers to take actions.
P1
Economy vs conservation genetics: recreational brown trout fisheries as an example
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Brown trout (Salmo trutta, L.) fishing is a sport in the wild of great importance in Spain and in many other countries. The expenses generated by recreational fishermen (around 700,000 in Spain) produce socio-economic benefits in local areas, providing income for services directly or not directly related fisheries. On rivers with excessive angling pressure, abundance of trout individuals are reduced making them more vulnerable and compromising the continuity of this resource and its economic exploitation. In most of the countries, domesticated trout strains have been used to restocking the rivers in order to increasing their populations size.

This species present higher level of genetic variation across their wild populations and many studies indicate that domesticated trout have different genetic characteristics to wild fish and so the restocking practices produce the loss of genetic diversity in wild population and potentially can affect their ability to adapt and survive in the future.

Brown trout populations of the Duero basin (Spain) present a unique gene pool that must be preserved from a conservationist point of view. However for the last decades this basin has been subjected to restocking programs using different hatchery stocks and only recently the genetic characteristics of wild and hatchery populations has been taken into account.

The goal of this study was to assess, using nuclear (25 allozyme and 6 microsatellite loci) and mtDNA (a 707 bp fragment of the mtDNA D-loop) genetic markers, the effects that stocking have had over these natural populations analyzing the genetic composition of eight wild samples (4 unstocked and 4 stocked areas) and two hatchery strains.

Stocked wild samples showed high levels of genetic variability and lower levels of genic differentiation than unstocked. The percentages of genetic introgression in the stocked samples showed differences between samples (5 to 90%) and between markers, showing nuclear loci higher values (38-48%) those obtained with mitochondrial DNA (34%)

The increasing of homogenization of stocked samples has generated a lost of genetic identity of these wild populations suggesting a revision of this management practices. The success of hatchery specimens not only to survive but also to mate with natural ones implies that the replacement of indigenous gene pools is a real fact that should be avoided.

P2
Energy Sovereignty and Democracy: transformative conflicts and the repolitization of life projects
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Energy is nowadays one of the main subjects addressed by ecological economists, political ecologists and scholars in Environmental Justice, both for the severe impacts of its production on the environment and peoples but also for its potential in transforming hegemonic structures. At the same time, issues such as energy -access, -transition, -security, or -poverty emerge as major concerns in response to unsustainable fossil fuels industries, but also as a critique to large-scale corporate-driven renewables.

This article discusses the emerging concept of energy sovereignty (or, in some contexts, energy
democracy) as a reclaiming slogan growing more and more popular among social movements and international networks to repoliticize the debate around changes in energy scenarios. It has been defined as “the ability of a political community to control, regulate and manage their own energy. It entails the right of conscious people to make their own decisions on energy generation, distribution and consumption in a way that is appropriate within their ecological, social, economic and cultural circumstances, provided that these do not affect others negatively” (XSE, 2012). However, the way the concept is being applied and interpreted needs further inquiry and unfolding to better capture similarities, differences and potentialities of such movements and political positioning. This article analyses therefore the rising of the popularity of energy sovereignty as a reclaiming slogan and political project put in place by Environmental Justice Organizations and transnational networks, and explores how it is understood across different countries and political contexts. The research is informed by interviews and data collected among anti-dam movements in Latin America (such as the Movimento de Atengidos por Barragem (MAB) in Brazil and Movimiento Rios Vivos of Colombia), as well as among organizations converged in a recent gathering on energy alternatives in India (the Bijli Vikalp Sangam). The theorization and overwhole reflections own significantly also to a two-year participatory action research in the Network for Energy Sovereignty (XSE) of Catalunya (Spain) and to the inspiring workshops of the ACKnowl-EJ project (Temper and Del Bene, 2016).

The article argues that among the organizations and networks analyzed, energy sovereignty addresses three common issues: first, it understands energy as intrinsically linked with food and water; hence, the reclaim of control over it goes hand in hand with a broader struggle for land and other natural resources. Secondly, it questions the broader historical trajectory that has led to a centralized and state/corporate control over the energy model. Third, it serves as a converging space for both resistance to dispossession and the generation of counter alternatives. The claim for energy sovereignty in fact does not only look for the resolution of current conflicts or social problems, but aims at transforming and radically disrupting the dominant model and neoliberal ideology.

The article also warns about important differences in the use of the concept, especially when strategically used in national politics (like in Ecuador, Bolivia, Venezuela or Argentina), and suggests hypothesis on the preference of the term sovereignty or democracy due to different political and historical contexts.

The article argues that energy sovereignty offers a powerful analytical tool to understand movements and initiatives to reclaim control and rights over energy sources and much broader over territories. In fact, while urging to reflect on what kind of energy production we wish to have, for what, by whom and how, energy sovereignty calls for differentiating between Energy with a capital “E” (as the abstract massive and uniform commercial generation of energy, as a function of capital accumulation), and the incommensurable and contextually diverse uses of energy, with a small “e” (Hildyard at al. 2012). While resisting to corporate-led techno-fixes, energy sovereignty calls for decentralization, relocalization and differentiation of energy generation, use and technology, challenging this way the current energy geographies and techno-infrastructural landscapes. Finally, while questioning economic and social relations underpinning the current energy model, energy sovereignty poses an epistemic challenge to reconsider our territory not as a mere repository of natural resources, but as a socio-cultural whole where to make sense of existence and where to base and root conscious and responsible political “life projects” (Escobar, 2008).

P3
The Value of Material Reuse: Materials as Economic Stimulus
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Abstract: Two residential renovation projects combine selective deconstruction with job training. Beyond financial savings, training is a huge bonus for the community. Scarcity shows us opportunity. Waste is an unneeded expense, and deconstruction offers savings and jobs. We illustrate material
donor and recipient economics. The road between these two factors includes contractors spending labor to lower the material ‘price’ and refurbishers who find broader markets for their product, partially because of green building popularity. The life cycle includes community. Regulation can support conservation and local industry. If manufacturers relocate, displaced workers cannot afford (typically expensive) locally made goods. A local economy creates better quality of life.

Keywords: deconstruction; demolition; green demolition; green building; post-consumer building materials; greenGoat; life cycle analysis; green collar.

Biographical notes: Amy Bauman LEED AP is a Project Manager for greenGoat, has two decades of experience in process re-design and process improvement. She has an extensive background in activity-based costing and technical research, having developed products using a strict financial discipline in the investment industry. She currently applies this thinking to resource conservation in its many forms. She serves on the Department of Environmental Protection’s C&D (construction and demolition) subcommittee, charged with researching and recommending ways for Massachusetts to increase C&D recycling. She is a graduate of Denison University with a Degree in Economics.

P4
The Water Crisis in Cyclades, Greece. Diagnosis and rectification
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This paper is part of a doctoral dissertation aiming at diagnosing the dysfunctional water sector in Tinos and in Syros, two islands of the Cyclades island complex, in Greece. In what follows, the research problem, the methodology followed and some preliminary results are presented.

As Greece opened up for foreign travellers and became one of European tourism destinations since the fall of the dictatorship in 1974 and its almost immediate succession to the European Union in 1981, the Greek islands and the island complex of Cyclades, in particular, benefited from the public spending on improving local infrastructure so as to make the islands attractive for international tourism. Investing on tourism boosted local economies and revitalised regions that had suffered from out-migration. Indeed, tourists rushed to the islands of the Cyclades and with them, came an increased pressure on water resources. More people required more water simultaneously.

Water provision in the majority of the Cycladic islands and in Tinos and Syros in particular, is often insufficient in quantity and is oftentimes interrupted, particularly during the summer. However, according to several Greek laws (for instance the 2003 Water Law and the Common Ministerial Decision Y2/2600/2001), water should be provided in a quantity sufficient to meet all the needs of the population, and it is emphasised that water provision should be uninterrupted. Furthermore, the issue of water quality often concern consumers and local authorities alike. The network in some of the Cyclades islands is aged and because of poor maintenance in some areas, red oxidised water, unsuitable for human use runs out of the pipes. Water authorities often have to issue warnings to the inhabitants, urging them to stop using tab water until further notice.

Frequent water quality problems are the reason for the inhabitants to lose their trust on the safety of tab water: they only use it for washing and personal hygiene and buy bottled water for drinking and sometimes also even for cooking. This not only increases the average monthly household budget (a three person household in Syros pays more than double for water compared to Athens) but it also generates vast amounts of waste from plastic bottles. Waste management becomes yet another troublesome issue to be tackled by local administration.

We see then, that the problem of the water sector of Tinos and Syros (and the majority of the Cyclades islands as well) can be understood as the combination of insufficient quantity, poor –perceived- quality and high cost of water.

Greek governments have invested considerable time, effort and financial resources in tackling the water provisioning problem in the islands of the Cyclades.
One attempt pursued by national governments was the construction of dams and reservoirs. This practice was predominant in the 70s and the 80s and constituted the manifestation of the engineering way of thinking about the water provision. In parallel, extensive water distribution networks were constructed, providing water to the majority of the island inhabitants. Settlements that could not be covered by the public network secure their water provision through privately run wells. Another attempt was the transfer of water via tankers from the mainland – a state-subsidised practice that was heavily criticised as being too expensive, unsustainable, as undemocratic and as serving hidden agendas. More recently local governments in the Cyclades have commissioned and constructed desalination plants. These desalination plants are powered from the local electrical grids, with power stations operating on mazut (generating dependencies on the energy sector).

These responses however have been predominately focused on tackling the quantity issue and not the quality or the cost of water either, as one can see from the short overview of the attempted responses discussed below. What is worth noting is that providing water for human consumption seems to be the first and most likely only concern expressed in the policies and the actions of the public officials and the other actors involved in the water sector in the Cyclades islands. Securing and maintaining the ecological functions of water are not perceived as having the same urgency as water provision. In the institutional realm, two major reforms took place, merging jurisdictions and decentralizing decision-making power. These reforms were to grant local authorities greater independence from Athens regarding, amongst others, water management. The purpose was to allow local authorities to design and implement water management policies best suited to the local conditions and needs.

Against the backdrop of the financial crisis in Greece the question arises though, whether the regions have sufficient funds and the personnel to meet the requirements laid down by the latest administrative reform.

While the main problem of Tinos and Syros refers to the quality, quantity and cost of water, the research problem addressed in this thesis is the inability of centrally planned solutions (technical solutions and administrative reforms) to rectify the problems. It becomes clear that a lot of policy effort has been invested in order to rectify the water sector in the Cyclades, in terms of improving water quality and securing sufficient water quantity. The central question then becomes “what is the reason of the inability to rectify the water sector? Why is the the water sector in the Cyclades still dysfunctional?”

To this end, two field trips were conducted in March-April 2014 and November-December 2014, where 35 in-depth, semi-structured interviews were conducted with appointed and elected officials from all levels (national, regional, local) and water users (domestic, agricultural and touristic). Interviewees were asked amongst others about their perception of the state of water resources on the islands, about what they believed was the root of the problem, and about how they believe it can be rectified.

Preliminary results show that there is a deep mistrust of officials and users of the local level towards central officials situated in Athens. Water users are skeptical of policies originating from the central government which they do not trust. What appeared to be an endemic mismanagement of water resources and funds can be attributed to the administrative control the central government in Athens has over local and regional administrations that are unable to effectually manage their resources (fiscal and natural) because of the limited scope of action available to them.

Local and regional officials have a deep and profound knowledge of local conditions and they are part of the island communities (as of course they also reside in the islands). They are also held accountable by the citizens (water users) for the success or failure of water policies and have therefore every reason to make sure that not only water provision is uninterrupted, but also that the ecological functions of water are secured so as to ensure that the islands remain inhabitable for the future. Following the abductive syllogism, we conclude that a first step towards rectifying the dysfunctional water sector in the Cyclades is by enabling a decentralized water management, detached and independent from central government. Local officials, being part of the community, enjoy the trust of water users and if they were to be empowered, they could incorporate local knowledge and ensure that policies are tailored to serve the needs of the islands as wholes.
At present, Mexico faces severe socio-environmental problems, many of which have intensified since the introduction of structural adjustment policies in the mid-1980s, and then the rise of neoliberal policies introduced in the 1990s, particularly with the advent of the North Atlantic Free Trade Agreement (NAFTA). These policies have provoked a massive rural-out migration toward urban and periurban areas in Mexico and the USA, the dispossession of land and resources across many indigenous and peasant territories, and their subsequent commodification. These processes of forced migration, dispossession and commodification of land and resources have deepened the geographic rift (sensu Napoletano, Paneque-Gálvez, Vieyra, 2015, Capitalism Nature Socialism) between the main financial and productive centers of the country, which accumulate capital and concentrate political power, and the rural and periurban territories, in which there have been an increase in poverty, social exclusion, loss of territorial and political autonomy, and environmental degradation, reasons that underlie the appearance of numerous environmental conflicts across the country.

In this context of multi-dimensional crisis, neither the State nor multi-lateral institutions, corporations and other stakeholders such as NGOs, have the ability to provide lasting solutions to solve the problems faced by indigenous and peasant territories. Rather the opposite, these actors are in general the very cause of such problems. It is therefore necessary that the communities affected by socio-environmental problems develop their own solutions based on other logics or epistemologies and forge alliances with other communities and with actors such as critical academics and activists. Such solutions should trigger socio-territorial and environmental innovations that enable alternative development models in which human welfare is linked with effective environmental and territorial protection.

Several authors have suggested that new technologies for mapping and monitoring territories and resources, such as small drones (unmanned aerial vehicles), can be useful tools to strengthen the territorial defense of indigenous and peasant communities as well as to enhance their management and conservation of natural resources, having thus potential to improve people’s livelihoods. Nevertheless, even if the potential of such new technologies might seem obvious to their advocates, we lack a sound empirical base to attain a comprehensive assessment on the topic. It is therefore necessary to design studies that enable us to infer the social and environmental conditions upon which the use of new mapping and monitoring systems can be actually effective and generate, at the same time, improvements in the livelihoods of communities facing situations of poverty, marginalization and environmental conflicts associated with dispossession dynamics.

To that end, we need to carry out case studies that make possible to evaluate what mapping and monitoring systems and under which socio-environmental contexts, such rural and periurban communities can improve their living conditions and the protection of their territories. Here we reflect upon preliminary results from and on-going project in central Mexico in which indigenous and peasant communities in rural and periurban areas are trained to use different mapping and monitoring technologies. We provide some insights into some of the social and environmental conditions that may enable or hurdle the participatory design and implementation of territorial mapping and environmental monitoring strategies by communities as a way to trigger innovations that may help improve communities’ livelihoods.
Towards improved measurements of wellbeing for a bounded economy

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Human wellbeing is the ultimate goal of social and economic policies. Mainstream Economics assumes that increases in wealth and the associated consumption of goods and services positively contribute to wellbeing (Easterlin, McVey, Switek, Sawangfa, & Zweig, 2010; Oswald, 1997; Samuelson, 1965). This focus on the pursuit of individual wellbeing through the consumption of goods and services has led to a strong emphasis on unlimited economic growth and led the current economic system into environmental and economic crises.

Climate change with its risks of extreme weather variations; its threat to agriculture, food security and natural disasters at a global scale is one of the most daunting (IPCC, 2014). Other environmental challenges our world faces are pollution, loss of biodiversity and resource scarcity (Costanza et al., 2014). Our time has also seen a financial crisis that came close to causing a systemic collapse at a global scale (OECD, 2009). At the same time, our generation is seeing a level of inequality unprecedented since the Second World War (Piketty, 2014; Roberts, 2012) and research has shown that such an extreme level of inequality hurts individual and societal wellbeing (Wilkinson & Pickett, 2010). The glaring reality of the confluence of these crises is a call to reexamine our fundamental values and premises.

The dissatisfaction with economic growth as a measurement of social progress has led to the search for other forms of measurement of human wellbeing. The social indicator movement is one important attempt at diversifying the measures away from GDP and economic growth (Barstad, 2014; Bruni, 2010; Nussbaum & Sen, 1993; Sen, 1993). The Human Development Index (HDI) implemented by the United Nations (UNDP) is another focusing on three dimensions: Health, education and income. Although income is an important component of human wellbeing, studies have shown that beyond a certain level, its contribution to wellbeing declines (Ed Diener & Seligman, 2004; Dodds, 1997; Easterlin, 1995, 2004; Easterlin et al., 2010; Frey & Stutzer, 2002; Oswald, 1997). More recent attempts at measuring progress put emphasis on incorporating subjective evaluations of wellbeing. The Organization for Economic Co-operation and Development (OECD) launched its guidelines on measuring subjective wellbeing in 2013 as part of its Better Life Initiative (OECD, 2013). The European Union gathers information on quality of life in European countries periodically and publishes its quality of life indicators online (Eurostat, 2015). Others in this same direction are the UN’s World Happiness Report and the World Values Survey (WVS). Ecological Economists have from early on argued for putting more emphasis on the qualitative aspects of wellbeing. For example, Georgescu-Roegen (1971) asserted that the goal of economic activity should be "enjoyment-of-life". A growing number of positive psychologists stress the importance of subjective wellbeing measures as a component of an overall assessment of human wellbeing (Clark & Oswald, 1994; E. Diener, 2000; Ed Diener & Suh, 1997; Easterlin, 1995; Frey & Stutzer, 2002; Gowdy & Erickson, 2005; Layard, 2005; Oswald, 1997; van Praag & Frijters, 1999).

Although introducing a diversity of indicators of human wellbeing as discussed above is important, there are critical voices that call for a closer examination of these measurements. For example, the positive psychologist, Oscar Kjell (2011) questions whether these measurements of wellbeing draw from psychological (and philosophical) approaches that reinforce the individualistic traits in Western cultures that have partly contributed to the environmental and economic crisis we face today. He investigates the possibilities that wellbeing research could support and learn from sustainability research. He finds that there are two lessons that wellbeing research could learn from sustainability research: interdependence and emphasizing the intrinsic value of nature. He criticizes current measurements of wellbeing for not reflecting human beings’ interdependence on community, non-human animals and nature. With rising urbanization and economic growth, communities often experience fragmentation (Slemp et al., 2012). Studies show the market is infiltrating arenas previously...
taken up by communities and that contributes to deteriorating wellbeing (Bruni, 2010; Bruni & Porta, 2005; Bruni & Stanca, 2008; Randon, Bruni, & Naimzada, 2008). These measurements ignore this trend. In addition, they emphasize an instrumental value of nature and disregard its intrinsic value. My paper takes inspiration from these critical voices and evaluates wellbeing/living standard measurement tools used by international organizations (for example, the UN and OECD). I will investigate if they reinforce an anthropocentric approach to promoting wellbeing at the expense of others and nature. Where relevant, I will draw on freely available data to support my analysis.

Reference
On estimating the value of nitrogen capture in aquatic systems – a case study of substitute costs for eelgrass in Sweden

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Eelgrass provides important ecosystem services such as nitrogen and carbon cycling as well as productive habitat for reproduction of many species (Heck et al., 1995, Jenkins et al., 2015 Borum et al., 1989, Kaldy 2006) Even though the eelgrass beds are recognised worldwide as an important habitat, estimating their economic value is far from a simple task and complicated further by a wide set methodological issues. A service such as nitrogen capture is not directly demanded by consumers and even the more direct services such as recreation (in cleaner water following from nitrogen capture) depend on values that cannot be measured by a market price. The substitute cost method is based on simple logic of transferring observed costs of substitute activity to the activity which is harder to observe or assign a value to by using money as a metric. When, as in the case of nitrogen abatement, several substitution possibilities exist, one should consider the least-cost combination of them as the replacement value. In the coastal waters of Sweden, the area of eelgrass has been reduced significantly. The conservation efforts could benefit from a study revealing the locations where the value of eelgrass as a nitrogen removal service is high. Thus, we estimate the value of losing the existing nitrogen removal service of eelgrass by deducting how much we would need to invest in achieving the same nitrogen reductions on land, given a cost-efficient combination of abatement measures within the two most important terrestrial sources (agriculture and anthropogenic waste water). Since both the eelgrass population and the cost of reducing nitrogen terrestrially are spatially heterogeneous, we develop a model which considers sufficient geographic detail on both land and sea. As the majority of the nitrogen load to the eelgrass beds at South-West coast of Sweden originates from agriculture, the model builds on Brady (2003) and Hasler et al. (2014). It combines reductions in livestock, chemical fertilisers, changes in crop & tillage types, as well as, dedicated buffer zones by using geographical and statistical data sources. For the costs of increasing the waste water treatment
(WWT), we use the existing plant data for current capacity and the literature data for the cost functions (Hautakangas et al., 2013). The study area is the coast of Skagerrak within Sweden, and its catchment area.

Our results show that for 35% of the eelgrass beds in the study area, the direct impact from land based measures lacks the capacity to abate the quantity of nitrogen that is released from the eelgrass biomass and sediment if the eelgrass dies off completely. This result demonstrates more general limitations of the substitute cost method and some specific issues regarding the developed model. In general, cost estimation by substitution requires the substitutes to have sufficient capacity to meet the quantity of service provided by the ecosystem. If this condition is not met, the value remains undefined by the method. The definition of capacity can be dependent on the model scale and accuracy of the descriptions of the ecological processes besides the capacity in controlling the anthropogenic inputs.

