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REPORT

Symposium

ENVIRONMENTAL GOVERNANCE IN AN INCREASINGLY COMPLEX WORLD:

An Interdisciplinary Exchange on Adaptation, Collaborative Learning and Knowledge Integration

Held in Stockholm, Sweden, 27 - 28 May, 2015.

The symposium was a collaboration between researchers at Södertörn University and Stockholm Environmental Institute organized as part of the research project titled “Environmental Governance in Context” funded by the Foundation for Baltic and East European Studies.

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Scientific Abstract

The purpose of this event was to bring together scholars and practitioners in order to create opportunities for an exchange of ideas, methodologies and experience. Participants with expertise in different areas i.e