At the commonly used level of economic analysis of aquatic ecosystem services (national or marine basin), the total abatement capacity is sufficient to meet all of the nitrogen that would be released from the destroyed eelgrass ecosystems. For such a specification our model estimates the substitution costs of 443 € per ha of lost eelgrass. The model optimal solution reduces the chemical nitrogen fertilisation intensity across the catchment areas from the baseline of economic optimum and an investment is made in increasing the abatement percent at one of the largest WWT plants. Such a general level of analysis can give a misleading idea on how important the eelgrass nitrogen capture can be for more local circumstances, which in the model are described at the scale of water bodies for the water framework directive monitoring. For meeting the nitrogen capture specific to eelgrass beds of these littoral stretches, the average cost per lost hectare of eelgrass reaches 5423 €. The least cost solution requires increasing the abatement levels in total of 13 WWT plants located in different catchment areas. Furthermore, on some areas close to the coast, agricultural practises are changed considerably, for example the field area on the islands is converted to fallow without any animal husbandry, while in other areas nitrogen inputs are reduced and some environmental practises such as catch crops are introduced. Reaching this level of total reduction (35% of the modelled total N capture by eelgrass) from land based sources to which ever lowest cost littoral stretch would lead to considerably smaller (52 €/ha) value estimates for eelgrass.

Our results highlight the importance of using accurate data and models in attempts to estimate economic values of ecological services. As in our case, it may at first seem that substitutes are within easy reach and that the question is at what price they carry. Alas, a deeper study of the system reveals capacity constraints, less than total control of diffuse emissions and natural processes like retention, which hinder the anthropogenic capacity to substitute other ecosystem services. However, in our model setup, we have only considered the direct effect of land based measures on the first stretch of sea the terrestrial load reaches. In further studies, the secondary effect consisting of the interaction of the nitrogen flows between the stretches should be also included, and would increase the overall effect of abatement particularly on the stretches that are further from the coast line. While it should not be particularly surprising that the ecological systems can play a large role in economic analysis, it seems that brushing aside concerns such spatial heterogeneity could have larger than anticipated influence on conclusions on the values of ecosystem services. In economics, policy relevance is something of a golden standard for funding and publishing. For policy relevant results, economists have tendency to analyse results at scales the policies are made; i.e the national and international. For valuation of ecosystem services, wide generalisation of results could help with getting research funded, published and cited. In an ideal study, the accuracy of the results is independent of the studied scale, but in practise limited resources can lead to compromises in input data and methods.

The substitute cost method is a compromise in itself, since substituting the costs from other sectors or activities might not reflect very accurately a value of particular ecosystem, such as the eelgrass. As our results show, further compromises with the spatial distribution of the ecosystem service can affect the estimated service value dramatically. Typical economic models of coastal ecosystems operate at the basin level and hence the low hanging fruits of substitute cost estimates could be rotten from the core.
From another angle, the capacity of the substitute cost method to answer the question of: how important is the distribution of eelgrass for its value, is limited because using a substitute does not imply the changes in the pattern of “true” demand for the service. In the case of nitrogen capture, the consequent value of less eutrophied water could be distributed by a different set of principles such as bathing area or diving sites.

For conditions in which the demand for nitrogen capture can be estimated by other means or for which using proxies such as good ecological status is deemed worthy, the developed model offers a framework for combining the land based abatement methods with the aquatic methods and facilitates using eelgrass as a nitrogen abatement measure cost-efficiently.


P8

The Catalan Economy towards the New European Energy Policy: through accounting of greenhouse emission multipliers

Pié Laia

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At the end of 2008, the European Union signed a climate change agreement and pledged to reduce the Union’s greenhouse gas emissions. One of the measures, which was established to reduce emissions, was that the most contaminating sectors, covered under the European Union Emission Trading System (ETS), and those which are not covered, will have to reduce their emissions. The aim of this paper is to analyse the effect that the implementation of the agreement signed by the European Union at the end of 2008 would have on reducing greenhouse gas emissions. Specifically, I will focus on the analysis of the emission multipliers and I will analyse the impact of a reduction of 10% of emissions in sectors not covered under the ETS and of a reduction of 21% by those that are covered. For this purpose, I consider three possible scenarios: firstly, I will simulate a reduction of emissions of 10% and 21% according to the sector while holding the endogenous income constant; secondly, a reduction of emissions of 10% and 21% with a reduction of endogenous income of 8.6%; thirdly I will apply a reduction of emissions by 10% and 21% with an increase of the endogenous income of 8.6%. Finally, I will analyse the decomposition of the emission multipliers in open effects, own effects and circular effects in order to include the different channels of the process in the generation of emissions of CO2 equivalents. The analytical approach used in this paper gives interesting results that can help to design and implement policies that help to reduce the emissions. The empirical application shall refer...
to the National Accounting Matrix with Environmental Accounts (NAMEA) for the Catalan economy (2001).

P9
Economic benefits and ecological costs from users in marine protected areas: linking contingent valuation and emergy analysis
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The evaluation of ecosystem services provided by the environment is usually realized basing on principles linked with the economic theory and then on the assumptions that 1) individuals have preferences for different market and non-market goods, 2) these goods are substitutable the one to each other.
Methods for measuring these values fall into two categories: revealed preference and stated preference. Revealed preference measurements are based on observations of users’ behavior, while stated preference ones are based on responses to hypothetical questions.
The main method among stated preferences ones is the contingent valuation, that directly asks individuals about the values they would place on an environmental good/service. Users’ preferences are then evaluated, for example, investigating the willingness to pay (the maximum amount a person would be willing to pay for an increment of a good) for a good via a survey or questionnaire.
The methodology has been applied to a couple of cases located in the north western part of Italy: Portofino and Cinque Terre MPA. In this case people were initially asked if they were aware about the existence of Marine Protected Area, later they were asked if, given that marine protected areas must protect coastal and marine environments, protect cultural, economic and environmental assets (especially with regard to flora and fauna), they judged the establishment of these areas as a priority, important, not very important, irrelevant. Finally they were asked how much would they be willing to pay to protect and save the area (€ per year).
The amount of money people declared to be available to pay can be compared with costs imposed by users on the environment to perform their activities.
These costs are evaluated by the assessment of users’ consumptions, estimated through information collected contextually to contingent valuation questionnaire and translated in emergy terms. The calculated emergy amount can be translated in money terms through the adoption of emergy to money ratio being then comparable with results from contingent valuation. In such a way it can be understood how much users value the natural services from MPA as well as what they really require to the environment to enjoy it.

P10
Economic Impacts of the New European Energy Policy for Catalonia: Exogenous Income Determination in a SAM Model
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In the conclusions of the European Council of October 2014, the Energy and Climate Change Policy Framework 2021-2030 ("Framework 2030") was adopted, with the aim of providing continuity to the
European Energy and Climate Change Package. This agreement and pledged to reduce the Union’s greenhouse gas emissions approximately 40% before 2030. The aim of this paper is to analyse the effects section of the main measures envisaged in the new European energy policy, in order to establish their effects on the Catalan economy. The methodology used a quantity-based SAM model, through which we analyse different measures that would help us to reduce CO2 equivalent emissions in those sectors that produce most of the Catalan emissions. Specifically, I extend the exogenous determination of production in the input-output model to a SAM database to show the reduction in the level of endogenous income of the model needed to reduce emissions by 40%. With this analysis, I quantify the degree of adjustments in the economic agents if the emissions levels are reduced to the level established by the EU policy. The results suggest that total CO2 equivalent emissions would reduce, and would therefore comply with the agreement on climate change signed by the European Union in late 2014. However, the economic effects of such accomplishment would force to reduce endogenous income in a greater extend.

P11

Analyzing cultural ecosystem services with the help of social media: a case study from Kiskunság, Hungary

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Ecosystem services (ES) have both direct and indirect effects on the human well-being. However, the identification of cultural ES and their complex links to the different dimensions of human well-being is very challenging. Among the several approaches to evaluate non-monetary values and human benefits of cultural ES, those directly analysing people’s perceptions and choices can point out these linkages. The analysis of photos containing location-related information (geo-tagged photos) on social media platforms offers a tool to evaluate non-monetary values of human well-being (Allan et al. 2015; Keeler et al. 2015; Tenerelli et al. 2016). The photoseries analysis builds on large databases of such documented perceptions: social media of photos. It is a cost-effective technique, and well capable for surveying and evaluating the ES perceived by people, also in a larger area (Austin, 2007; Bagstad et al., 2014).

The Kiskunság is located in the Danube-Tisza Interfluve in central Hungary, where the KISKUN LTER (Long Term Ecological Research) study region of 7500 km² was launched in 1995. This is found in the semiarid sand forest-steppe region with large extents of inland sand dunes and shallow alkaline lakes. In the frame of the EU FP7 OpenNESS project a case-study site in the Kiskunság was established, where an assessment of the cultural ES was conducted by photoseries analysis. The case-study site covers 833 km² area, and partly includes the Kiskunság National Park with rich and very unique flora and fauna, and also arable fields, forest plantations, orchards, vineyards, pastures and fallow lands. Our scopes were 1. to identify ES hotspots; 2. to identify locally specific ES; 3. to identify which landscape features can contribute to non-monetary values of cultural ES; 4. to analyse ES by their spatial distribution and association on the basis of social perceptions.

Material and Methods

Photos taken within the Kiskunság case-study site were collected from the online photo-sharing platform Flickr, and then they were analysed. After downloading the photos of the Kiskunság case study area and retrieving the additional informations on the circumstances of taking the photos, a photoseries analysis was conducted by classifying the images using the following criteria: 1. To understand socio-cultural background of the photo maker the following attributes were recorded: local or non-local; Hungarian or foreigner; male or female. 2. To reveal the actual supply of the cultural ES appearing on the picture, the photos were categorized by ecosystem types; human activity; creature/living being on the photo; aesthetic value; intellectual value as local identity, educational or scientific value; temporal characterization of the pictures as part of day, season.
Statistical analyses were conducted in the R statistical environment (R Development Core Team 2008). Spatial distribution of the actual ES captured by the coordinates of the geotagged photos was compared to the land-use/habitat map of the Kiskunság (Bíró et al. 2008), and evaluated by spatial analysis using ArcGIS software.

Results and discussion
Using the Flickr social media platform, 2942 photos were evaluated, from which 1223 photos were included in the analyses. All the rest were considered ineligible and dropped for various reasons, such as wrong location, indoor photo, people or pets as main subjects, or because there was a duplicate of the picture.

The 1223 photos were taken by 103 users in an unequal distribution. 78 of them have taken less than 10 photos, 10 of them between 11 and 20, 8 of them between 21 and 30, and more than half of the total amount of the photos were made by 7 users, one of them has made 292 photos on a national equestrian event – the last was a professional photographer.

The distribution of the groups of creatures appeared on the photos was the following: vertebrata (mostly birds) on 52, insect on 31, plants as main objects on 194, domestic animals (mostly horses - 149) on 173 photos.

Recreational activity, where the photographer was probably only a bystander of the activity, appeared on 196 photos (148 aircraft/paragliding – there is a sports airport on the study site, 10 picnicking, 5 angling, 1 swimming, 6 biking, 26 hiking or walking), while as participant of the activity e.g. in an adventure park appeared on 109 photos.

Local identity appeared on 119 photos as traditional riding show. In addition, the national coach driving competition appears on 107 photos, however, this is not a local, but a national event. Propagative activity or place appeared in only several cases, but on dozens of photos of one photographer, e.g. a series of demonstration of settlements (29), or animals with scientific nomination mostly of two photographers, also in 29 cases.

The land cover appearing on the photos, is mostly anthropic: urban or overused grasslands mainly for airport or for other sport activities. Preliminary results show, that the photos are strongly connected to the relative densely populated areas and anthropic infrastructures, and the natural landscape is very rare on these photos. This may be the specialty of the photos of the most popular social media, not specialized e.g. for nature photography. It may be useful to compare ES, ecosystem service hotspots, landscape features contributing to cultural ES appearing on the photos of diverse photo-sharing social media, considering the differences in the preferences of the contributing communities.

References


By and large, ecological economists recognise that most nations have minimal ‘ecological space’ to accommodate further GDP growth. Indeed, where nations have already exceeded ecological limits, ecological economists stress the need to undergo a phase of de-growth in order to again operate in an ecologically sustainable manner. Complicating the sustainability issue is the fact that unemployment – a major cause of income disparities, family breakdown, crime, mental illness, and social unrest – is strongly linked to real GDP. For example, under existing institutional arrangements, a growth rate of around 2-3% is generally regarded as the minimum required to prevent unemployment from escalating.

Unfortunately, unemployment has become a common feature of economies around the world since central governments abandoned the goal of full-employment during the 1970s. In response, a number of economists have called for the reinstatement of the full-employment objective. These economists believe that full employment could again be achieved if central governments undertook policies that increased real GDP (i.e., increased aggregate spending) sufficiently to coincide with the full-employment level of real GDP.

The problem with this solution to unemployment is self-evident. If the full employment level of GDP continues to rise over time due to ongoing expansion of the labour force and/or because increases in labour productivity are taken in the form of higher real incomes rather than fewer work hours, then the nation in question must continually increase its real GDP to achieve and maintain full employment. This is ecologically unsustainable.

The central problem with conventional solutions to the unemployment scourge is the assumption that the full employment level of GDP is largely beyond the control of policy-makers and that real GDP must be adjusted upwards to match it. In an ecologically-constrained world, the opposite is required. That is, assuming a nation’s real GDP has reached ecological limits, it is the full employment level of GDP that should be adjusted – invariably downwards – via appropriate policy settings to match a sustainability-constrained level of real GDP.

One of the suggested means to achieving the latter is a Basic Income Guarantee (BIG), which would involve every adult citizen receiving an unconditional income payment from the central government. Provided the BIG is sufficiently large, it is argued that the BIG would induce many workers to exit the workforce and forego some income to enjoy greater leisure time/freedom. This would reduce the number of people in paid employment and the real GDP required to achieve and maintain full employment.

There are, however, huge weaknesses associated with the BIG. They include the failure of BIG proponents to recognise: (i) the important role that meaningful work plays in enhancing human well-being; (ii) the detrimental impact that a BIG would have on worker incentives; and (iii) the fact that providing each citizen with a claim on real wealth without the obligation of having to work/contribute to wealth creation would have disastrous macroeconomic consequences (e.g., hyper-inflation). Disconcertingly, the main opposition to the BIG is the belief that a central government would be unable to finance such a scheme, which is not the case if the central government is a monetary sovereign. In all, the BIG is not a viable solution to unemployment in an ecologically-constrained world.
Another suggested way of achieving full employment is an employer-of-last-resort programme or Job Guarantee (JG). The JG would involve a currency-issuing central government using its spending powers to provide jobs at a minimum living wage to all people unable to secure paid employment. Importantly, the payment of a minimum living wage would enable all citizens to access the basic necessities of life and ensure price stability by hiring unemployed labour off the bottom of the labour stock-pile (i.e., by operating as a buffer-stock employment scheme).

As proposed by its advocates, the JG is a relatively conventional unemployment cure in the sense that its purpose is to boost aggregate spending so that real GDP rises to match the full employment level. This is of no benefit if real GDP has reached ecological limits. However, unbeknown to many JG advocates, the JG, when combined with quantitative restrictions on the rate of resource throughput, could achieve full employment by rationing an ecologically-constrained real GDP through paid work to ensure labour is always the limiting factor of production. To be successful, the JG would also need to be supplemented by policies that increase labour market flexibility in ways that do not undermine wages and conditions of employment and reduce the incomes of the rich by taxing economic rents. Overall, full employment in an ecologically-constrained world is feasible provided a currency-issuing central government is willing to exploit its exclusive spending and taxation powers and use paid productive work as a mechanism to equitably distribute a sustainable national economic pie.

P13
Building an inclusive community: removing institutional barriers which prevent access to urban green spaces
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Many authors indicate that access to green spaces in cities brings tangible benefits to urban inhabitants. However, we also realise that this access is often uneven and in particular certain social groups tend to be discriminated (especially due to socio-economic status). The aim of this paper is to suggest an inventory and classification of institutional barriers which restrict access to urban green spaces. Additionally, we reflect on how such barriers can be removed.

Institutional barriers preventing access to urban green spaces stem from both the legal system and the different customs and social norms. Eventually, institutional barriers related for example to property rights translate into entrance restrictions, physical barriers, spatial planning provisions discriminating certain uses and users, and various urban green space management schemes. For instance, allotment gardens can be used by allotment owners only (possibly also their family or friends), private gardens are often inaccessible to anyone besides their owners and their tenants, and botanical and other special gardens are usually accessible only upon payment of an entrance fee.

We used the case study city of Łódź, the third largest city in Poland. To define and characterize the specific barriers we used literature, maps (for example location of green spaces), the latest investment plans, field visits, as well as legal and planning documents (for example local zoning plans). The identification of the specific institutional barriers and their consideration in the relevant municipal policies and strategies is of key importance to sustainable development of a city, and especially to citizen satisfaction and quality of life.

This study is carried out within the ENABLE project (Enabling green-blue infrastructure in complex social-ecological regions – system solutions to wicked problems) funded by BiodivERsA.
The green economy discourse is closely related to the notion of postindustrial society, to the transition to a new technological structure that, in terms of business and economy, is characterized by postindustrial, information, bio- and nanotechnologies. However, the nature and design of a green economy is formed not only by means of technological quality changes in producing and consuming goods that are inherent to the postindustrial society, but also by means of specific transformations in the existing matrix of social development.

Countries differ significantly both in the scale of developing green segments of economy, in the levels and nature of green investment influence on the economic growth and in their institutional support. The tendencies of permanent intensification or local weakening of the policy of green economic growth are developed in a certain social context that includes the interaction of different entities on forming and developing a green economy, as well as a set of certain sub-processes with specific ways and results of this interaction.

Countries can react in different forms – from certain actions on greening the national economy by following the chosen path of development, to significant changes in certain political spheres that are accompanied by shifts in socioeconomic conditions, public opinion, governing and other subsystems. The research was aimed to discover a social context of developing the green economy in Russia and Latvia and to identify the role of the local communities’ environmental identity in this process. Herein, the authors interpret “environmental identity” as a whole variety of means that serve to a person or a group for identifying themselves towards the environment and the processes of changing environmental conditions of the area they live in. Environmental identity is characterized by common environmental interests, close environmental values and ideas, norms of interaction with the environment and common ways of choosing actions in making environmental decisions. The economic dimension of environmental identity distinguishes itself due to the fact that people prefer actions which maximize profitability under the conditions of certain norms and social categories.

In terms of methodology, the research is based on the sustainable development theory that stresses the importance of social context of transition to environmentally-oriented development, as well as the methods of identity economics that highlights the role of identity for developing collective actions and overcoming negative effects of social dilemmas and that determines norms and objectives of people’s economic behavior.

The research empirical basis is results of expert interviews and social research which were carried out by the authors in Russia and Latvia, as well as statistical and other data.

The research main hypothesis was that wide diffusion of green economy practices could not take place beyond a certain social context that creates a social request of local communities for benefits related to the green economic growth; being a strong source of motivation for making economic decisions, this diffusion creates a demand and offer in the market of green goods and services. The research results allowed for identifying a set of common factors which form and support environmental identity in both countries. One of these factors is a “sense of place”, i.e. belonging to a certain region, its natural and social environment that intensifies the desire for living and working for the local community benefit. Moreover, a territory itself can be an environmental article that may be promoted for attracting investors in order to develop a specific environmentally-oriented economic complex, e.g. the ecotourism industry. Despite the significant differences in cultural and behavioral patterns as well as in social experience of members of the local communities, the feeling of environmental identity is based on both objective natural features of the area and integrated subjective realities in all dimensions of life.
An important element of forming environmental identity is environmental literacy, knowledge of ecology (at least at a general level) and clear ideas about the principles of ecosystems functioning. Environmental identity often becomes actual when natural disasters, accidents and unfavourable environmental conditions emerge. In this case, people realize the importance of nature and their own dependence and weakness in comparison with the natural forces. Almost all the environmental risks accelerate constructing environmental identity that is often based on a one-way protest, e.g. against deforestation, urban development of greenfield areas etc., though the community members’ readiness for collective actions in order to optimize environmental, economic and social interests spreads even wider, forming specific environmental identity.

Actualizing environmental identity also takes place in the context of observing certain socioeconomic norms. Just as social identities that are formed in the interaction with social groups and key agents of identity, environmental identity is intensified as a result of communication with people that already have it. An important way of forming environmental identity is holding a position in the sphere where this type of identity is welcome or required. It can be employment in environmental activism or consulting, environmental sciences or education. Environmental identity is also formed in the nonprofit sector, social entrepreneurship and in green economy sectors.

Based on the conducted research, the authors mark out several effects of environmental identity influence on economic behavior.

A social effect is based on normative ideas about the necessity of healthy eco-friendly lifestyle, methods of environmental education and upbringing that integrate the necessity of protecting and preserving the environment into the consumers’ value system, as well as of green marketing technologies that include meeting environmental standards; it is also conditional to observing conventional norms of behavior and choosing goods and services which are the least affected by external factors. Rising income level and life quality promotes the social effect, as green goods or services are often qualified as normal or even superior goods.

A speculative effect is related to the consumers’ expectances when they realize the threat of health loss or possible financial losses and start consuming green goods (e.g. water treatment equipment or solar batteries) for meeting a basic need for safety. Applying direct or indirect regulation methods that are used by the government (such as different types of preferences for manufacturers and consumers) can intensify this effect significantly.

An important question is why there are a lot of cases when the environmental identity that was formed and is expressed in careful attitude towards environment, preservation of local traditions of natural resources management and commitment to local eco-friendly products does not stimulate local communities’ demand for development of environmental technologies and production of green goods and services.

In our opinion, the answer lies in consumers’ limited rationality caused by high transaction costs of seeking information in the market of green goods and services as well as by the existing economic stereotypes and indifference to novelties. Ambiguous parameters of “environmental friendliness” of many green goods and products also cause additional preconditions for increasing transaction costs when assessing quality of goods and services. It seems that advance in a rationality level requires wider application of methods for environmental certification and standardization, ecological assessment and rise in the level of general environmental literacy and culture.

**P15**

**Re-shaping global change science for the 21st century: young scientists’ perspectives**

**Thomas Schinko**, **Edoardo Borgomeo**, **Mikko Dufva**, **Lukas Figge**, **Fabian Schipfer**

Pondering the crisis that faced humanity following the unleashing of the atom, Einstein remarked, “a new type of thinking is essential if mankind is to survive and move towards higher levels”. Now well into the 21st century, humanity is faced with even more grand challenges, currently culminating in a multi-faceted global crisis involving the economic and financial system, the climatic system and other ecological dimensions, the energy system, and the distribution of wealth and capabilities. Due to the fact that over the last few decades the human population has increased so significantly and the socio-environmental system has become so much more complex, this trans-dimensional crisis appears more difficult to tackle than the challenges of the last century. Reflecting on these modern-day challenges, we have come to the simple, yet transformative, conclusion that ‘global change science and research’ needs to evolve further towards true systemic trans-disciplinarity if it is to really make a significant contribution towards addressing these challenges.

Following a survey of approximately fifty PhD researchers from a wide range of cultural and disciplinary backgrounds, on what they considered to be the most contentious issues facing humanity in the years ahead, we were able to collate and consolidate their responses as follows:
- Planetary boundaries and resource constraints
- Adapting to changing environments
- Dealing with conflict
- Re-defining quality of life

We tackled these questions in a workshop with a group of about twenty young and senior scientists. The outcome of the workshop was not a list of answers but the realization that global change science and research are only a part of the larger socio-environmental system. Three specific guidelines emerged, which we suggest researchers should consider if they want to conduct global change research that really matters for the future of humanity:

(1) Be aware that your research is part of the larger socio-environmental system - connect and relate to the bigger picture!
(2) Accept that controversy is a given and that it is essential for reaching robust science-based solutions – engage with tensions within the societal system
(3) Be more reflective about the normative assumptions underlying your research – you are part of the socio-environmental system and have a specific view on it!

We argue that in order to implement the guidelines listed above, there needs to be a radical shift in global change scientists’ mindsets and practices towards a more transdisciplinary, holistic and systemic understanding of their research. We propose, in other words, a systems view of science, whereby research is seen as only one aspect of the socio-environmental system, and is connected through a multitude of feedback loops directly and indirectly to other aspects of the socio-environmental system (e.g. research and societal decision making).

Implementing a systems view of global change science would require a big leap forward: moving from interdisciplinarity to transdisciplinarity to real-systemic-transdisciplinarity. If interdisciplinary research was about bringing together different scientific world views, then transdisciplinary research is about embracing the broader societal controversies; whereas a systems (intelligent) view can be seen as embracing feedbacks, socio-environmental contexts and uncertainties while still being able to act.

By broadening the horizons of (young) scientists, we are confident that truly systemic research can provide more robust policy advice than traditional, monodisciplinary or pseudo-interdisciplinary research, and inform the development of strategies to address the four big questions detailed above. Moreover, the continuous and iterative integration of new (scientific) evidence, generated in a discursive research environment, prevents society from entering undesirable path dependencies, thus allowing for more robust decision-making. Within this context, global change researchers have to both consider the transformations that are currently taking place, and, in order to safeguard our future, pro-actively engage with those big transitions that are yet to come.

But how can we as a global change research community engage in transdisciplinary research so that the outcomes will have a positive impact on humanity’s future? We argue that following the guidelines above, the global change research community would necessitate taking action at different leverage
points: (1) improved education of global change scientists, by which we are not simply referring to an increase in inter and transdisciplinary training and education, but much more: universities around the world would have to provide the kind of environments that, in addition to nurturing students’ cognitive and academic skills, also taught them interpersonal skills, empathy, and the ability to listen to and understand both each other and other stakeholder groups within the broader societal system. This is closely related to our second entry point (2): research practice. Part of the challenge of doing inter- and transdisciplinary research is that, based on their individual scientific education, natural and social scientists often use very different language and have very different world views. Hence, before conducting any kind of systemic-transdisciplinary research, resources have to be made available for finding and developing a common language for the different stakeholders involved. Working with metaphors or narratives could be one way of opening the discussion and overcoming these differences through language. At a third level for intervention, (3) the current professional research environment, which today seems to be more set up for disciplinary careers (e.g. in order to establish yourself professionally you publish in prestigious specialist scientific journals), needs to be reshaped, such that it allows young scientists – particularly in the global change research domain – to foster their systemic-transdisciplinary research without compromising their scientific careers. Transforming current global change research into a truly systemic-transdisciplinary endeavour would also trigger transformations in the broader socio-environmental system, as well as the overarching global environmental landscape. However, this chain of causation is by no means unidirectional; rather, the three (sub-) systems mutually affect each other in multiple ways. This strengthens our argument for employing a truly systemic transdisciplinary approach in global change science and research, and by doing so making a substantial contribution towards re-shaping our future.

P16
Wellbeing in time of austerity and Nordic welfare state
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The economic growth has been presented as a necessity for the Nordic welfare state. The Nordic welfare states are more equal societies than many others but they consume resources too much. Understandable economic growth cannot be infinite in the finite globe. Luckily, wellbeing doesn’t always systematically grow along with economic growth. Yet, the economic growth is presented as it would bring wellbeing for all. Less asked question is what kind of wellbeing Nordic welfare state supports and could it be more sustainable? In the paper, the focus is on social work as a public service of the welfare state.

As a public service social work is a part of the Nordic welfare state. The aim of the public services is to increase wellbeing or at least bring some support and help in difficult times. In our research, the aim was to clarify what the comprehension of the social services is about wellbeing. The research question was twofold. Firstly, how social work supports the wellbeing of the social assistance recipients? Secondly, what are the possibilities to promote socially and ecologically sustainable social work in Finland? Well-being was understood as a complex and relative research object. The theoretical framework based on Erik Allardt’s categorization of wellbeing. According to him, wellbeing basically includes three categories: Firstly, living standards (having), secondly, some meaningful social relationships (loving) and thirdly, the possibility to be herself or himself (being).

The data collection was carried out as part of the larger research project of National Institute for Health and Welfare (THL). We used the interviews of the clients as research data. Six group of the social work clients were interviewed by the researcher of THL in different part of Finland. The sizes of the groups varied from three to seven people. Total amount of interviewed were 29 clients. The main themes were 1) the task of the social work and social assistance 2) being a client in the social services 3) where to find services needed and 4) experiences from other services than social work.
As the interviewees were people who were on income support it is not surprise that having category appeared to be dominant. Indeed, it is an important category as it sets the standards for need covered by the public sector. Necessary needs to fill are defined in the guidelines of income support. The coverage of support changes in time (e.g. mobile phones, access to internet). However, the clients’ experiences were that social work focused mostly on the having category despite the fact that the other categories were essential to wellbeing as well. Especially interviewees without social networks felt social workers as important and necessary social contacts. Parents were afraid that their children suffered the stigma of poverty and social assistance. For many clients, social relationships brought support that helped cope with everyday life. Almost every interviewee was willing to work but a suitable job was not available. They were stuck to being on income support. In practice, this meant that clients had to participate some activation measures or otherwise an amount of income support could be lowered.

It could be possible to learn from people who use resources with ingenuity. In any case, it should be clarified how to support people without the stigma. In Finland, strong focus in case work doesn’t help as it formulates social problems (e.g. unemployment) to individual’s problem. Lack of understanding about the complexity of wellbeing in the social services is problematic. Strong economic growth is unexpected and consumption is already on an unjust level from the angle of global perspective. The bright side is that better comprehension about wellbeing in social work and social policy can produce better outcomes for the clients, society and nature.

Indeed social work is just one service in the welfare state. However, the detailed analyses showed that social work do not support the wellbeing of clients as it should. Nowadays social work as public service seems to continue or to maintain unsustainable idea of the necessity of economic growth. This endangers the legitimation of the Nordic welfare state. In any case, Nordic welfare state needs to be reformulated in a style that it can offer support for wellbeing in a sustainable way. Basically, this means institutional change which is not possible if the idea of wellbeing is not considered in the global context. On the other hand, sustainable future should appear intriguing in order to be legitimated. The Nordic welfare state has produced security for the majority and produced general trust in society. These good qualities should be secured in the future.

P17
Transferring Williamson’s discriminating alignment to the analysis of environmental governance of social-ecological interdependence

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Institutional fit is operationalized by transferring transaction costs economics (TCE) to the analysis of instances of social-ecological interdependence that are embedded into Social-Ecological Systems (SES). The instances we look at re-allocate costs and benefits resulting from people’s deliberate or unintended actions. We conceptualize them as “nature-related transactions”; yet conventional environmental economics denominates such effects as externalities. We see the application of TCE to nature-related transactions as a starting point for developing a theory on how specific features of these interdependencies align with structures of environmental governance. While our analysis of governance of nature-related transactions is strongly inspired by conventional TCE, we carefully spell out the differences with conventional TCE and outline analytical steps based on discriminating alignment that enable a TCE analysis of environmental governance of nature-related transactions. The
approach allows us to construct a broader range of hypotheses about suitable governance structures, avoiding the notion that markets would always be the best way for regulating these effects.

In applying TCE to nature-related transactions, we argue that characteristics of nature-related transactions can be subsumed under the core categories of jointness, uncertainty, asset specificity, frequency, rivalry, excludability, and social-related distance. The choice of some of these categories is clearly inspired by SES thinking, allowing us to add important key dimensions when transposing conventional TCE – which very much focussed and still focusses on issues of industrial organisation – to nature-related transactions. These categories include jointness in production, considerations about the types of goods and services, and physical and social-related distance. With this range of characteristics of nature-related transactions, we are able to explain governance structures in contexts where newly emergent social-ecological interactions are to be regulated, testing the hypothesis that governance structures are aligned with characteristics of nature-related transactions in a discriminating way.

Benefits of this approach include its generating a rather narrow list of descriptors of instances of biophysically-mediated interdependence – compared to quite a few other, much more comprehensive and detailed frameworks analysing SES –, and relating it to one evaluation criterion: cost-effectiveness. The TCE of nature-related transactions thus identifies sets of stylized contextual factors and aspects related to the governance of hazards of ex-post opportunistic behaviour that cut across scales. They can be used as composite descriptors that facilitate analysis of complex multi-scalar arrangements of natural resource governance. Finally, by introducing the concept of ‘governance challenge’ and distinguishing it from other sets of intervening contextual factors, we argue that the approach of applying TCE to nature-related transactions can provide a useful, pre-structuring device for building a research program based on a typology of governance challenges and their relation to specific contextual settings and performance criteria and their implications for the transaction costs of addressing them.

In this paper, first, we review TCE, focusing on the concept of discriminating alignment, and then present the literature transposing it to nature-related transactions. Subsequently, we elaborate our approach to resolving some of the critical aspects of this transposition. We then operationalize our analysis of governance of nature-related transactions. For this, we outline analytical steps that take into account a consolidated set of core characteristics of transactions that matter specifically to nature-related transactions. We illustrate the approach through the example of wolf management in Upper Lusatia, Germany. Here, we found that, due to the bilateral monopoly between the state and private actors transacting a public (biodiversity) and a private good (e.g., livestock), problems of measurability and uncertainty, a disposition of private actors towards culling of wolves, and the need to cater to public acceptance of wolf protection has led to a form of hierarchical governance prohibiting the killing of wolves which is embedded in a polycentric, hybrid governance structure concerning its monitoring and sanctioning. This governance structure re-structures nature-related transactions by minimizing opposing incentives between livestock owners and the state. It minimizes the need for monitoring of the ban and provides incentives for the co-production of monitoring of the legitimate application of compensation payments.

P18

Fifty shades of green: Revisiting decoupling by economic sectors and air pollutants

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Using a consistent dataset for eighteen EU countries, six economic sectors, and six pollution indicators, we analyze decoupling of production–based emissions from GDP growth from 1995 to 2008. Computing decoupling factors as defined by the (OECD, 2002), we find that in almost all sectors and by almost all pollutants the median EU country had at least some decoupling. However, considerable heterogeneity in its magnitude can be observed across countries, sectors, and pollutants. For most
pollutants and sectors, median decoupling performance improved from 2001–2008 compared to 1995–2001, while between-country disparities increased simultaneously. In a second step, we investigate country-level changes in decoupling states between the two sub-periods based on (Tapio, 2005). We find high diversity across countries and over time. To explain these differences across countries and sectors, we assess the impact of environmental policy stringency, and find tentative evidence that stricter policy encourages decoupling, however the effects are small and imprecise, differ by economic sector and pollutant, and take several years to materialize.

P19
The influence of Green Infrastructure on Urban Resilience in Greater London
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High population densities and diverse economic activities in urban areas create social issues as well as a range of environmental impacts including air pollution, soil contamination, loss of biodiversity and health problems (Alberti et al., 2003; Dobbs, Escobedo, & Zipperer, 2011; Grimm et al., 2008). Many of these impacts are linked to urban climate conditions, which are dynamic and likely to change over coming decades as global climate envelopes shift their distribution and characteristics. The formation and growth of urban areas generally depend on the expansion of human migration from rural areas to urban areas, and urban population increases from differences between birth and mortality rates (Gaston, 2010). Yet the main driver for such movement comes from economic variables (Francis & Chadwick, 2013), and the speed of urbanisation mainly depends on the level and pace of economic growth. For instance, people tend to move from rural areas to urban areas in pursuit of more opportunities for better living and working conditions as well as higher income. As a higher density of population and more active economic activities occur in urban areas, the city becomes a megacity, in which a total population exceeds ten million people.

In this situation, the concept of urban resilience has started to be used so as to increase the capacity of the entities and players to adapt to rapid changes. Resilience is defined as the magnitude or amount of disturbance a system can absorb before it radically changes into a different state as well as the capacity to self-organise and the capacity for adaptation to emerging circumstances (Adger, 2006; Berkes, Colding, & Folke, 2003; Folke, 2006; Francis & Chadwick, 2013). According to Folke (2006), resilience is an advanced concept indicating ‘the dynamic development of complex adaptive systems with interactions across temporal and spatial scales’. Urban ecosystems are regarded as complex adaptive systems as there are complicated interactions between human and the natural environment in the socio-ecological system.

In urban ecosystems, urban green spaces play a pivotal component for increasing urban resilience. They incorporate street trees, public parks, gardens, lawns, allotments, urban forests, cultivated land, brownfields and wastelands, wetlands, lake/sea, and streams (Bolund & Hunhammar, 1999; Francis & Chadwick, 2013). They are arenas for preservation of flora and fauna and increase in biodiversity in urban ecosystems (Bolund & Hunhammar, 1999). Urban green spaces are found in all cities but are particularly common in Europe, taking up from 2 per cent to 46 per cent of urban areas (14 per cent in UK) (Francis & Chadwick, 2013). Urban forests contribute to eliminating air pollutants (e.g. sulphur dioxide, nitrogen oxides, ozone, carbon monoxide and particulates), which is crucial for megacities which experience rapid urbanisation and industrialisation (Jim & Chen, 2009). Tree shading- and evapotranspiration-cooling effects are typical examples in the literature on influence of urban forests on local microclimate (Dwyer & Miller, 1999). In terms of water regulation service, street and park trees can have the value of runoff reduction, which leads to minimisation of erosion and stream sediments as well as higher ecologic scores in urban areas with tree canopies (Mahon & Miller, 2003). Urban vegetation is a crucial component in providing supporting service (e.g. photosynthesis) in urban ecosystem, but it only sequestrates small amounts of carbon dioxide concentrations of a city (Niemelä et al., 2010) if there are single vegetation species planted (particularly with low capacity for
sequestration), or disconnections between open spaces. As well as higher connectivity, there should be proper choices of tree species as well as better management and maintenance by keeping their mortality lower (Strohbach, Arnold, & Haase, 2012), along with more creation of green spaces (particularly shrubs rather than herbaceous plants or grasses).

Greater London has the London Plan which is a comprehensive strategic plan covering economic, environmental, transport and social issues in the mega city over the next 20-25 years (GLA, 2011). This plan has six objectives, and four out of these are in a direct relation to green infrastructure. Since the initial release of the London Plan in 2004, there have been updates twice in 2008 and 2011, given that the population will continuously grow in the city as well as increasing economic, social and environmental issues. Under the condition, the relevance of urban open spaces and several socioeconomic indicators should be examined so as to provide researchers and policy makers with the information or data for managing green coverages in some areas.

The correlation analysis of two quantitative data such as open space and socioeconomic data of Greater London was conducted with SPSS. The data for open spaces in Greater London was gained through Greenspace Information for Greater London (GiGL). The data was converted from vector to raster in Geographic Information System (GIS), so as to calculate landscape metrics for open spaces in Greater London through a spatial pattern analysis programme, FRAGSTATS 4.2. The socioeconomic data was obtained from “London Borough Profile”, London Datastore. In addition, data on total carbon emissions from Industry and Commercial, Domestic, Transport, LULUCF Net Emissions, and per capita emissions were gained from UK local authority and regional carbon dioxide emissions national statistics: 2005-2014 released from Department of Energy and Climate Change. The indicators from open spaces are total area of open space and patch density or contagion of open spaces. The latter indicator allows to figure out the level of fragmentation of open spaces. The socioeconomic indicators cover number of jobs by workplace, jobs density, crime rates per thousand population, and several wellbeing indicators such as life satisfaction, worthwhileness, happiness and anxiety.

The correlation outcomes can be divided into three levels such as Greater London as a whole, and Inner and Outer London. In Greater London as a whole, total area of green spaces has a strong relation with crime rates, and a less strong relation with number of jobs. Both socioeconomic indicators showed a negative trend along with the increase of open spaces. In terms of wellbeing indicators, the positive trend of life satisfaction, worthwhileness and happiness, and the negative trend of anxiety can be found in accordance with the increase of green coverage. In Inner London, job density and crime rates show a negative trend in accordance with the expansion of total open space areas. And as contagion of open spaces is higher, the indicators of number of jobs, jobs density, and crime rates also showed an increase tendency. As for worthwhileness and happiness, it also showed a substantial correlation with contagion of open spaces. In Outer London, the correlation between job density and crime rates, and open space cannot be found, but the wellbeing indicators such as life satisfaction and worthwhileness show an increase trend along with larger green coverage.

References
The potential role of an unconditional basic income in a sustainable and just economy

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1 Introduction

The existence of planet boundaries likely enforces degrowth of the current global economy in the future. Pursuing a human transition into the state with new economic constraints requires a redistribution of wealth to some degree. A minimum target should consist in enabling a living above the subsistence level for all humans. This is an ambitious aim which could be in contradiction with physical reality. However, humanistic reasons obligate to act in this way. A possibility to approach this goal is to introduce a basic income which guarantees consumption above the subsistence level. Essentially, three kinds of basic income could be conceivable. The first one is the unconditional basic income (UBI) which will be paid out to every member of the economy regardless whether he or she receives other incomes or has assets. The second one is the means-tested basic income. The economy member receives the basic income only if he or she has no other income of the same amount and has only assets below a certain tax exemption limit. The third possibility is to connect the means-tested basic income with an obligation to supply labor if demanded. The latter type of basic income is already installed in many economies of the industrial nations. Due to the high amount of wealth in industrial nations it is even conceivable to install an UBI above the subsistence level without risking a collapse of the economy. However, it is not clear if an UBI can be realized in less prosperous economies. An UBI that is not much smaller than the social product per capita could reduce the labor supply in a destabilizing way. The present study addresses with a simple model the limitations of the UBI in a probable future economy with reduced production.

2 Model

The possible impact of an UBI is studied within a simple static economic model. It divides the economy in the aggregates households, firms and state. The monetary cycle comprises sales pC, wages wN, profits P, tax T and basic income B where p denotes the price, C the real consumption, w the wage rate and N the supplied labor volume. The model has some similarity with the static model by Green (1968)
which describes the effect of negative income taxation. However, in the present model the UBI is transferred via a sales tax. Savings of households, investments in firms and issuing of loans are neglected so that the model rather represents the economy in the short term. Therefore, the following monetary budgets hold at equilibrium for households, firms and state

\[(1) \quad P+wN+B-pC=0\]
\[(2) \quad pC-wN-P-T=0\]
\[(3) \quad T-B=0\]

Firms organize the production of goods and offer services. Both are summarized by the social product $Y$. The laborers supply the labor which is necessary to provide the social product $Y$ which is simply related to the labor volume $N$ by

\[(4) \quad Y=C'N\]

where $a$ denotes the output elasticity and $C'$ the productivity. The labor volume has been scaled in such a way that $N=1$ represents the value where all labourers work at the maximum possible amount. Then, the social product just takes the value $C'$. Furthermore, $Y=C$ holds since investments are neglected. The consumption in turn is divided into basic consumption $C_{\text{min}}$ covered by the UBI and the additional consumption $C_{\text{plus}}$ so that

\[(5) \quad Y=C=C_{\text{min}}+C_{\text{plus}}\]
\[(6) \quad T=B=pC_{\text{min}}\]

Households maximize their utility $U$ in this simple model. It is a function of consumption $C$ and labor $N$:

\[(7) \quad U=\frac{4[d(N-1)^2+1-N^2]}{(2-d)^2}C\]

where $d$ denotes the propensity to work and $g$ the elasticity of utility with respect to consumption. The propensity to work is a parameter that determines the amount of labor where utility maximizes for a given consumption. The idea behind the introduction of this parameter is that people might see some benefit in providing a small amount of labor for free because labor may act as a mean to integrate into society. Utility maximizes at $N=0$, $N=0.2$ and $N=0.4$ for $d=0.2$ and $d=0.6$, respectively. Utility vanishes at $N=1$ due to the high work load that does not leave room for enjoying the consumer goods. Extremal utility results by taking the derivative of $U$ with respect to labor $N$ and setting it to zero. Assuming constant UBI, real wages, and real profits in the calculation is reasonable since households do not speculate that their individual preferences have any impact on macroeconomic quantities.

Wage, profit and price depend on consumption and labor. Assuming a mark-up $q$ for the profit gives the relation

\[(8) \quad pC_{\text{plus}}=wN(1+q)\]

and by inserting the production function one obtains the real wage

\[(9) \quad \frac{w}{p}=(C'N - C_{\text{min}})/N(1+q)\]

Then, setting the derivative of $U$ with respect to $N$ to zero and substituting (8) and (9) leads to a polynomial equation.
The solution describes an economic equilibrium in which households have extremal utility. The equilibrium state depends on the ratio $C_{\text{min}}/C'$, the propensity to work $d$, the ratio $g/(1+a)$ and the output elasticity $a$. The ratio $C_{\text{min}}/C'$ measures the real consumption based on UBI in relation to the maximum possible consumption. A high $C_{\text{min}}/C'$ is not necessarily associated with high minimum consumption since the economy can be underdeveloped. On the other hand, a low $C_{\text{min}}/C'$ can already guarantee living above the subsistence level in an economy with a high degree of economic development. The ratio $g/(1+q)$ is a measure for marginal utility of consumption and it solely determines $N$ in the case where $C_{\text{min}}=0$ and $d=0$.

3 Results
The polynomial equation can only be solved with a numerical method but the result can be interpreted qualitatively. For $d=0$ the numerical analysis leads to a so-called Laffer curve (Laffer 2004). A Laffer curve has been displayed by Veen and van Parijs (1986) in the context of UBI (see their Fig. 1). This curve shows up in the diagram where $C_{\text{min}}$ is plotted against $C_{\text{min}}/C$. The first is the real UBI while the latter variable can be seen as the nominal value of the UBI. With increasing $C_{\text{min}}/C$, $C_{\text{min}}$ increases too but starts to decline beyond a critical $C_{\text{min}}/C$ value in the so-called “prohibitive range”. The decline happens because the curve displaying the social product $C$ as a function of $C_{\text{min}}/C$ has a negative slope. Consequently, the introduction of an UBI has a degrowth effect and should for this reason be of interest in ecological economics. The highest Rawlsian social welfare results at the maximum $C_{\text{min}}$. This maximum has also another meaning because the economy becomes unstable for higher $C_{\text{min}}/C$ values. The instability arises from a change of sign from negative to positive derivative of marginal utility. In the positive case the marginal utility increases (decreases) with increasing (decreasing) labor supplied which means that the utility function becomes a minimum in the “prohibitive range”. Consequently, the degrowth effect of UBI is limited and other measures are necessary to lower the consumption further if intended. The additional problem of a maximal $C_{\text{min}}$ below the subsistence level could arise in economies with low technical progress $C'$. With existing propensity to work ($d=0$) the maximum of $C_{\text{min}}$ attains a higher value that would lessen the latter problem. However, the social product is also larger at this maximum so that the degrowth effect is more limited. For a large $d$ the UBI $C_{\text{min}}$ can even get higher than $C$. This would mean that people are willing to pay for providing work. However state seems unrealistic nowadays.

4 Discussion
The introduced simple model predicts a decline of aggregate consumption with an increasing UBI. Therefore, the introduction of an UBI would support degrowth. Furthermore, the inequality would decrease as productive society members would support less efficient ones by a redistribution tax. However, the approach has a limit beyond which the economy becomes unstable. The reason is that people who work claim an additional “gift”, namely $C_{\text{plus}}$. If $C_{\text{min}}$ comprises the most essential goods and services to live above the subsistence level, $C_{\text{plus}}$ can be seen as superfluous from a radical ecological viewpoint. On the other hand, countries with low technical progress can possibly not offer an UBI above the subsistence level at all. An economy with an intermediate performance where the maximal $C_{\text{min}}$ is just above the subsistence level would result in a very small $C_{\text{plus}}$ and would be optimal from an ecological-humanistic point of view. On the other hand, the UBI could be out of reach in poor countries. In this case a basic income could be combined with noncommercial obligatory labor that is exclusively devoted to the production of subsistence goods. Then, the market economy has a socialist core that can expand or shrink depending on the present economic state.

This study did not address inequality since the model only considers aggregated quantities. Yunker (2013) analysed the UBI in an equilibrium model that includes 20 heterogeneous households. He also found a decrease of aggregate consumption and detected a decrease of inequality. Possibly, additional insights can be gained by extending the model to multiple households and firms. Introducing an UBI can only be understood as a potentially useful additive for shaping a sustainable economic system. Other measures that were not discussed here are necessary to overcome the inherent instability of financial capitalism (as e.g. mentioned by Minsky 1992).
CO2 emission profiles for mobility behavior in Austria

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Mobility is essential for high quality of life in modern times because it enables people to access labor markets, goods and services and enjoy recreational activities. However, transport is a major contributor to local and global environmental pollution. Hence, major efforts are required to achieve the EU climate goal of 80% CO2 emission reduction by 2050. The transport sector is of special interest in Austria because it is a major contributor to the nationally generated greenhouse gas emissions with a share of about one quarter of GHG generated in Austria. In addition, it has been reported that on average every fourth way in Austria is related to work. Hence the provision of sustainable mobility solutions is essential for prosperity and a low carbon society.

This paper aims to assess drivers of transport-related CO2 emissions based on a household survey and is driven by the following research questions: Which mobility-related CO2 emission patterns can be observed in Austria? To which extent are mobility-related CO2 emissions driven by household characteristics and structural factors? Our analysis is based on a representative (web-based) Austrian household survey (1449 observations) which has been conducted in February 2013 for the EU FP7 project DEFINE (Development of an Evaluation Framework for the Introduction of Electromobility). The survey provides information on typical mobility behavior such as trips to work, most often travelled trips and annual car usage.

We developed two indicators to assess CO2 emission profiles for Austrian households. The first indicator describes CO2 emissions for trips that are travelled most often and is based on the trip distance and energy intensity of the chosen transport mode. Means of transport include non-motorized transport modes such as walking and cycling, motorized private transport (car, motorcycle) as well as public transport (bus, train, underground and tram). The second indicator illustrates CO2 emissions for annual car usage based on annually driven kilometers and vehicle characteristics (e.g. fuel economy). Multivariate analyses permitted to test the effects of socioeconomic characteristics, behavior and preferences of households on CO2 emissions. In addition, another focus of analysis laid on the effect of agglomeration size on mobility and CO2 emission pattern. The understanding of both household-specific and structural factors as drivers of mobility is important in order to incentivize and transform the current transport system into a more environmentally friendly one.

Statistics of the survey indicate that the share of walking as main transport mode for a trip decreases sharply after the trip distance exceeds one kilometer. In addition, the use of underground and tram services remains relatively constant up to 10 kilometers of travelled trip distance and then decreases. Already for main trip distances of above one kilometer on average over 50% of the interviewed persons use private transport modes.
Our results show that the size of a city, work status and income are the most important factors in determining mobility induced CO2 emissions. Relating to annually driven kilometers, gender adds explanatory power since men drive more often and over larger distances. Also educational status becomes relevant as higher educated people tend to travel by car more often. Persons living in rural areas have a higher CO2 emission profile than people in urban areas because typical trips are longer. In general, persons living in larger cities tend to have lower CO2 emissions because availability and actual use of low carbon transport modes (public transport, walking, cycling) become more common. The results based on propensity score matching reveal that commuter allowances positively contribute to a person’s CO2 emissions for main trip behavior. Moreover, a positive environmental attitude does not directly affect CO2 emissions generated by mobility in general.

To conclude, long-term spatial planning should include enterprises and the private sector in the development of sustainable mobility concepts since the majority of persons indicated that their main trip is related to work. Next to household-specific drivers, external factors such as population size, availability of infrastructure and public services shape significantly CO2 emission profiles of households. This paper contributes to the understanding on the interrelationship between both socioeconomic and structural drivers of mobility patterns which is necessary to drive behavioral change. A combined analysis of socioeconomic and spatial patterns informs urban and regional policies for effective low carbon mobility solutions.

P22
Recoupling land and strategies in the bioeconomy to fulfil human and societal needs in a functionalist approach
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Without fertile land, clean air and water, healthy forests as well as a certain proportion of protected natural area, a good life, not even ‘a’ life, is possible. Functioning ecosystems are fundamental for economic strategies to fulfil basic human needs with products and services such as food, construction materials, textiles, medicines and energy, as well as to provide us with a space for recreation, recovery and creativity.

The 20th century can be characterised as the fossil fuel era which resulted in a perceived relaxation of our dependency on physically limited resources such as land. More recently, however, the concept of a bioeconomy re-emerged as a strategy to mitigate climate change, to reduce fossil fuel dependencies, to prevent food scarcities, to store carbon and to support struggling rural areas, among other promises. However, an ambiguous physical capacity of land resources, land related greenhouse gas emissions, large terrestrial biodiversity losses, overconsumption of food, generally low income levels in agricultural and food sectors and a growing dependency on cheap biomass feedstock from tropical regions towards western societies, in particular the EU, leads to the following research question: Is a bioeconomy capable of increasing its societal contribution in modern societies such as the EU, while respecting safe environmental boundaries?

In order to answer the question, we take a human needs perspective on the functions and role of land as a fundamental resource for the social foundation and the bioeconomy of a modern society. With respect to fundamental human needs (f.i.Max-Neef 1991) such as subsistence (food, water, energy and shelter) and protection of nature, oneself, the current and the future generations depend fundamentally and structurally upon natural resources available and accessible for each global citizen (Folke et al. 2011, Raworth, 2012). This dependency is also recognised as a societal need for sustainable development, both at the domestic and at the global level, and included in the UN sustainable development goals (UN, 2015). However, socio-ecological perspectives generally adhere to the worldview where the global society ‘lives’ in a finite resource environment, meaning that material stocks, including land, are limited and that human pressures on natural ecosystems should be minimized in order to safeguard their functioning (Costanza et al. 1997, Daly 1992).
In this paper, we take a functionalist approach, as opposed to a market approach, to be able to model complex ecological mechanisms linking land resources and societal strategies to fulfil human needs in a modern society. By taking such a functionalist perspective, we show that productive land resources can be considered the most fundamental need of any society, both for its stability and for peaceful development, as well as for warfare (a.o. Carneiro, 1970). Furthermore, by taking a long term perspective, it is shown that the functional link between physical resources, human needs and societal strategies have largely been loosened in the fossil fuel era, leading to a pattern of overconsumption and, as a consequence, inefficient land use in modern societies. The functionalist approach allows us to re-establish the link between human needs, societal strategies (bioeconomy pathways) and resource use (land) in a modern society as a prerequisite to increase resource use efficiencies by the bioeconomy embedded in society. Furthermore, by using empirical databases on the environmental impacts of consumption and production, adverse environmental impacts can be modelled at both the domestic and global level. Our approach develops towards a notion of socio-ecological efficiency which can be optimised in strategies that enhance the role of the bioeconomy in society while reducing environmental impacts. The results will be presented in a comprehensive indicator framework that allows a modern society to manage land resources in a social contract between stakeholders, aiming at strengthening both its own social foundation as well as that of other societies.

P23
Shrimp Export from India to the global North: A Case for Ecologically Unequal Exchange
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Decisions regarding land use are complex and involve many social, economic, institutional, political, environmental and financial parameters. Recent research indicates that many of these decisions are not made locally; rather distal drivers provide the fundamental reasons for land use change patterns (Young et al., 2006).

Shrimp aquaculture is one such activity with high levels of land use change. In many third world countries, either the critically endangered mangrove forests are converted to shrimp ponds for commercial aquaculture, or agricultural plots of rice or paddy which sustain local, often indigenous population are transformed for shrimp farming (Ali, 2006; Chopra et al., 2009; Gerber et al, 2009). This is primarily because of the potential of high foreign exchange earnings of shrimp aquaculture, which has led to its promotion by governments, international institutions and businesses acting as distal drivers of this land use change, while dismissing the harmful local environmental and social costs.

India, with a coastline of more than 7,500 km has a booming commercial shrimp aquaculture industry. In the last decade alone, there has been manifold increase in foreign exchange earnings from seafood export, from 1425 million US$ in 2002-02 to 5008 million US$ in 2013-14. Shrimp constitutes approximately two-thirds of seafood export from India (Government of India, 2014). The majority of this is exported to the countries of global North, viz. countries of North America, the European Union and Japan. This change in land use resulting from trade to the global North has given rise to many conflicts and grassroots resistances, across coastal India.

This research aims to look at the ecological distribution conflicts from an ‘environmentalism of the poor’ (Martinez Alier, 2003) perspective, which arises as a result of the ecologically unequal exchange (EUE) (Hornborg, 1998) of commercial shrimp trade between India and the global North. Ecological distribution conflicts are struggles over natural resources, and accompanied by inequalities and injustices (Martinez Alier, 2009)

I identify three key features accompanying cases of EUE after a literature review. Using these three features, I make the case of EUE by providing evidence in the Indian shrimp aquaculture context. Firstly, the distal drivers originating in the global North shape the land use change patterns. Secondly, the costs and benefits of this trade are unevenly distributed. Thirdly, such non-balanced trade is
accompanied by protests and resistances due to large human rights violation and environmental
degradation. In order to prove the above, I capture the flow of material and energy required in the entire process
of shrimp aquaculture. This shows the conflicting points which result in resistances. I show the trade
patterns of shrimp aquaculture, both production and export, of the last twenty years (1996-2016) from
the Handbook of Fisheries Statistics. I also document voices of resistances and protests from across
the country. Protests in India have also spanned for more than two decades, and have often been
violent, leading to illegal land grabbing, damage of property and sometimes even death, in the hands
of the ‘shrimp mafia’. All the evidences for this research have been gathered from secondary data source, including gray
literature (national and regional newspaper articles, documentaries) along with my field study in the
Sundarbans Delta of West Bengal, conducted in January, 2015. I also use government data from the
Forest Survey of India to show the statistical mirage which makes it extremely difficult to find
conclusive evidence of degradation of mangrove forests. My research shows a mismatch between
what the locals claim and the government data represent.

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P24
The Sustainability Revolution or On the Fallacies of Ethical Consumerism and
Reformism
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The Sustainability Revolution or On the Fallacies of Ethical Consumerism and Reformism
The status quo is characterised by multiple crises (Demirović, 2013). Ecologically, Rockström et al.
(2009) identify nine planetary boundaries, four of which have already been transgressed (Steffen et
al., 2015). Economic inequalities are increasing (Oxfam, 2014). Democratic institutions diminish in their
legitimacy and trust. The number of people searching refuge is at its peak. Thus, those committed to
sustainability demand change.
However, versions of the changes necessary and transforming agents vary greatly. Under the labels of
corporate social responsibility or corporate sustainability firms are seen as transforming agents whose
previous myopic focus on profit maximisation and shareholders ought to be extended to reach
sustainability. Thus, the stakeholder model of the firm (Freeman, 1984) and the triple-bottom-line
(Norman & MacDonald, 2004) have been introduced. In another version ecological problems are
interpreted as market failures and externalities which ought to be internalised (e.g., Aidt, 1998). A third version sees consumers as transforming agents influencing production with their demand (Irving, Harrison, & Rayner, 2002). If they consumed sustainably ecological predicaments would perish (e.g., Gilg, Barr, & Ford, 2005). Thus, responsibility for ecological ills and their remedy is individualised. All of these approaches are reformist since they leave key institutions of capitalist relations (e.g., the state, private ownership, or consumer-producer relations) in place.

In this article I argue that (ethical) consumerism and reformism will not bring about the change needed to achieve sustainability. Instead, fundamental, radical transformation of current institutions like the state, democracy, corporations, and economic relations is needed. Starting with the critique of the above mentioned reformist approaches (e.g., Alfredsson, 2004; Banerjee, 2008; Maniates, 2001; Spash, 2010) I will outline the position of fundamental, radical change relying on concepts of ecological economics (e.g., Bithas, 2011), eco-socialism (e.g., Löwy, 2015), and degrowth (e.g., Trainer, 2012; van Griethuysen, 2012). This will serve as an alternative to reformist approaches which is feasible and tackles the multiple crises at their roots, thus promising results.

This article presents an abstract analysis of theoretical positions on transformation and its agents. Methodologically, a systematic literature review is applied which focuses on alternative approaches toward sustainability aside from mainstream concepts of Sustainable Development (e.g., Brundtland Commission, 1987) or reformism / consumerism outlined above. The aim of this article is biased insofar it explicitly sets out to challenge the hegemonic discourse within sustainability science (Jickling & Wals, 2008). The subject of sustainability has been subdued by conservative and reformist lines of thought, as mirrored by many conferences on the topic. Thus, this article might play the role of the devil’s advocate, proposing an alternative, radically different view on sustainability. However, from my conference experience such a devil’s advocate is highly appreciated as it explicates tensions and sparks debates about fundamental assumptions held by the participants.

This radically different view on sustainability, fed from various streams of ecology and sociology, is the result and original contribution of this article. It advocates a transition strategy which calls into question modern institutions of the state, democracy, and the economy as well as conceptions of culture, nature, freedom, and individuality. More polemically, this article sees reformist approaches and a focus on ethical consumerism as barricades against the needed transition. The multiple crises (Demirović, 2013) can only be overcome if fundamental changes are implemented, not unlike a sustainability revolution.

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Natural capital is an extension of the economic notion of capital as a "resource providing a stream of valuable goods or services in the future" for environmental goods and services [Costanza, Daly, 1992] The concept of natural capital is closely linked to the idea of the so-called ecosystem services. Natural capital in the form of ecosystems provides many varied ecological services for both production and consumption, and above all, for the maintenance of life on earth [Costanza, 1997]. In addition to natural resources, ecosystems are the source of life-sustaining services as well as regulatory, cultural, aesthetic, etc. [Daily 1997]. The loss of biodiversity threatens the stability of ecosystems and could have a significant impact on the ability of ecosystems to provide those services in the future [Diaz, 2006].

In the context of decision making, the main problem is the assessment of changes in natural capital stocks. One major issue is the development of basic criteria and assessment tools. Ecosystems are basically a spatial concept, the natural approach is to evaluate changes in space, based on the ecological landscapes approach [Barbier, 2011]. GIS tools can be used to evaluate land use or land cover changes, thus determine changes in the availability of natural capital stocks and provided streams of services.

Rational policy of ecosystems conservation should also be based on economic criteria, thus allowing to maximize the welfare of the present and future generations. The main problem, however, is the valuation of ecosystem services [TEEB, 2010]. Despite these difficulties, the basic economic model of competing land uses allows us to formulate the criteria of economic rationality in the management of natural capital [Barbier, 2011]. According to the model, the conversion process is economically rational if the shadow price of the ecosystem is negative, i.e. the capitalized value of marginal unit of developed land (for agricultural, residential purposes, etc.) exceeds the capitalized value of ecosystem services provided by the unit of natural landscape. Otherwise, if the shadow price of the ecosystem is positive, the areas already developed should be restored to its original natural state.

The aim of the work is a preliminary application of the criteria coming from the economic model of competing land uses to assess changes in land cover in Poland in the years 2000-2012. Another goal is to expand the basic economic model in order to adapt it to the available spatial data. The stream of benefits provided by the unit of ecosystem depends on various qualitative characteristics. For example, there are a lot of evidence suggesting that spatial fragmentation results in biodiversity loss and lower
ability of ecosystem to provide services. It seems reasonable to include some of qualitative variables into the model.

Data used in the research came from Corine Land Cover database for the years 2000, 2006 and 2012. Particular types of land cover were classified into 3 groups: natural, semi natural and anthropogenic. Then each of them was assigned with the value of provided benefits. Ecosystem services values are taken from secondary sources [De Groot et. al., 2012] Authors are aware, that such approach is very raw approximation of real values provided by various ecosystems of Poland. Within the future research we plan to use this methodology to evaluate changes in the urban space of the main Polish cities, which requires additional data gathering (Urban Atlas data is available only for one year).

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P26
Revealing ecologically unequal exchange as a constant and salient feature of our globalized world economy
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In assessing global long-term patterns of ecologically unequal exchange (EUE) this paper investigates a topic that has been controversial in the ecological economics community. We quantitatively capture and describe the global extent of EUE between nation states and reveal EUE is an inherent feature of our globalized world economy over the past decades.

EUE not only received attention from scholars with different disciplinary backgrounds (Hornborg, 2014; Jorgenson, 2012; Peng et al., 2016) but also has serious implications for the real-world sustainability aspirations of nation states. In short, EUE is an opaque phenomenon that systematically allows richer nations to achieve a high level of raw material consumption, while depriving poorer nations socially and environmentally. Such exchange relations are both obscured, and to some extent justified and legitimimized, by international financial trade relations. EUE allows richer nations to achieve a certain degree of efficiency in their economic structure and partly even to achieve an absolute decoupling between resource use and economic growth (Wiedmann et al., 2015). However, these achievements are largely illusionary, merely displacing ecological constraints and socio-environmental burdens to less powerful nations and regions (Bergmann and Holmberg, 2016; Weinzettel et al., 2013). Whereas global biophysical interlinkages between countries have rapidly increased over the last decades (Kastner et al., 2014), the quality and directions of these flows follows certain patterns: we observe an unequal appropriation of materials, energy, time, and land by richer nations to the disadvantage of poorer nations. Thus, important hypotheses of EUE are (1) an unequal appropriation of biophysical goods through global markets by richer over poorer nations; (2) poorer nations deliver
more unprocessed materials to the global markets in exchange for processed goods by richer industrialized countries which have a higher monetary value per item but lower social-ecological impacts; (3) biophysical goods (materials, energy, land, and labor) of poorer nation states are undervalued in monetary terms compared to products from industrialized regions. The concept of EUE calls attention to pervasive sustainability issues related to international trade, like outsourcing of resource intense production and raw material extraction to peripheral countries and regions, or unequal power relations in the global supply and value chains. While there is a range of conceptual work (Andersson and Lindroth, 2001; Hornborg, 2016) and of case studies proving the validity and significance of EUE relationships between or within single nation states (Dorninger and Eisenmenger, 2016) or for specific commodities (Oulu, 2015), global multidimensional assessments of EUE are hardly undertaken. Some of the findings from the first and so far only empirical assessment (Moran et al., 2013) have been called into question (Dorninger and Hornborg, 2015). Hence, there is an urgent need for an adequate operationalization and quantification of EUE.

In this contribution we propose and apply the use of environmentally-extended multi-regional input-output (EEMRIO) analysis to assess EUE at the global scale, using data from EEMRIO databases (EXIOBASE and GTAP). Environmentally-extended input-output tables show biophysical flows that are embodied in traded goods and that do not show up in regular trade statistics. This is highly relevant in order to create consumption-based indicators which redistribute resource use to the country of final demand. Even though this method – like every other approach that accounts for embodied flows – has its shortcomings (Dorninger and Hornborg, 2015; Schaffartzik et al., 2014) we still believe that EEMRIO tables are a very promising and useful methodological approach.

In our paper we do not only challenge the findings of Moran et al. (2013) – who found, amongst others, that high-income countries are net-exporters of raw material equivalents – by showing that richer countries indeed benefit from EUE relationships, but present additional new metrics highly relevant for identifying EUE, i.e. flows of embodied energy, land, labor, biodiversity, and monetary value added along the supply chain, between countries for a longer time period (1995-2012). A long-term perspective is important to show that EUE is a constant phenomenon that does not simply disappear after a year of exploitation but persists and is exacerbated as an inherent part of the global economic system. To show this, countries are grouped along gradients of rich to poor and high to low population density. We highlight how high mass consumption in rich industrialized countries are increasingly sustained by EUE relationships with poorer regions. Results are shown on the national scale as well as on a per capita basis.

In this way, we present novel findings that contribute not only to the scientific understanding of the extent, ubiquity and persistence of the phenomenon described as ecologically unequal exchange, but also show in a critical and reflexive way how the global phenomenon of EUE can be operationalized and assessed quantitatively.

Regarding global resource use, our results suggest that ideas of ecomodernists and technological optimists (Asafu-Adjaye et al., 2015) to achieve an absolute decoupling only via increasing resource efficiency do not hold true in the face of EUE realities. We instead argue that overdeveloped countries need to focus on biophysical degrowth (Fischer-Kowalski and Haberl, 2015; Kallis, 2011) in order not to violate global environmental justice concerns (Hornborg and Jorgenson, 2013). In conclusion, EUE both derives from and impacts on institutional structures and systemic human behavior. Considering EUE within ecological economics has a transformative power in advocating for underprivileged regions in the world, for environmental and social justice, and eventually for future generations by challenging dominant global institutional structures. We argue that any national attempt that seriously means to target sustainability transformation inevitably must include considerations of EUE.

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P27
Managing sustainable business models in the hospitality sector with the help of a mission statement

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Currently, the normative mission statement of a sustainable development is increasingly gaining
importance within the international political debate. A more comprehensive understanding of the term sustainable development is for example reflected in the Sustainable Development Goals (SDG) and the sustainability policies of the European Union and Germany. Central components include: the recognition of absolute planetary boundaries (Steffen et al. 2015), the necessity of decoupling resource consumption from economic growth, the central demand for justice, and the demand for companies to take responsibility for social and environmental conditions along the value chain. These aspects are focused upon for example (United Nations 2015, EU-Kommission 2011, BMUB 2015, Bundesregierung 2012).

Although single issues of a sustainable catering are discussed in the food service and public procurement sector, e.g. aspects of animal and climate protection or consumer’s health, the implementation of sustainable business models is not yet a major idea. So far, only singular approaches to apply aspects of sustainability are existent. But although the food service sector is crucial for a sustainable development no comprehensive sustainability strategy has been developed. Companies often deal with a great uncertainty about the implementation of the normative and political idea of sustainability. Since uniform regulations with regard to a comprehensive management of the concept are missing companies sometimes develop their own policies. In conclusion, we hypothesize that the food service sector needs guidance on specific sustainability strategies due to a gap between the status quo in the industry and the target state set by science and politics.

Against this background, the talk will give insights into the food service sector’s status quo with respect to sustainable nutrition or more specifically, the implementation of sustainable strategies. Furthermore, the normative requirements for sustainability in form of a mission statement, called “sustainable food services” are discussed. We perceive this mission statement as a means to transfer current political demands (as in the SDG of the UN) into the sector. It could serve as a model for the entire food service sector to support and facilitate implementing aspects of sustainability into business practices.

Contrary to visions, mission statements are supposed to focus on the present and to take, as a framework for action or code of conduct, an integrating, guiding role within organizations – i.e. answering the question “How should we behave in order to achieve these goals?” (Vahs 2012). Therefore, mission statements should contain fundamental principles, express values and present the desired development of the sector. For their formulation, positive, concise, understandable and not contradicting terms are useful. Moreover, they have to be valid in the long-term as well as feasible (Graf and Spengler 2000). The background for developing the mission statement “sustainable food services” comprises: First, as an important prerequisite for a sustainable transformation, all major actors and stakeholders of the production and consumption system have to agree upon a shared framework concerning the term sustainability. Second, the mission statement opens spaces of possibilities and assists questioning and breaking consumption- and action routines. Third, the mission statement creates a framework for communication and transfer. This framework can be continuously expanded and concretized.

The mission statement is derived from the current debate about sustainability in the food catering sector as well as from existing normative structures. Therefore, a participation procedure is necessary, including the following steps (Graf and Spengler 2000): 1. Desk research for an objective definition through the analysis of the target state (set of values, the normative basis) and the status quo of sustainability in the hospitality and food service sector. 2. Stakeholder dialogues and expert workshops to create compliance and acceptance of the mission statement. 3. Testing and evaluation of the application of the mission statement with practice partners of the project.

An analytical framework was used in order to assess the status quo of sustainable development in the sector in relation to the normative basis (Gebauer / Hoffmann et al. 2011; Gebauer / Timme 2011). Relevant publications were analysed through qualitative content analysis (deductive method described by Mayring 2015). Literature was evaluated with MAXQDA (Version 11). During the investigation the literature was analyzed with regard to the ecological, economic and social dimensions of sustainability – which are expanded to the dimension of health (for the reasoning see Lukas et al. 2014). A noteworthy aspect is that there are many interdependencies and target conflicts between the
individual dimensions of sustainability that need to be addressed from our point of view. In summary, the following eight topics are included in the proposed and discussed mission statement, in which interdependencies and target conflicts are present as well:

- Principle 1 - Conservation of natural resources
- Principle 2 - Conservation of biodiversity
- Principle 3 - Protection of the climate
- Principle 4 - Responsibility in the value chain
- Principle 5 - Use of animal products
- Principle 6 - Promotion of healthy eating
- Principle 7 - Transparency and dialogue with the customer
- Principle 8 – Orientation towards the interests of employees

The proposed structure of the mission statement is the basis for discussions with companies of the sector and also with stakeholder from science, politics, consumers, NGOs and others. The intermediate results were discussed within the sector, using participative stakeholder dialogue forums. Three workshops with experts and prominent stakeholders were held in 2016 up until today. Results indicate that a more concrete distinction of the basic values and guiding principles is needed for example in form of a roadmap for a practical implementation of a sustainable management in the out-of-home catering sector. To meet the challenges of anchoring the eight key principles of sustainability we suggest to use classical management tools to reduce complexity. Therefore, the key principles of sustainability need to be broken down to the company level (location, product level, value chain, environment – where?) and to the management level (mission statement, strategy, objectives, measures, key figures/indicators – how?). Besides, a connection to the different dimensions of sustainability (economics, ecology, social affairs and health – what?) is important. An example for the transformation of the key principle 5 is shown in the following table.

Table: Transformation of key principle 5 into the Management of companies in the hospitality sector

<table>
<thead>
<tr>
<th>Key Principle 5: Use of animal products</th>
<th>management-level (how?) strategy</th>
<th>Animal products should be reduced in the offer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>objective</td>
<td>Therefore the portion size of meet is reduced by 10 % and the vegetarian and vegan offer will be extended.</td>
<td>measures A change in the recipes will be checked and vegetarian/vegan alternatives are developed.</td>
</tr>
<tr>
<td>indicator</td>
<td>Share of animal products per meal (%)</td>
<td>dimension (what?) ecology, social affairs and health – what?)</td>
</tr>
<tr>
<td>company-level (where?) product</td>
<td>Source: own diagram</td>
<td></td>
</tr>
</tbody>
</table>

The stakeholder dialogue revealed that at the management level, sustainability should be substantiated by a mission statement, the determination of a strategy, the formulation of short-, medium- and long-term goals, the definition of measures and individual performance indicators as well as the implementation into a continuous improvement process. While the mission statement and strategy integrate the interests of internal and external stakeholders, the goals, measures and key figures are set out concretely by the company's implementation. Until summer 2018 the mission statement will be tested within catering service companies. Hence, results of the implementation in everyday companies practice can be discussed at the conference.

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National accounts with a broader energy sector
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Energy is essential to economic activity, and advances in energy consuming technologies, coupled with
increasing energy consumption, have characterized industrialization and economic development over the past century [3].

Accounting for energy quality reveals a relatively strong relationship between energy use and economic output. When comparing the relevance of different energy consumption measures to economic growth and total factor productivity (TFP), the contribution from these measures increases according to how accurately they represent productive uses of energy in production [1].

Recent work [1,6,10] suggests the appropriate measure to aggregate and account for energy inputs to production is useful exergy. In thermodynamics, exergy is the maximum amount of physical work that can be theoretically recovered as system approaches equilibrium with its surroundings. It is a measure of potential work that accounts for irreversibility due to increases in entropy, and allows for the construction of comparable aggregate measures of energy flows in the economy.

The actual amount of work performed by a system is generally much lower than the theoretical maximum. Hence, exergy actually provided to perform a final economic function — after accounting for losses — is defined as useful exergy (e.g. electricity actually converted to light in a light bulb). It is a quality-adjusted measure of energy inputs to the economy, just before becoming energy services. Implementing a useful exergy accounting methodology for individual countries such as Portugal [9] suggests that consumption of useful exergy follows the same trends as output growth, signaling a close relationship between the two — as studied in [7, 8]. Useful exergy seems to be the appropriate factor of production to represent energy flows in the economy. However, useful exergy is also — by definition — an intermediate product, and in order to write economic output as depending directly on useful exergy inputs, a specific framework has to be assumed for the economic system. This has been previously attempted by [2], adopting a two-sector model — identifying extractive and energy conversion activities as a separate sector — but with the simplifying assumption that factors of production are used in the same proportions in these sectors’ generation of useful exergy output as they are in the economy as a whole. Our model provides an alternative to the simplifying approach in [2] to treat useful exergy as a primary factor of production. In our model, the economy is described as a two-stage process with a separation between the energy-related activities, and the remaining economic activities. The energy sector (E-Sector) is responsible for supplying the majority of economic activities with useful exergy, which can be directly consumed by end-users, or act as an intermediate, being used in the production of all kinds of final investment and non-energy related consumption of goods and services in the non-energy sector (NE-Sector).

The E-Sector defined in our model is broader than energy sectors generally considered in economic models and accounts, which are usually associated with the energy industries (i.e. production/sale of energy). By contrast, our E-Sector aggregates every single process that performs the conversion of primary exergy (extracted from the environment) into final exergy (sold to consumers), and from final exergy into actual useful exergy. Hence, the E-Sector includes not only energy conversion in industry, but also end-use devices (e.g. appliances, vehicles) used by firms or households. A crucial assumption of our model is the treatment of these end-use devices as capital investment in the E-Sector.

Our separation of economic activities in two sectors involves a redifinition of economic consumption and investment variables, as well as a distinction between useful exergy directly consumed by end-users and useful exergy used in production of goods and services. Since our redefined economic and energy variables will not correspond exactly to the accounting framework in national accounts and energy balances, a decomposition and reclassification of these datasets is required in order to test the two-sector model empirically. In this work, we restrict the empirical analysis to Portugal (1960-2009). Specifically, some goods defined as consumption in national accounts are redefined as capital investment in the E-Sector, due to their role in primary-to-useful exergy conversion (e.g. household appliances, motorized vehicles). Total consumption is also divided between consumption associated with direct useful exergy consumption (e.g. electricity, gas, and other fuels) and consumption of other goods and services. Disaggregation of consumption expenditure is performed at the level of COICOP (Classification of Individual Consumption according to Purpose) and COFOG (Classification of the Functions of Government) divisions and groups. Total investment is disaggregated between investment in the E-Sector and NE-Sector, at the level of non-financial produced fixed assets (ESA95).
Useful exergy data for Portugal is disaggregated between useful exergy directly consumed (e.g. some transportation and residential uses), and useful exergy used in NE-Sector goods and services production. Labor inputs – assumed for simplicity to be only relevant to the NE-Sector – are measured as total annual hours worked.

Some interesting results are derived from our proposed model. First, the monetary value of directly consumed useful exergy by households, government and institutions – in relation to total economic output (i.e. consumption plus investment expenditure) – has decreased in past decades. This may be due to changes in consumers’ preferences (e.g. increased use of less efficient – but cheaper – end-use technologies), constituting a force for energy coupling [5].

Second, results suggest that while useful exergy and capital inputs to the NE-Sector behave as substitute with regard to labor inputs, they are complementary goods to each other themselves. This means that capital’s (useful exergy) demand rises when the price of useful exergy (capital) drops. This agrees with the general view that, on one hand, capital stock is useless without being activated by useful exergy, and, on the other hand, useful exergy requires capital support to be economically productive.

The methodology exposed in this work forms a basis for growth analysis with energy inputs – measured as useful exergy – as a primary factor of production, establishing itself as an alternative to the approach in [2]. Our approach can provide important insights into institutional and political measures concerning economic production and productive energy uses. For example, companies that supply energy inputs to the economy today could gain incentives to save energy if instead they focused on supplying the services provided by energy (i.e. supplying light instead electricity). Focusing on developments in energy services provision rather than simply on energy use and prices can reveal the true declines in costs, increased consumption and welfare gains that have been achieved [4]. Thus, it is the authors’ opinion that acknowledging a broader energy sector has important advantages for energy saving and sustainability.

References
Natural Capital and Ecosystem Services (NCES) hardly can be valued according to usual market assessment tools and criteria. As a consequence they are most often given too little weight in policy decisions. This neglect may ultimately compromise the wellbeing of human societies and the sustainability of economic activities. There have been many studies in the past few decades aimed at estimating the value of a wide variety of ecosystem services. The evaluation of NCES is imbedded in the larger search for indicators to guide our lives and behaviors in environmentally desirable directions. Both have policy overtones as well as scientific underpinnings. Various methods have been used to value non-market-traded NCES to support decision- and policy-making and advance sustainable development planning. Of course, evaluation methods run the risk that an evaluation does not cover all issues of a complex problem, (such as environmental protection, resources scarcity, etc) in a satisfactory way. Due the complexity of environmental problems, appropriate methods are needed to provide a holistic framework that can be used in multi-criteria assessment. In this work, the Emergy Accounting approach is presented as an integrative method to evaluate NCES. Emergy Accounting, a donor-side approach with its implicit boundary set at the biosphere level, keeps track of the entire supply-chain of resources down to the final products, co-products and by-products, calculating their intensity factors and assessing their role within the ecosystem’s web and hierarchy. Emergy is defined as the available energy of one kind (usually solar) previously used up directly and indirectly to make a service or a product (Odum, 1996). The unit of emergy is the solar emergy joule (sej). The emergy required directly and indirectly (through all the pathways in a system web) to generate one unit of energy or mass of a product flow is named tranformity or specific emergy respectively (sej/J; sej/g), although the term UEV (Unit Emergy Value) has also been recently introduced. In a natural ecosystem (which is not only subject to, but the product of natural selection), the transformity also indicates the position of each type of energy flow in the ecosystem’s energy hierarchy (this only applies loosely and at a very coarse level to human-dominated systems, many of which co-exist without having yet been selected by long-term natural evolution). The total emergy driving a system, calculated as the sum of all emergy inflows, is assigned to the product or service delivered (for further details see Odum, 1996; Brown and Ulgiati, 2004, 2010). After all the flows of interest have been quantified, a set of indicators (EYR, ELR, ESI, %REN, etc.) can be developed for better understanding of a system’s dynamics as well as for environmental policy making (sustainable resource use), by assessing the environmental performance of the process itself (Brown and Ulgiati, 2004). This work aims to explore to what extent the emergy method can be used to complement and integrate the picture provided by other accounting methods and indicators. In particular, the application of Emergy Accounting to different case-studies is here presented as potential added value in Multi-criteria analysis framework. As a matter of fact, Emergy Accounting shares a lot with other methods (e.g. Life Cycle Assessment), at least in operational terms (definition of the system boundary, data inventory, allocation procedures, etc), hence Emergy is here presented as one of the dimension able to describe a multi-faceted system. In conclusion, what Emergy provides to other accounting methods is:

- A donor-side value perspective linked to the full supply-side chain, which becomes apparent when even small investments may carry a large emergy demand due to their high UEVs.
- A non-anthropocentric perspective that looks at the consequences of a process’ resource use in terms of the contrasting needs of other species on Earth (the overdemand for and misuse of resources inevitably entails less emergy left to flow through other hierarchical levels of the biosphere web).
- Inclusion of labor and services. Although sometimes questioned, these additional emergy inputs indirectly add to the analysed process the fraction of renewables that supports the economy at the
nation-wide level, as well as the welfare of a given society, sometimes resulting in some processes becoming too 'expensive' in emergy terms.


P30
Environmental and social justice: the November 2014 outbreak of legionella in Portugal
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In November 2014, Portugal experienced one of the most serious outbreaks, in international terms, of legionella or legionnaires' disease, an atypical and potentially fatal pneumonia. 14 people died and 377 were infected, in some cases with consequences for the rest of their lives. The outbreak occurred in Vila Franca de Xira, a town on the outskirts of Lisbon, Portugal's capital, in an area which combines a strong industrial sector and high population density with asymmetric socio-economic conditions. Scientific analyses showed that this outbreak had very particular characteristics: the molecular profile and bacterial phenotype were rare, the combination of weather and climate was atypical, and the outbreak occurred over a wide area. The likely origin of the infection was determined from a match of the legionella strain in patients and that isolated in the cooling towers of local factories. Although it tends to be seen as an “exotic plague” (Fields et al., 2002: 506), legionnaire’s disease is not unusual. When it occurs, it has high morbidity and mortality rates. The legionella bacterium is found in natural aquatic environments (like lakes and rivers), but also in artificial water supply systems. Cooling towers, water systems (in hotels, houses and factories), air conditioning units, respiratory therapy equipment and jacuzzis are examples of sources of aerosol generation capable of transmitting legionella which have historically been behind many outbreaks of legionnaires’ disease (WHO, 2007).

There is an ample literature in epidemiology and environmental sciences on the disease and its outbreaks. The conclusions of those studies have helped to define international guidelines designed to reduce the risk of contamination and to direct the competent authorities in quickly diagnosing and containing outbreaks. But analysis of epidemiological and environmental factors is often decontextualized in social, political and economic terms. These studies seem to be conducted as if the outbreaks did not involve social and technical systems, social contexts, specific habitats, and particular economic and political circumstances. There has been neglect of the conditions and factors which it falls to the social sciences to identify, and which are clearly not covered by the natural sciences. Paradoxically however, the social sciences have also not taken part in this debate. Unlike other diseases where there is a strong element of the man-made, like BSE, the social sciences, as far as we can determine, have not studied legionella outbreaks.

Ecological, technical and social conditions are all relevant factors in the disease and its outbreaks. It is incomprehensibly reductionist to devalue or neglect them, in uncritical fashion. It should be noted that although there are some rare cases where bacteria found in nature caused the disease, most reported cases are attributed to technical systems of water management. Legionella is therefore recognized as an “environmentally acquired disease” (Lin et al., 2009: 606) and is regarded by the World Health Organization as an illness deriving from human changes to the environment (WHO, 2007: 1). It is,
moreover, seen as a preventable disease (Fields et al., 2002: 507), given that control and elimination of bacteria in water management systems depends on maintenance and careful monitoring of the system (WHO, 2007).

Legionnaires’ disease shares many of the typical characteristics of modern societal problems as far as the emergence of new conflicts over environmental and social justice issues is concerned. These conflicts involve the inextricable linkage of ecological, social and economic risk factors which may be too complex for the usual protection and control mechanisms. Legionnaires’ disease is a risk both on account of its origins (it is the unintentional product and consequence of man-made processes, including industry), and its characteristics (it is an invisible threat until symptoms appear, and it may have synergistic effects and potentially irreversible and unpredictable consequences). Our aim is to understand the outbreak which occurred in Vila Franca de Xira, based on the assumption that this type of episode is a social and technical object as well as a biological one. This means that such outbreaks, in addition to the obvious point that they are epidemiological, medical and environmental events, also need to be placed in their specific social, political, legal, urban and industrial contexts, and studied in the light of the social and material conditions of the place in which they occur, the discourses of experts and lay persons on the topic, political decisions, regulatory mechanisms, and the technological options mobilized for the purposes of monitoring and suppressing them. In methodological terms, the case study drew on two information sources: (1) documentary sources (e.g. the daily communiqués from the DGS throughout November 2014, as made available on its website; epidemiological and environmental reports; and newspaper articles). These documents made it possible to reconstitute the longitudinal sequence of events in the Vila Franca de Xira outbreak and to analyse the positions of the main bodies involved; (2) in-depth interviews were carried out with key actors: epidemiology, air quality and environmental law experts; members of the citizen and legionella victims’ movement; and political leaders.

This paper seeks to explain a series of risk factors present in the outbreak in Portugal which provoke discussion in the context of environmental and social justice. First, on the cooling towers, which caused the bacteria to spread as a result of a rare, possibly unique mix of weather and climate conditions. Although this is a factor which is studied and emphasized in the natural sciences, the natural sciences viewpoint is not conducive to exploring the possibility that the towers were in themselves a risk factor, subject to the multiple interactions of complex technological and industrial systems, and even to the indeterminacy and failures of human behaviour in connection with the proper use, maintenance and cleaning of these devices. Secondly, we demonstrate that the affected community lives back-to-back with an industrial estate, in a municipality where dense housing was built on the back of policies and a type of urban development based on cheap credit, expansion of the road network and the real estate business. The daily co-existence with industries, the importance attached to economic growth and job creation, the trust placed in them regarding suitable monitoring of procedures and prevention of possible contamination, the local authority’s beliefs regarding control and protection of residents’ rights, all combine to make the dangers “invisible” to local residents. Thirdly, we observe that the outbreak occurred following a legislative change which established that the independent external regulation of air quality in industrial buildings was no longer compulsory. Against a backdrop of the severe financial crisis and budget restrictions which the country has been facing since 2007-2008, enshrining the possibility of self-regulation of routine inspections in the body of the law further aggravated the crisis of confidence surrounding transparency of procedures and the government’s and businesses’ ability to monitor risks.

References
P31
Producing Sustainability: a contribution toward applying Georgescu-Roegen’s general theory of economic process to the archetypical case of coastal mangrove conservation
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It could be argued that, since its formal inception in the late 1980s, if not before, the transdisciplinary field of ecological economics has been concerned with what might today be described as phenomena particular to The Anthropocene. Among these is the challenge of restoring and maintaining the ecological integrity of the world’s compromised and threatened coastal mangrove forests. Mangrove forests have the peculiar status of being, at one and the same time, both one of the most glaring examples of the ecological devastation associated with The Anthropocene and also one of the most promising opportunities for remediating that devastation through targeted ecological rehabilitation and management. Due to their exceptionally high degree of social-ecological multi-functionality, their critical ecological importance for biological productivity in both coastal and oceanic biomes and their exceptionally high carbon sequestration capacities, there is today little debate that mangrove conservation and rehabilitation constitute net welfare benefits for both local and international economies. However, due to their geographical location, along coastal stretches with exceptional tourism potential and high exposure to climate change driven extreme weather and their extremely humid micro-climate, which is inhospitable to sustained human habitation, mangrove destruction continues at alarming rates.

Based on this exceptional collection of characteristics, it is proposed that the question of how it is possible to recover and maintain the world’s mangrove forests is archetypical of The Anthropocene: that is to say, it embodies the core dilemmas and dynamics of the epoch. On that basis, the ecological economic processes of restoring and maintaining the ecological integrity of the world’s compromised and threatened coastal mangrove forests are taken up here for study as archetypical examples of the challenges associated with living well in The Anthropocene. The aim of the theoretical work presented in the paper is to provide a logically coherent, empirically situated, conceptual basis for specifying ecological economic prerequisites that must be met in order to establish and maintain the just and sustainable use of coastal mangroves, taking into account the rights and preferences of both local (direct) and international (from-a-distance) users and the needs of the mangroves non-human inhabitants.

Employing Nicholas Georgescu-Roegen’s general theory of economic process as its analytical basis and employing ‘living well with mangrove forests’ as the final cause of the highest order economic process to be modelled, this paper works through a step by step analysis of the ecological economic process of producing sustainability, using the constraints and characteristics of the concrete case: of sustainable use of mangroves as its point of reference. In order to avoid getting lost in the details of any one particular case, this theory work is elaborated based on reference to a stylised imaginary mangrove forest or moderate size, quality and exposure, somewhere along the coast in the Caribbean Sea. The analysis combines conventional flow-fund theory based representations of the elements of three specific sub-processes - mangrove destruction, mangrove recuperation and mangrove maintenance – with representations of how each of these respective sub-processes is purposively constituted and operationally capitalised based on decisions taken by communities of economic actors regarding how to allocate and distribute those resources at their disposal for use in the economic process of process production. In the study, it is presumed that, in the event that there is no surplus, there are also no resources available for the process of process production but only for direct use in
the production of output flows proper: in other words, subsistence systems are assumed to be subject either to path dependency or to the purposes of external economic actors with surplus who are able to invest in process production. The paper closes with reflections on the theoretical and empirical usefulness of the approach for future work on mangroves and more generally and provides a set of concrete recommendations regarding steps that could be taken by local and international users of mangroves in order to improve the quality and to increase the quantity of the world’s coastal mangrove forests.

P32
Is it a long way from Science and Research to Impact and Action?
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8th November, 2016 is “a date that might turn out to be one of the most important in human history, depending on how we react” – stated Noam Chomsky, American linguist after the election of Donald Trump in the US, when the World Meteorological Organisation announced that the past five years were the hottest on record. It also reported “unexpectedly rapid melting of polar ice, further reducing the cooling effect of polar ice reflection of solar rays, thereby accelerating the grim effects of global warming.”

That November day also marked the start of the international conference on climate change in Morocco (COP22) convened to focus on actions, how to implement the Paris Agreement, which entered into force in October 2016.

Now, more than ever science needs to clearly communicate findings, results, novel approaches to influence populist mainstream thinking and to encourage humanity to act, at least adapt to changing circumstances as it is already too late to be focusing only on mitigating the effects of climate change. It is vital to move away from the current anthropocentric approach to a more eco-centric one that takes into consideration resource efficiency, eco-development that can be a win-win situation for both humans and our living and not-living environment.

New trends and new ideologies clearly mark the emergence of novel thinking in the way research and science is produced, used and communicated. This presentation will discuss emerging ideologies such as the whole systems thinking, the nexus approach, the circular economy, the collaborative or sharing economy and also new ways we think about economic growth: smart, inclusive and even de-growth, looking more at qualitative development rather than quantitative progression.

Recent studies (LSE, 2011) discuss the need to enhance public understanding of energy and environmental science and policy and to maximise the impact of academic research. Knowledge-brokers are needed who will provide support to build a successful research and dissemination program for academia. This will ensure research is impactful and clear messages can be relayed to non-expert audiences: the private sector, governments and the civil society. Such a ‘boundary organisation’ can help researchers raise their profile and visibility by explicitly seeking to achieve greater impact with both academic and external audiences. An ‘impacts interface’ is created by simplifying, interpreting and translating findings of Research and Development into more integrated, useable and immediately applicable outputs.

Businesses often bring in external experts from universities to produce a ‘think-piece’ or a piece of research; likewise, government agencies sometimes commission research to check whether their strategies or policies are appropriate or will work. Academia could be the key provider of information for evidence-based policy-making, and essential for executive decision-makers. But, academic outputs tend to leave the ‘So what?’ and ‘What next?’ questions mostly unanswered. (LSE, 2011)

There is a wide ‘impacts gap’ between research being completed and published and its being recognised or achieving any external impacts beyond the university sector itself. There is an even wider
‘outcomes gap’ between research being used by non-university actors and its then having visible effect. There may also be an ‘understanding or communication gap’ between academics and potential clients, who often view that researchers speak in academic jargon, and cannot extend their specialized knowledge.

In order to achieve impact on external audiences - in business, government, the media, civil society or public debate - while also advancing the ecological economics discipline, research findings need to be disseminated, commercialized and academics need to be encouraged to work co-operatively with industry to realise economic and societal impact.

The UK ‘Research Excellence Framework’ is based on how much external ‘impacts’ have been achieved by universities and departments. The next Research Excellence Framework cycle is expected to increase the weight of the ‘impact’ criteria. Research Councils UK defines research impact as ‘the demonstrable contribution that excellent research makes to society and the economy’. This can involve academic impact, economic and societal impact or both (ESRC):

- Academic impact is the demonstrable contribution that excellent social and economic research makes in shifting understanding and advancing scientific, method, theory and application across and within disciplines
- Economic and societal impact is the demonstrable contribution that excellent social and economic research makes to society and the economy, and its benefits to individuals, organisations and/or nations.

Knowledge exchange, knowledge economy, collaborative research, science shops are today’s initiatives to distil complex ideas into comprehensive messages in order to have an impact. It is vital to link fundamental research and scientific innovations to today’s problems while also avoiding to create unforeseeable difficulties. The presentation will discuss examples from the challenge of geo engineering to the horse manure pollution problem from the 19th century.

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Company schemes for working-time reduction in Austria: barriers and supporting factors for a successful implementation

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Working-time reduction (WTR) is increasingly discussed as a cornerstone of a social-ecological transformation. First, WTR has the potential to foster employment, even in times of economic stagnation, thereby reducing growth pressures (Antal, 2014; Jackson and Victor, 2011; Zwickl et al., 2015). Second, shorter working hours might address several social issues, such as poor health, well-being or gender inequalities (Coote et al., 2010). Third, WTR could reduce environmental pressures by reducing the scale of economic output and by changing individual consumption patterns (e.g. Knight et al., 2013).

Despite its various promising implications, it is important to note that the actual effects of WTR are highly uncertain and contested, and crucially depend on the respective policy design (Kallis et al., 2013). WTR might also face resistance from both employees and employers, e.g. because of income losses, intensification of working time or increased cost for firms. It is thus essential to investigate the policy design and implementation of already existing working-time measures to identify factors that support or hinder a successful realization of WTR. For this purpose, Austria provides some notable cases that have hardly been studied.

By investigating the functioning, difficulties, and virtues of these innovative reduction schemes in practice, we are aiming to gain some valuable insights for policy makers with respect to barriers and supporting factors for a successful implementation of WTR on the company level.

For this purpose, we conduct a collective case study on seven firms that have successfully achieved to reduce their working time by applying different WTR schemes. Following a purposeful sampling strategy, the firms were chosen in order to attain a broad variation in terms of economic sectors, business stages and firm sizes. In turn, all these aspects may affect the potential for the realization of WTR on a broader scale. A series of qualitative interviews with worker representatives, management representatives and employees was conducted. The interviews were expected to shed light on the motives for WTR in the respective firms. They also covered potential initial resistances, both on employer and employee side, and how skepticism towards shorter working hours could be overcome.

The results reveal various supporting factors, barriers, risks and chances for reduced hours of work. Our analysis shows that similar problems, such as employee dissatisfaction, health issues, low productivity, or fear of losing skilled labor, provided the impetus for reorganizing and cutting work hours. Our findings suggest several factors that enhanced the implementation of a new working-time scheme, including the desire of employees for more employee-oriented working-time flexibility and autonomy, a value change towards a better work-life-balance (especially among the young generation), and relatively high incomes. From the firm perspective, especially prospects of higher productivity, cost reductions and an increase of the employer attractiveness were identified as supporting factors. Moreover, powerful works councils, a favorable economic situation, the existence of institutional arrangements (e.g. collective agreements, public subsidies) and external consultancy (e.g. scientific evaluations, experiences from other companies) facilitated the implementation of WTR.

Turning to potential barriers and risks for WTR, we found that employees might oppose WTR due to possible income losses, the risk of work intensification, or an unwillingness to change habits. For firms, fears of rising costs due to (partial) wage compensations or reorganizational processes, difficulties to find additional skilled staff, a deterioration of performance figures (i.e. sales per capita), or uncertainties concerning the legal foundation of certain working-time models might prevent them from implementing WTR. The cases also showed how firms had responded to these barriers and risks.

Finally, our analysis suggests that for developing and successfully implementing individual WTR solutions, democratic implementation processes, including votes, deliberation processes, and pilot...
projects are important. The fact that both employees and employers potentially benefit from new schemes of reduced working times is a prerequisite for maintaining and continuing the new model.


P34
Quiet degrowth – diachronic and synchronous perspectives on the European semiperiphery

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The phenomenon of global environmental change calls for a rational and emotional response, primarily from societies (economies?) of the developed world. Those people who claim to be committed to creating such a response are known as environmentalists, and within practically democratic societies (economies?) their identity attracts different political and market responses. In social research, much effort is spent in search for these environmentalists, and in trying to understand why these are found in certain geographical and social and locations rather than others. One of the dominant views in environmental sociology holds environmentalism to be a position more prevalent within the affluent societies. Conceptually, this draft paper insists on the need to distinguish between politicised and depoliticized environmentalism, with the former exemplified with the social movement called degrowth. Empirically, we aim to show that the research whose results connect environmentalism to average national affluence relies on a politically impotent construal of what it means to be an environmentalist. Based on such research a particular map European environmentalist and transformative potential emerges.

We are focussed on the European semiperiphery as the standardly presented environmentalist laggard within European environmentalism (cf. Bozonnet, 2017). Unlike societies classified as globally “peripheral”, this region is characterised by already high material standards of living. At the same time, here concern for the environment appears even lower than what is the case for much of the global periphery proper (Domazet and Ančić, 2017). This perception is closely connected to the affluence hypothesis which explains the differences in prevalence of environmentalist sentiments with differences in national affluence and access to ‘green’ products and services. To start off we contrast conceptually the dominant ‘post-political’ conception of environmentalism with ‘degrowth-oriented’ environmentalism, associating the former with green consumption and the latter with concerns over distributive justice. Such theoretical conceptualisations precede, but to an extent also predetermine, the mapping that empirical research produces in search for environmentalists. The kernel of such environmentalism lies in willingness to pay for the sake of the environment, which is the hidden basis for the results of the so-called affluence hypothesis (Franzen and Meyer, 2010). We propose a tentative step to move conceptually to an environmentalism of a very
different kind. This would be an environmentalism (and a broader socio-economic transformation) in response to the global environmental situation, rooted in a movement known as degrowth. Challenging the belief in the necessity, possibility and desirability of economic growth, this originally southern European movement is rapidly spreading across the continent and beyond (see Demaria, Schneider, Sekulova, & Martinez-Alier, 2013; Muraca, 2013).

The environmentalist stream of degrowth thinking stresses the current competition and future strategic trade-off between ecosystems and the industrial production and consumption systems. The democratic stream of degrowth champions debate and popular engagement over definitions of development and progress, and over struggles for justice, redistribution and technological intervention into social metabolisms. These are the motivations leading to ‘environmentally motivated democratic degrowth’, or a ‘growth-critical environmentalism’. Such environmentalism, concerned fundamentally with social justice, rejects the post-political response to environmental crisis that frames it as a problem that can be solved by relying on (techno-scientific) expertise (Swyngedouw, 2010).

In the empirical overview, we employ this new differentiation in order to revisit the very same datasets that the position we reject make recourse to for advancing its claims, primarily the ISSP Environment module (ISSP, 2012). This data indeed testifies to the importance of affluence in Europe – but only to the extent that the dominant pre-conceptions of what characterises an “environmentalist” remain unchallenged. With particular focus on the European semi-periphery, we trace a pattern of concern with environmental issues that does not correlate with affluence. Instead, this pattern, stands in an intimate relation with issues of dominant social paradigm, developmental aspirations, inequality and commitments in favour of distributive justice (e.g. Brajić Vuković, 2014; Dolenec, Domazet and Ančić, 2014). This has political and economic implications, including a strong case against positions that hold that the key for cultivating responsiveness to environmental perils is found in the generation of the monetary wealth which would dispose people to pay more for ‘greener products and services’. If our challenge is valid, then another kind of politics is needed. We use as a case study of a most recent dataset from Croatia (2016), focusing on economy-environment, developmental aspirations and broader cultural overviews and flourishing, to illustrate these points in finer level of detail. This paper shows how defining environmental value orientations more in lines with those of degrowth lets a very different map of environmentalism in Europe appear. Politically, this challenges established conceptions of what is realistic policy both for this continent and beyond. We conclude with a brief suggestion for a kind of politics that might be both politically feasible and capable of articulating an appropriate response to the challenge of climate change.

REFS


P35
Which neighborhood effect? A cross-country choice experiment on the impact of coordination and social norms on the willingness to accept biodiversity conservation payments by European farmer
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This paper aims to shed light on the challenges and opportunities of promoting farmers’ willingness to accept payments for biodiversity services in Europe. Agro-environmental schemes (AES) are, with protected areas and compulsory regulations, one of the main governmental tools for biodiversity conservation in EU countries, Switzerland and Norway. The impact of AES on biodiversity, however, is only modest (Kleijn & Sutherland, 2003). According to some authors, such lack of ecological effectiveness is due to insufficient participation of farmers, low levels of enrolled area in degraded areas and the lack of spatial coordination of contracts at the landscape scale (Kuhfuss et al., 2015).

Explanations about AES uptake abound. The impact of economic factors on farmer’s willingness to participate in AES are well understood among researchers (Knowler & Bradshaw, 2007; Sattler & Nagel, 2010). Less understood is the role of cognitive and normative factors. Explanations based on social norms and recognition logics build on the premise that farmers do not only care about the economic implications of their decisions but also about what others think about them and what is “appropriate” (Beedell & Rehman, 2000; Burton, 2004; Chen et al., 2009; Christensen et al., 2011; Jaeck & Lifran, 2009; Sheeder & Lynne, 2011).

Coordination can increase farmer’s uptake of agro-environmental programs (Franks & Emery, 2013). Farmers’ sense of effectiveness and/or obligation shall increase if they participate together with others and they may in turn be more willing to participate (Kuhfuss et al., 2014). Additionally, coordination can promote agglomeration effects of individual conservation efforts on biodiversity (Gabriel et al., 2010; Schmidtner et al., 2012), i.e., via the spatial coordination of such efforts (Bamire et al., 2013; Parkhurst et al., 2002; Warziniak et al., 2007). However, coordination also entails costs. The opportunity costs of collaborative conservation can be particularly high for some farmers in heterogeneous landscapes if collaboration implies the standardization of conservation measures (Ohl et al., 2008). This in turn may create equity issues among farmers if effort-based individualized payments are not feasible. Also, there are transaction costs. Farmers need to communicate, make collective decisions and potentially also supervise the proper implementation of those decisions, all of which requires time and resources (Goldman et al., 2007). In occasions the costs can be notably high, over 30% of opportunity costs (Villanueva et al., 2015).

In order to assess the impact of normative concerns and coordination requirements on farmer’s participation we use a choice experiment (CE) survey. In this survey, farmers were confronted with a series of choice cards where they were proposed alternative agro-environmental programs. Their task was to choose one program (or none) per choice card. Each scenario was the result of combining different levels of the attributes under study (Table 1). In our study farmers were invited to implement a “tree planting measure”. The measure was found to fulfill a series of constraints, including:
maximizing its applicability in different contexts, familiarity for farmers, potential for soil, water and biodiversity conservation, possibility to be used for agricultural production if desired by the farmer, and possibility for cross-boundary coordination. The selection of the attributes of the choice scenarios (Table 1) was based on a combination of the reviewed theory and information from focus group discussions with farmers in two of the study sites.

Table 1. Attributes and levels of the choice experiment

Location of trees
Location of trees along the border of the farm of a neighboring participant
1. Coordinated
2. Not coordinated
Share of farm
Percentage of farm dedicated to the measure
1. 1%
2. 5%
3. 10%
Recommendation
Whether the program has been selected over others by a group of reference
1. Recommended by farmers
2. Recommended by scientists
3. No particular recommendation
Payment for action
Annual individual payment in € per hectare, in addition to the reimbursement of planting costs and other governmental subsidies.
1. 50
2. 100
3. 150
4. 200

Cases were selected in three countries, Switzerland, Germany and Spain, following a “most different-case” strategy (Mill 1872, cited in (Sekhon, 2004). According to preliminary results (Table 2), coordination shows a negative impact across the board, although not significant except Spain. This supports transaction cost theory and our conjecture about the added difficulties of collective decision making, as well as the weight of long-term uncertainties. The attribute has the strongest impact among all attributes in the Spanish and German cases but not in the Swiss case. Indeed, the substantive impact for the Swiss sample is notably smaller than in the Spanish and German samples. This can be associated to the long standing efforts to promote agro-environmental practices and to coordinate efforts at the landscape scale in Switzerland.

Table 2. Preliminary results (conditional logit model)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ALL</th>
<th>Spain</th>
<th>Germany</th>
<th>Aargau</th>
<th>Zurich</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Conserv.</td>
<td>-1.763***</td>
<td>-1.270***</td>
<td>-1.310**</td>
<td>-1.858***</td>
<td>-2.079***</td>
</tr>
<tr>
<td></td>
<td>(0.214)</td>
<td>(0.487)</td>
<td>(0.556)</td>
<td>(0.414)</td>
<td>(0.354)</td>
</tr>
<tr>
<td>Soil Conserv.</td>
<td>-1.453***</td>
<td>-0.660</td>
<td>-0.952*</td>
<td>-1.503***</td>
<td>-1.935***</td>
</tr>
<tr>
<td></td>
<td>(0.218)</td>
<td>(0.506)</td>
<td>(0.569)</td>
<td>(0.419)</td>
<td>(0.360)</td>
</tr>
<tr>
<td>Biodiv. Conserv.</td>
<td>-1.542***</td>
<td>-0.648</td>
<td>-0.638</td>
<td>-1.833***</td>
<td>-2.074***</td>
</tr>
<tr>
<td></td>
<td>(0.296)</td>
<td>(0.701)</td>
<td>(0.762)</td>
<td>(0.570)</td>
<td>(0.483)</td>
</tr>
</tbody>
</table>
Also, the recommendation attribute shows the highest heterogeneity of impact both across countries and levels. The recommendation by farmers has a positive and relatively strong impact as compared to the absence of any recommendation in particular. This is the case for the full sample as well as each of the country samples. Alternatively, the recommendation by scientists has a very low positive impact in the full sample and impacts in different directions in the country-samples. Only the farmer recommendation coefficient in the full sample is significant at the 95% level; however, the impact is strong in all samples. Overall, the results support the theory of planned behavior and our conjecture about the importance of knowing about the preferences of other potentially relevant groups. More particularly, the different pattern found for the farmer and scientist recommendation levels indicates that such social pressure depends also on the group that exerts it.

P36

Macro- and socioeconomic impacts of a sustainable economy – Use of system dynamics approach to compare model assumptions on the energy transition in the UK
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What are optimal policy strategies to “green” the UK macro-economy? And, what are the macroeconomic and socioeconomic consequences of those strategies? These are the main research questions of this study. Additionally, this project addresses the following methodological question: What are the potential implications of certain assumptions (e.g. equilibrium assumption, rational agents) of typical Classical General Equilibrium (CGE) models on policy recommendations?

Within its “Climate Change Act 2008”, the UK committed to a reduction of at least 80% of emissions by 2050 against 1990 baseline” (UK Government, 2008; HM government, 2011; CCC, 2016). Reaching this ambitious climate target, requires the UK to “green” and restructure its economy and to introduce additional policies (CCC, 2016). However, besides its climate targets, the UK pursues other macroeconomic (e.g. high GDP, high productivity, remain internationally competitive) and socioeconomic objectives (e.g. low inequality and high employment). Therefore, this study aims to elaborate “green” policy recommendations (e.g. taxes, regulations, financial or monetary policies) that support the UK to reach its climate target, while at the same time maximizing other macroeconomic and socio-economic objectives.

This investigation is exemplified by the UK energy supply sector for several reasons. In 2014, the UK energy supply sector was the single largest source of UK emissions, accounting for 31% of the total emitted emissions in the UK (Department of Energy and Climate Change (DECC), 2016). Moreover, a large number of the UK power stations will close down within the next decade as they are at the end of their operational life. Hence, the coming years provide a window of opportunity to invest in less
carbon intensive energy generation infrastructure. Third, changes in the energy supply structure towards more “green” energy sources, will trigger structural changes in all other sectors of the economy towards more “green” production (DECC, 2014). The considered time horizon of the study is from 2016 to 2050, aligned to the time horizon of the UK climate targets. In addition, this project evaluates the policy impacts of proposed policy strategies in five-year steps, corresponding to the average planning horizon of policy makers. Different indicator sets will be used to evaluate the impact of different policy strategies.

This study uses System Dynamics (SD) as the main research method (see Barlas, 2002; Forrester, 1961 or Sterman, 2000) for three reasons. First, the energy supply system and the relevant economic dimensions are all complex systems and involve delays, non-linearities and feedback loops. Second, the focus of the study lies on the understanding of feedback loops and the underlying structure (cause-and-effect relationships) in those systems rather than on partial systems analysis and correlations. In contrast, the currently used CGE and econometric models are not designed to investigate complex systems and cause-and-effect relationships. Finally, this study simulates different research areas (economy vs. energy supply sector) in one modelling framework. All these reasons make SD an appropriate research method. Additionally, python programming is applied to deal with uncertainty of certain parameter values in the model, to analyse the simulation results and to identify robust policy strategies.

CGE models are the dominating modelling approach that analyses the consequences of climate policies. The UK government as well as the independent Climate Change Committee use, predominantly, the well-established Macro-hybrid energy-economic MARKAL Model for climate policy analysis and the investigation of related long-term macroeconomic consequences (Strachan et al., 2007, Strachan et al., 2009). This model is a combination of a neoclassical CGE economic model and the technological-rich bottom-up energy system MARKAL model (Strachan et al., 2007; 2008). However, this modelling approach involves certain restrictive assumptions of typical neoclassical models. For example, it relies on the assumptions of cleared markets (equilibrium in the economy) in the long-run, rational agents and perfect information. Alternative studies use econometrically estimated macroeconomic models such as The Cambridge Econometrics MDM-E3-model that is integrated in the standard MARKAL model (Ekins, 2006; Ekins, 2011). These econometric models assume that future behaviour can be forecasted by observed behaviour in the past. Moreover, both modelling approaches (CGE and econometric macroeconomic models) focus mostly on linear correlations, rather than on complexity, non-linear cause-and-effect relationships and feedback loops (which is the case for SD models). The described characteristics of these traditional approaches are not only important from a technical perspective, but also from a practical perspective as the application of these models can lead to biased policy recommendations and therefore to sub-optimal social welfare outcome for societies.

The expected contribution of this study is fourfold: First, it contributes to a better understanding of the system structure of the economy and energy supply sector, which is crucial for the identification of leverage points for policy implementation. Second, it delivers policy recommendations that “green” the energy supply sector of the UK while maximizing the outcome of other important economic objectives. Third, this study demonstrates macroeconomic and socioeconomic costs and benefits of a “green” transformation of the production structure of the economy exemplified by the UK energy supply sector. Finally, this study gives a methodological contribution by providing an analysis of the implications for policy recommendations of certain assumptions of CGE-models (e.g. equilibrium assumption, rational agents).

The expected results that will be presented at this conference is the conceptional framework (see figure 1) and the more detailed model structure of certain sectors of the thesis SD model. Thereby, the SD model includes the relevant economic sectors (production, labour market, consumption and financial sector) and a bottom-up representation of the energy supply sector. The production structure is on industry-level and differentiates industries with regard to their carbon intensity. Further, with regard to the energy supply sector, a special focus lies on the simulation of the investment choices of investors for new energy infrastructure.
References

P38
Mujeres autoconvocadas opposing mega-mining in Argentina. Their motivations to advocate for environmental justice
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In Argentina, the social opposition to mega-mining has adopted a participatory format with the multiplication of self-summoned neighbors’ assemblies in the towns either already affected or potentially threatened by the activity. In the latter, women are important actors both in membership and leadership. This article explores the motivations of these women to preventively mobilize against mega-mining, before the companies concretized their planned implementation. Previous literature on the environmental justice movement overly focused on motherhood to understand women’s motivations while this literature has also commonly disregarded ecofeminist theoretical frameworks. However non-essentialist ecofeminisms help surpassing pre-conceived ideas about what are feminine concerns. The aim here is to provide a broader picture on women’s motives without disregarding motherhood either. Semi-structured interviews on Skype were conducted with self-summoned...
women from Esquel, Famatina and Chilecito, in Chubut and La Rioja provinces, where the neighbors’ assemblies were formed preventively, before the mining projects became operational. The interviewees expressed incentives which combined the defense and the attachment to the territory with the concern for their children and with the worrying knowledge they obtained about the impacts of mega-mining in towns where the mega-mining industry is effective. Their valuation language of the territory corresponds to the eco-territorial turn of the grassroots struggles counteracting extractivism. Even though women’s claims are not explicitly worded under ecofeminist terms, Mies’ and Shiva’s anti-colonialist and anti-capitalist ecofeminism provides with an understanding of their struggle and enables looking beyond gendered biased conceptions which determine beforehand what women’s motivations are. The results from the interviews have also evinced the political empowerment of women, triggered by their opposition to mega-mining.

P39
Limits and facilitators of adaptation in the marine fishing community of Maharashtra, India
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Summary
Marine fishing livelihoods are vulnerable to multiple environmental and anthropogenic stressors. Adaptation to the impacts of these stressors is vital for sustaining livelihoods of the marine fisherfolk. This study is an attempt to assess adaptation, its limits and drivers in the marine fishing community of Maharashtra (a state) in India. The study also aims to understand the variations in adaptation strategies and their drivers, among the fishing communities located in urban, peri-urban and rural regions of the state. Focus Group Discussions conducted among the three communities reveal that their perceptions about change and impacts, as well as adaptation strategies, vary. But adaptation in all the three communities is limited by poor institutional facilities and policies. Logistic regression model is used to further empirically analyze the drivers of adaptation in the community. The results indicate that economic and social capital, and perceptual factors are important determinants of adaptation decisions. These results provide useful insights for the design of adaptation interventions to support the livelihood of the community.

Introduction
Sustainability of livelihoods mandates adaptation to changes. India’s marine fisher folk are vulnerable to multiple environmental and human-induced stressors such as extreme weather events, pollution and trade-competition (Vivekanandan 2011). Climate change, which can lead to changes in oceanography, can also impact the availability and diversity in marine life, subsequently crippling marine livelihoods (Doney et al. 2012). Multiple stressors have resulted in reduced fish catch and consequently lower income for the artisanal marine fishing sector (Pauly & Zeller 2016; Sumaila et al. 2011). Adaptation to the impacts of these stressors is vital for sustaining livelihoods of the marine fisherfolk. But there is limited understanding of private adaptation in marine fishing communities, especially those located in India. This study is an attempt to assess adaptation, its limits and drivers in the marine fishing community of Maharashtra (a state) in India. Further, the study aims to understand the variations among the community located in urban, peri-urban and rural areas.

Method
Three Focus Group Discussions (FGD) were conducted to understand perceptions of change, adaptation strategies and limits to adopting such strategies in fishing communities located in urban, peri-urban and rural regions of Maharashtra. The questionnaire for these discussions was designed after an in-depth review of the literature, news reports on the community, field visits and interviews.
with experts and community leaders. The important adaptation strategies and their limits were identified through these discussions.

Based on the observations from the FGDs, a household survey is designed to empirically examine adaptation and its drivers in the community. The survey is in progress. Communities located in peri-urban and rural regions are currently being surveyed. It is expected to be over within the next four months. The results described in the following section are based on 200 responses collected from six fishing villages in Mumbai (an urban area in Maharashtra): Versova, Khar Danda, Mahim, Worli, Cuffe Parade and Colaba.

Logistic regression models are estimated to assess the contribution of different factors to the probability of decision to adapt. Adaptation includes decision to motorize and mechanize boats, insure boat, use multiple nets, work longer hours and go longer distance. Capacity or the decision to adapt can be dependent on various social, economic and institutional factors such as education, health, experience in fishing, economic assets, sources of credits/subsidies, membership in cooperative/public bodies and presence of social support, for example, trust among the community (measured through seven items on a Likert scale) and presence of relatives in the profession (Islam et al. 2014a; Islam et al. 2014b; Allison & Horemans 2006; Cinner et al. 2015). The decision to adapt can also be influenced by perception of changes in the environment/climate, trade competition and future livelihood planning (Adger et al. 2009; Daw et al. 2012). Hence, the explanatory variables in the logistic regression models are various socio-economic and perceptual factors, which can define the capacity to adapt. These are a mixture of continuous, binary and categorical variables. The dependent variables for the five logistic regression models are binary variables indicating the presence and absence of the five adaptation strategies among the respondents.

Results

The FGDs reveal that the perceptions about change and impacts as well as adaptation strategies vary among the urban, peri-urban and rural fishing communities. The urban community has been experiencing a decline in catch since a longer period as compared to the peri-urban and rural community. Also, the urban community is highly aware about environmental and climatic changes as compared to the other two communities. The urban community has intensified their efforts and have adapted. On the other hand, the limitations experienced by the three communities are similar. They are largely limited by shortcomings in the institutional facilities and policies, such as unavailability of credits as well as fishery-related public infrastructure, and poor information on weather and potential fishing zones.

The results of the logistic regression indicate that adaptation through motorized and mechanized boats is highly associated with availability of formal credits, subsidies and perception of change in catch. Usage of multiple nets is influenced by availability of formal credits and increased experience of trade competition. Longer number of working hours is highly initiated by presence of household members who can stay back to take care of the house and family. Long working hours is also related to willingness to make their children continue in the profession. Similarly, adaptation by going deeper into the sea is determined by household members who can stay back, willingness to continue their children in fishing and availability of formal sources of credit. Insuring boats is driven by experience in fishing, availability of credits, subsidies, having relatives in fishing and perceptual factors regarding climate change and increased pollution.

Conclusion

Marine fishing communities are vulnerable and adaptation is crucial. Understanding the limits and drivers of adaptation can immensely help in community adaptation management. The paper has explored adaptation and its barriers in three different fishing communities: urban, peri-urban and rural. The study has also empirically identified the drivers of adaptation in the livelihoods of urban fishing communities (Household survey of peri-urban and rural communities is in progress). All the three communities are largely limited by poor governance. Overall, economic and social capital, and perceptual factors play important roles in determining adaptation in the urban community. Thus, economic incentives and awareness programmes (about various environmental changes and their future implications) in the community can assist in sustaining the artisanal marine fishing sector. The
results of the study provide rich insights for the design of adaptation interventions to support the livelihood of the marginalised fishing community. Comparison among urban, peri-urban and rural communities might help tailor policies accordingly.

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P40
Floods stay in the head, droughts are easily forgotten
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Despite the common stereotype that England and Wales are wet countries with steady precipitation, both have actually suffered from severe dry periods such as in 1975/1976, 1995 or 2010-2012. The problem was and is exacerbated by aging infrastructure and high leakage levels. Current drought governance in England and Wales is reactive rather than proactive. The array of instruments and measures focusses primarily on what to do when in a drought but not how to prevent a drought or to plan ahead for a drought.

This poster has two aims. First of all, it will present results from an international literature analysis, an analysis of policy documents and grey literature on drought and water scarcity management. This is complemented by the results of an analysis of all UK water companies' Water Resources Management Plans (WRMP). WRMPs are a legal requirement where water companies set out their strategies to meet supply and demand. Hence the criteria for the content analysis where for example key water saving strategies, leakage reduction, maintaining deployable output, metering, cross-sectoral collaboration or stakeholder involvement.

The results of the review and analysis of national and international academic and grey literature shows that it is a very specific range of drought management options that are currently used in drought management practice in England & Wales. This critical literature review also provides a, non-exhaustive, list of key drought management options from other countries, especially Spain, Australia and the United States (California). Currently employed drought management options in the UK focus on restricting water use in times of drought and are therefore, with the exception of elements of drought plans and water resources management plans, reactive rather than proactive. International
literature shows that proactive measures that focus on cross-sectoral collaboration, certain abstractor groups such as farmers and options that put emphasis on the value of water are the way forward in drought management. This proposal is in particular concerned with developing initiatives for ‘valuing water’.

The analysis of all English and Welsh Water Companies’ WRMPs had as an objective to look for themes and patterns with regard to current drought and water scarcity management practice. Against the background of internationally available drought management options, the analysis shows that English and Welsh water companies tend to focus on drought management options referred to in the formal regulatory framework, but rarely push for innovation with only a few exceptions. Some water companies introduce in their WRMPs innovative options at the ‘appraisal of options’ stage only to later discard these options. This is puzzling. Why do some water companies pursue and implement innovative drought management options while others do not? In other words, what are drivers for and barriers to innovative drought management practice in England & Wales? For example, compulsory metering is a heavily disputed issue in England and Wales and water companies approach it differently. Some companies have set themselves targets to introduce compulsory metering in the future other companies run pilot studies. More important, flooding policies and drought policies are treated as two different entities causing maladaptation. Better communication and collaboration with the agricultural, forestry, energy and housing sector are needed to overcome fragmented planning and implementation. Since droughts are often followed by heavy rainfall debates about drought governance are difficult to maintain as people tend to forget them while pictures of floods stay in their heads. The results of this first step will be presented in manner that breaks away from the usual supply/demand dichotomy we found in drought management literature. Instead it will focus on abstractor groups or issues such as valuing water.

In a second step and following up the results from the first step, this poster presents the results of a scenario building workshop that was held in 2016 with stakeholders and researchers from UK drought and water scarcity management – the environment ministry (DEFRA), the Environment Agency, water companies and the economic regulator and water consultancies. The workshop developed four scenarios on the topic of resilient drought and water scarcity management in England & Wales in 2065: (1) ‘Accepting decline’, (2) ‘Rising to the challenge’, (3) ‘Enjoying their luck’ and (4) ‘Passive Acceptance’. The poster will elaborate on each scenario and its storyline before drawing conclusions with regard to future drought and water scarcity management. The results of the scenario workshop are in line with the results of the first steps, i.e. the need for more collaborative and integrated approaches to drought and water scarcity management. Workshop participants identified water use culture, integrating flood and drought policy or the willingness to share water (among water companies) as key drivers for resilient drought and water scarcity management in England & Wales in 2065. Last but not least the poster discusses potential next steps to change current approaches to drought and water scarcity management based on the results.

P41
The REEL Framework – A tool for assessing the quality of instruments in soil governance

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Soils are imperative for humans because of their provision of various ecosystem services, such as ensuring food security, biodiversity conservation, water regulation or carbon sequestration. Therefore, environmental and natural resource governance is needed to guide the sustainable and effective use of this limited resource. However, several existing soil governance instruments have been highly criticized as neither being efficient, effective nor legitimate in governing soils in a way that they
sustainably provide these services in the long-term (e.g. Montanarella and Vargas 2012, Howard and Larson 2015).

The development of effective policy instruments and favorable institutional conditions are therefore considered as preconditions for the implementation of sustainable soil management practices (de Jager 2005). There is some agreement in the literature that new governance instruments and tools are needed in order to achieve a more successful soil governance system (Howard and Larson 2015, Weigelt, Müller et al. 2015). However, there is a lack of analytical tools to systematically estimate the performance of instruments in soil governance. Therefore, this paper aims to fill this assessment gap by providing an analytical structure that allows the evaluation of the quality of instruments.

The paper presents and tests an analytical framework for soil governance instruments that can be applied for evaluating different types of approaches for soil governance. It is based on a systematic review of the existing literature on environmental and natural resource governance and builds on the work of existing frameworks but focuses specifically on the evaluation of instruments. Instruments quality here is equated with maximizing governance performance, which is evaluated with the dimensions resilience, effectiveness, efficiency and legitimacy (REEL). Effectiveness, efficiency and legitimacy are considered as being core dimensions of governance (e.g. Piattoni 2010). In addition, these core dimensions need to be analyzed in different spatial scales and different time scales. Each quality criterion has been further specified by indicators to enable the assessment of each criterion.

1. Resilience: In the context of global change, resilience is considered as important feature of governance systems to react to disturbances and adapt to changing circumstances. So far, no set of indicators has been developed to measure the resilience of soil governance instruments. Based on resilience indicators for different types of resilience, a set of indicators to measure an instrument’s resilience comprising evaluating the flexibility, possibility for learning, diversity and redundancy of the instrument is suggested.

2. Effectiveness: Indicators of effectiveness of governance (processes) can be distinguished into the output, such as food production or performance indicators), outcome (change of behavior of actors) and impact, e.g. on the environment (change in ecological condition) (Hogl et al. 2012).

3. Efficiency: Assessing the efficiency of any instrument demands that the (policy) objective to be obtained had been determined. Three dimensions of efficiency are distinguished: 1) cost-efficiency (ratio of needed input to the desired effect), 2) Pareto-efficiency (allocative dimension) and 3) adaptive efficiency (innovation over time).

4. Legitimacy: The concept of legitimacy is distinguished into three dimensions: 1) input legitimacy, 2) throughput legitimacy and 3) output legitimacy (Rantala 2012, Schmidt 2013). For example, input legitimacy is split into equality in participation and rule compatibility and relates to equal opportunities of participation in decision making processes and the questions if rules comply with already existing institutions.

In the analysis of each of these criteria, the spatial scale and time scale are to be considered. In governance analyses “the spatial dimension” is often related to geographical units, such as globe, region, landscapes and patches, which again is closely related to jurisdictions (see Cash et al. 2006). For analyzing soil related governance and/or decision making, spatial boundaries related to administrations have to be set in relation with ecological boundaries, such as geological conditions or parcel boundaries. It is important to evaluate the effectiveness, efficiency and legitimacy of instruments in different time scales. For example, an instrument might be effective in the short-term, but it might not be effective in the long-term.

Between most of the criteria trade-offs, but also synergies exist. Especially, identifying and fostering the implementation of the instruments that embody synergies between the criteria have a high potential for improving soil governance systems. An example of a policy tool, where synergies between criteria are high, is the instrument of agri-environment-climate measures (AECM). This is demonstrated by applying the proposed analytical framework to the analysis of AECM in the German state of Saxony. This empirical example illustrates how the framework and especially the indicators of the four quality criteria can be applied in practice and be used as analytical tool to assess the quality of the policy instrument.
Found voice: Art as a novel data source to elicit cultural ecosystem services in river catchments

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Responding to increased flood risk from climate change the UK government has recognised a need for greater investment in flood defences (CCC, 2016; HM Govt, 2016) and in the nation’s natural capital (NC, DEFRA 2015; NCC 2015). This has raised the profile of nature-based solutions (NBS), such as restoring peatlands and reconnecting rivers to floodplains, to deliver flood regulation and other ecosystem services (ES). The ES approach has attracted policy interest as it connects NC and the ES flows it supports with human wellbeing (MEA, 2005; TEEB, 2011; Fisher et al., 2008). One category of ES, cultural ES (CES), comprise a range of nature- and place-based benefits. The significance of this category is that the continued delivery of CES has been noted as one of the most compelling arguments to conserve NC (Polasky and Segerson, 2009). Yet identifying, measuring and valuing CES is difficult (Satz et al., 2013) and thus their inclusion in catchment management is often absent or deficient. The two most commonly reported CES are recreation and aesthetics; they are also the easiest to monetarily value (Turner et al., 2016). If it is time for ES in decision making to deliver solutions to respond to the urgency of sustainability challenges (Daily et al., 2009) then it is also time to develop methods that account for CES that have a more prominent role in NBS solutions.

There are two key sources of challenge in assessing CES, their: intangibility which makes them difficult to identify; and incommensurability which means they do not fit in typical valuation methodologies as people may be unwilling to trade them off (Chan et al., 2012). In this paper we are concerned with the identification of CES, in river catchments. Although many CES are intangible, frameworks exist that describe CES types (e.g., MEA, 2005; TEEB, 2011). Yet, Chan et al., (2011) argue that the CES literature often conflates services, benefits and values. Chan et al., (2012; 9) make the following distinction,
whereby: “services are the production of benefits (where benefits may take the form of activities), which are of value to people”. They identify 12 categories of benefits.

Case studies in Australia and Mexico have applied these benefit categories (Bark et al., 2014; 2016; 2017). Bark et al., (2014) identified which benefit categories were mentioned in interviews by members of the Ngemba Ngemba Aboriginal community when they discussed water planning along their stretch of river in the Murray-Darling Basin, south-eastern Australia. The results were compared to State level water resources planning documents to determine if the plan’s goals matched the benefits desired by the community. The authors noted that the benefit categories were useful as an accounting tool and recommended the addition of ‘Aspiration’. They also cautioned against reductionism inherent in the categories which contrast with the community’s regard to holism and an enduring stewardship of, and set of obligations to, their land, water and ancestors.

In Bark et al., (2016; 2017) the Chan et al., (2012) framework was again used to identify and to dynamically track the expression of different benefits during a restoration event on the Colorado River delta, Mexico. Data was collected from newspapers and blogs and articles were coded by benefit categories and a time-tag. In combination a picture emerged about the sequencing and relative prominence of human-water interaction (Sivapalan et al., 2014) over the lifetime of the restoration event. In Bark et al., (2017), using the same dataset, the authors focus on human services to nature that initiate benefits. They find that nature alone does not provide CES, rather human aspiration, knowledge and activity contribute to, and are instrumental in, the socio-ecological system. The case studies described above provide evidence of the usefulness of the Chan et al., (2012) framework. Somewhat obscured in the application of it, is the inherent challenge of finding data to apply it to. In the examples above, interviews and media articles provided the data points. In neither case were the ‘participants’ directly asked about CES or introduced to the ES approach conforming to Satterfield’s (2001) judgement that the elicitation of cultural benefits and values is likely best when it is indirect. With this in mind we set about finding material from which we could code benefit categories related to river catchments in the UK.

Through a series of walks, including a long-distance walk, the Dales Way, in West Yorkshire and Cumbria, England, unstructured conversations with other walkers and people owning or working in public houses and shops, on farms, and in Bed and Breakfasts established that people openly discuss the benefits they receive from, and the values they attach to, river catchments. This scoping exercise confirmed that many of the benefit categories from Chan et al., (2012) were important to those living in, or recreating in our case study Calder catchment. In these encounters we used a subtle form of elicitation; listening. However, in order to code ‘data’ we needed to collect testimony yet we had residual concerns about structured forms of elicitation inherent in surveys or interviews (Satterfield, 2001). We thus searched for other forms of contemporary testimony. The documentary Calder made in 2016 by filmmakers Geoff Brokate and Paula Sutherland forms our dataset. It traces five Mytholmroyd, West Yorkshire residents’ experience of the 2015 devastating floods in the Calder. It provides testimony for tracing the benefits they receive from, and the value they attach to, their catchment. The film was coded in NVivo10 using the Chan et al., (2012) benefits categories plus Aspiration.

Discussion
We investigated art as testimony for eliciting CES benefits. Like Bark et al., (2014; 2016; 2017) this data was not created for analysis; it was identified from an existing source. An advantage of such ‘found testimony’ is that it is not directed by the researcher, who is rather another observer. An alternative approach is to ask people directly to discuss ES, including CES, like in Hatton MacDonald et al., (2013). In that paper the authors’ consideration to their audience of local leaders was to use plain Australian language to describe ES. Key to found testimony is that responses are not provoked in data collection processes, but rather gleaned from where they spontaneously emerge. The challenge is such data sources need to be found. Yet once found, an advantage of working with artists, is that they have different perspectives and can get closer to a community meaning people may more readily express the benefits they receive and their values.
The five personal stories in Calder not only make real the damage from flooding but tell of wider attachment to place and social connectedness as well as identity with, and inspiration from, the river catchment. The five speak of Activity, i.e. memory (history, baselines), vigilance and volunteering, which is expressed at the individual, community and national levels and provides evidence of other-oriented values (Chan et al., 2012). Another advantage of such found voice is that personal stories are a powerful means to communicate CES.

References

P45
Institutions, the state, and robustness of Russian agriculture
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Russia has been experiencing tremendous changes in both land use and state regulation since the
breakup of the Soviet Union in 1991. Large-scale abandonment of agricultural land that initially swept the country is now seeing a reversal in many regions, where land reclamation goes hand in hand with agricultural intensification (Kühling et al., 2016). Adaptation to climate change is becoming essential as the frequency of food production shortfalls in the key crop-producing Russian regions is expected to triple by the 2070s (Alcamo et al., 2007). The transition from a command-and-control to a market economy has also been anything but smooth, and was characterised by profound institutional changes including redefining the role of the formerly omnipresent state in the economy and land management (Wegren, 2009).

The role of the Russian state in the agri-food system and its implications for the system’s robustness, in the absence of an active civil society, remain understudied. The bulk of the literature has focused on the federal level, and very little data exists on actual interactions between farms and the state authorities now, 25 years into the transition (e.g., Griewald, 2016). Meanwhile interactions at the regional level are particularly crucial in a federal system. Furthermore, to unveil the real state influence upon agricultural producers, it is insufficient to analyse policies and statistics. Only a study of state-farm interactions on the ground can reveal the actual scope and depth of state intervention.

The present study focused on the Tyumen region, located in West Siberia and confronted with a range of country-typical challenges related to land-use change, climate change, and biodiversity loss (Degefie, 2014; Mathar et al. 2015). It is one of the seven regions making up the Western Siberian Grain Belt, where 70% of all grains of Asiatic Russia are produced (Kühling et al., 2016). Around 36% of the population live in rural areas (FEDSTAT, 2016). Large agricultural enterprises work over 80% of agricultural land in the region (TYUMSTAT, 2015). The empirical study was guided by the following questions:

1) What role does the state play in shaping the agrarian institutions in the Tyumen region?
2) How does this state influence affect the institutional robustness potential of the agri-food system?

The notion of institutions is central in this study and refers to ‘the humanly devised constraints that structure human interaction’, including both formal and informal constraints as well as their enforcement characteristics (North, 1993). The term ‘agrarian institutions’ incorporates the various institutions related to agricultural production, including labour, input procurement, agricultural marketing, and advisory services (Bardhan, 2001). The existing agrarian institutions can either be conducive to or undermine robustness in a particular agricultural system: this influence is referred to as the ‘institutional robustness potential’. To operationalise this notion for a post-Soviet agri-food system, three blocks of literature were analysed: a) robustness of social-ecological systems (Ostrom, 2007; Levin and Lubchenco, 2008, etc.); b) new institutional economics with relevance to agriculture, in particular: property rights and land tenure security, contract enforcement, public and private ordering, properties of nature-related transactions, path dependency, institutional economics of agricultural organisation (North, 1993; Prosterman and Hanstad, 1999; Allen and Lueck, 2002; Hagedorn, 2008: Brookfield and Stocking, 1999, etc.); c) the role of the post-Soviet state in agriculture (Rapaczynski, 1996; Wegren, 2000, 2009, etc.). The selected criteria for the institutional robustness potential include the extent to which the particular institutions support/account for diversity and heterogeneity (including biophysical diversity, seasonality, climate change effects, agro-biodiversity, management and organisational diversity), room for autonomous change, feedback loops, security of land tenure, and self-enforcement of institutions.

The study relied upon qualitative research methods, in particular semi-structured interviews and a document analysis covering federal and regional laws and subsidy regulations. 59 interviews were conducted in the Tyumen region in 2013-2014 with family farmers, farm workers (directors and/or agronomists), directors of grain elevators, district authorities responsible for agriculture and local experts.

First, the study revealed that the role of the state had gone a long way from management by fiat to a much higher degree of farm independence. Along with the legal changes, the perception of the role of the state also changed, and farmers were well aware that the state’s sphere of competence had shrunk. Nevertheless the intervention did take place, and was found to have been especially prominent in the case of land management and advisory services. In particular it concerned the timing of
agricultural operations, input use, the crops cultivated and the sown area size. The current top-down approach of the authorities appeared to point to a continuing lack of trust in private land users and their ability to manage the land according to their own judgment and economic reasoning. Official as well as perceived eligibility requirements for subsidies often served to sustain farm compliance with state prescriptions. This worked especially well in a region where farm profitability without subsidies would be negative (MARF, 2016). However, certain large farms were also believed to enjoy state preference when new land became available.

Second, the analysis showed that the contemporary manner of state influence did little to enhance the robustness potential of the agri-food system. It accounted for the local characteristics only to a very limited extent, and restricted feedback loops and room for autonomous change indispensable to agricultural activities. Instead of staking on enhanced interest representation and inclusion of farmers’ and public concerns, state intervention appeared to largely serve the political goal of production increase motivated by the self-sufficiency targets at both regional and federal levels. The ‘food security’ discourse, in turn, was used in regional elections to attract voters from the northern areas, rich in oil and gas but with only marginal agricultural production. Where politically motivated top-down regulation precludes agricultural diversity and environmental change from being fully perceived and adequately tackled, chances are low that effective adaptation can take place. The paper finally discusses the manner of the Russian state to intervene within an international context and shows that path dependency, including the history of property rights in land, plays an important role in explaining the present-day functioning of the agri-food sector.

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The effects of unsustainability, such as the effects of climate change and limits to growth, are well known. Despite the growing concerns about sustainability, there is little or no consensus on what it means (Lélé, 1991; Mebratu, 1998; Daly, 1990). ‘Sustainability’ should refer to environmental, social and economic sustainability (Giddings, Hopwood & O’Brien, 2002; Van der Vorst, Grafe-Buckens & Sheate, 1999).

To achieve sustainability, each entity must be held accountable to all its stakeholders for the effects of its activities on the environment, on society and on the economy (Henriques, 2004). Here an ‘entity’ is a corporate organisation in the private sector or a government institution.

In order to achieve accountability by and comparability between entities we need measures of the outcomes—i.e. the ultimate effects—of entities’ activities on the environment, on society and on the economy (Adams, Frost & Webber, 2004). But most measures of sustainability focus on entities’ performance and practices and not on the ultimate effects of entities’ activities. For example, companies reporting in terms of the guidelines of the Global Reporting Initiative (GRI) find themselves having to report numerous such measures. Whilst such measures may be interesting, they fail to allow comparability on the basis of their ultimate effects on the environment, society and the economy. As argued by Vos & Reddy (unpublished) “performance is the result of practices which are implemented to effect a desired outcome.” It is the outcome that is central to accountability and sustainability, not performance (Vos & Reddy, op. cit.).

The ultimate aim of the triple bottom line (TBL) framework is to make entities accountable for the effects that their activities have on the environment (the environmental bottom line), on society (the social bottom line) and on the economy (the economic bottom line) (Elkington, 1997). This suggests that the TBL framework is an obvious framework to use to measure sustainability. But the TBL framework is highly criticised (Norman & MacDonald, 2004). In addition, it is widely accepted that there is no agreed-upon methodology for the measurement of the TBL (Norman & MacDonald, op. cit.; Porritt, 2004; Gray & Milne, 2004). Norman & MacDonald (op. cit.) find it “surprising and worrisome” that very little research has been done on formulating the TBL.

This paper will deal with environmental sustainability. In order to address the issue that very little research has been done on the formulation of the TBL, and in particular the formulation of the environmental bottom line, the primary aim of this paper is to propose alternative formulations, using the TBL framework, of the measures of the following effects:

– the effects of its activities during a reporting period on the environment as at the end of that period (this satisfies the criterion of accountability for immediate effects);
– the effects of its activities during that reporting period on the environment as at future time horizons (this satisfies the requirement of accountability for lagged effects);
– the effects of its activities during future years on the environment as at subsequent time horizons (this satisfies the requirement of establishing future sustainability). (Reddy & Thomson, unpublished)
A distinction is made between accountability for the past and present effects, and sustainability for future effects.

The paper will be organised as follows. The first section will set out the aims of this research and the contribution of this research to the current sustainability and TBL discourse. The next section will include a literature review. The literature review is the basis from which the criteria, alternative formulations and models will be developed. A criticism of the literature leads from that basis to the specification of the criteria and the alternative formulations of the measures and models. The literature reviewed will include literature on the origins of the TBL, the definitions of the TBL and uses of the TBL. Current thinking on the TBL will be reviewed and criticised. Current measures and measures that are available but not being used widely will be assessed. The challenges of estimating the environmental bottom line will be investigated. Philosophical discussions on the need to avoid the trap of reductionism will be included. These discussions form the basis of the critique of the way in which the concept of the TBL is applied. This critique emerges from the literature review, but also from the way in which business people talk about the TBL. The criteria for measuring environmental sustainability will then be developed. The current models for measuring the effects of environmental variables on the biosphere will be investigated. Explanatory variables required to estimate the environmental bottom line will be explored. Alternative formulations of the environmental bottom line will be developed and the models required for the determination of the measures, and the models that will facilitate the projection of these measures, will be formulated. The scope of this research excludes the practicalities and political issues around the implementation process.

References
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SUSTAINABILITY POLICY OF ESEE 2017 CONFERENCE

The Local Organizing Committee is strongly committed to make the 12th Conference of the European Society of Ecological Economics (ESEE 2017) as sustainable as possible in environmental and social sense. We are openly devoted to the values of social and environmental justice, we pay special attention to diversity, gender equality and participation.

Our sustainability policy aims to adopt, apply and promote principles that can contribute to make the event more sustainable and to encourage participants to be environmentally and socially conscious. We are committed to engage an ongoing discussion with the major stakeholders, such as participants, suppliers, catering providers, conference committees, track chairs, volunteers, local community groups, etc. in order to be able to integrate the sustainability principles into the organization and management of the event.

Our sustainability strategy aims to cover the following principles:

- Minimizing the environmental load of the conference package and information materials.
- Offering accommodation options committed to greener principles and are in walking distance from the venue.
- Reducing waste quantity and promoting recycling at the venue.
- Selecting subcontractors and other service providers (e.g. catering) based on environmental and social merit.
- Giving attention to intergenerational relationships and to involve socially disadvantaged people (NGOs and civic organizations dealing with intergenerational relationships, homeless, and marginalized people).
- Prioritizing gender balance in composition of the speakers and the program.
- Using participative decision-making strategies during the planning, inviting all organizers to express their opinion and thoughts, and making decisions together on the basis of consensus.

Concrete measures taken are the followings:

Catering:

Catering providers were selected based on multiple criteria related to sustainability. We compiled a guideline for caterers and we used a multi-step selection process in order to choose the most appropriate catering companies. According to our guidelines, our caterers guarantee that various menu options are offered at the main meals and vegan/vegetarian food is more widely available than meat.

We preferred short supply chains, thus meals that prepared with local, seasonal products will be provided. If some products cannot be local (e.g. coffee), these will have a fair trade label. We ensured that the catering companies know the number of participants as accurate as possible in time to avoid food waste.

We also preferred small enterprises against big providers. With this principle our goal was twofold. First, we wanted to support small, local and environmentally conscious catering providers, who are usually less competitive in the global market against big, multinational rivals. We are convinced that with this event, we will provide an opportunity for them to network and cooperate with similar entrepreneurs. Second, with choosing several small providers instead of one, our goal was to promote the great variety of local gastronomy and create the atmosphere of a real Hungarian food fest in the conference.
Our caterer providers are the following:

**Bistro No Waste**

Bistro No Waste takes eco-friendly eating to a new level!

Zsuzsa Keve decided to create a Budapest bistro that is almost entirely waste-free – made possible by serving food on edible plates, which is provided with biodegradable cutlery, too.

The plates are made in industrial environments with press machines, and their inner surface is shiny because of a heat treatment that allows them to retain liquid for 15-20 minutes. We can bake bread in them, and put them in the freezer or the microwave – although at Bistro No Waste, there’s no microwave, deep fryer, or palm oil to be found. Their cleaning products are environmentally friendly. The entire place produces only 3-4 liters of trash each day, excluding what can be composted.

The plates are also a great composting material, as they break down completely in just 30 days. The wheat bran and PLA-based knives and forks, while not edible, take about the same amount of time to decompose. The spoons are made from sugar cane to better withstand the hot soups, but are also biodegradable.

**Házikó**

Házikó connects the city and the countryside

Házikó produces and delivers fresh, healthy and natural foods for conscious city consumers who would like to know from where the pure ingredients are coming from. All packaging is biodegradable and the production is environmental friendly, also products are made without any preservatives and additives. Thus choosing Házikó means a socially responsible decision and a direct contribution to the development of the countryside.

Why is Házikó unique?

Rural development and sustainability principles stand behind the impeccable quality of our soups, sandwiches, salads, party platters, fruit and vegetable filled rolls and desserts, providing particularly valuable meals. Very often it takes only a couple of hours for the lettuce or zucchini to make the journey from the gardens to your table. Sweet-scented apples hanging on the tree today will be in your pie tomorrow. However, what is truly outstanding is what comes next. If you wish to check out where the pears, paprika and the buffalo originate from, you can. Reading information on the packaging will put you on the right track.

Our ingredients are obtained exclusively from small-scale farms, with a strong preference for organic farmers. In this way the work of producers in the rural areas acquire value and meaning. All our
suppliers farm in a plant-, animal, land- and human-friendly way. The place of origin of all ingredients of our products are indicated so you will know what you are eating and you can even look up farms personally. Preservatives, additives and food colouring is not used at all throughout processing of the pure-source ingredients. The environmentally friendly operation of our workshop and the biodegradable packaging of our products make our concept complete.

Katlan Toni

Katlan Toni is a group passionate about catering. We mix traditional Hungarian kitchen with modern gastronomy trends. We keep local kitchen treasures while creating refreshed versions of old recipes for today’s taste and requirements. Our dishes are made from quality ingredients and lots of love. Katlan offerings are always tailor-made. At outdoor events, catering services, weddings and gourmet festivals our aim is to see satisfied guests and partners. Their reviews are the most important references for us.

Mantra

Mantra Specialty Coffee is a coffee sanctuary, a little cosy coffee shop in the heart of Budapest.

We serve specialty grade high quality coffees roasted by Rubens Gardelli 4 times Roaster champion of Italy.

You can find coffees from different regions, which are representing the tastes of the micro climates, processing and so on, because they all make a big effect on how the coffee beans will taste.
We offer vegan cakes as well, they are homemade, really delicious and simply perfect on the side of a good cup of joe.

**Waste management:**

We paid special attention to reduce waste quantity to minimal level. We provide reusable materials throughout the catering: dishes and containers based on ceramic and glass, metal cutlery, glass cups and/or other reusable glasses, cloth napkins. There will be no PET bottles or plastic cutlery.

If it is necessary to use disposable materials, we choose those which are made from recycled or plant-based material, and are recyclable. The paper used should be chlorine-free.

We encourage participants to bring their own reusable drink container (e.g. cup, thermos). For those, who cannot bring their own container, we offer a biodegradable bamboo mug. The mug is reusable and it doesn’t have any logo, thus it can be used on other events (or later at home) too.

We ensure the correct disposal of waste from the catering service, including the separation of recyclable materials. Food waste will be collected by a local NGO, Budapest Bike Maffia. The members of the organization deliver food, toys, or useful things essential to life by bike to the people in need. Their goal is selfless assistance to homeless people and poor large or small families. (for details on their activity, see [http://bbm.hu/en/](http://bbm.hu/en/))

**No paper policy**

We applied a no paper policy in our conference. We decided not to prepare a conventional conference bag with printed programs and other informational material. Instead, we developed a mobile application ‘ESEE 2017’, where you can find all the necessary information including programme, maps, details of other participants etc.

**Garden**

As a hard greening measure, we used 10 EUR from every registration fee to make one of the inner courtyards greener. We installed a green wall of ivy at the courtyard. During the Opening Ceremony there will be an official opening of the place, which can be used throughout the conference and will be maintained after the event too. We hope that later the place will become a green oasis of the building, where students and professors can relax and enjoy the nice atmosphere of a green environment.
Social entrepreneurs

One of our goal was to support local social enterprises and provide opportunities for them during the conference. Therefore, we invited social entrepreneurs, whose aim is to maximize social impact and improvements in human and environmental well-being alongside profits. We also ordered products of social enterprises to give as a prize for the Best Student Paper and Best Poster. During the conference, you can find and buy the product of Matyo Design (on Wednesday) and Kabinet Galéria (on Wednesday and Thursday).

Matyo Design

One of our main goals is to transfer this two hundred year old piece of Hungarian ethnographic culture onto modern, comfortable clothes and accessories. We would like to keep Matyó culture alive. We work towards boosting Matyóland’s economy, building a bridge between generations, and drawing attention to responsible buying. To achieve all of this, we have been developing our enterprise for the past seven years, we buy most of our material in and around the village of Tard, and we provide job opportunities for the local women. All our products are unique, and are handmade with love.


Kabinet Galéria

Kabinet Galéria (1085 Budapest, Kőfaragó u. 15.) is a shop for pleasing products where artifacts created by disadvantaged people are exhibited. These items can also be purchased. The artists are supported by Igazgyöngy Alapítvány, Down Alapítvány, Szigony Ütitárs Alapítvány, Kockacsoki and Lámpás 92’ Alapítvány. We can make the purchase more personal because we have a direct connection with the artists, know the professional work at the organizations, the story of each item.
It is our goal to make the artifacts and their creators more popular, to propagate their art and support their exhibitors. The venue is not accidentally Józsefváros. We would like to indicate there is transition between poverty and the district of palaces.

We cooperate with organizations that produce quality art, their professional work is exemplary and where the income of creators taking part in the creation of items is dependent on the products sold. In other words, our consumers directly support the creators.

The gallery is also a venue to provide opportunity for the first exhibitions where monthly variable collections can be seen (e.g. Glass city by Rácz Katinka, Colourful world by Strbík Ágnes) and where minor events are organized (e.g. book exhibitions, conversations with the artists)

website: [https://www.facebook.com/kabinetgaleria](https://www.facebook.com/kabinetgaleria)

By creating and applying a sustainability guidelines, we created a new policy at our university. Our hope with this guidelines is to have an indirect positive impact on scientific events at our university in the future.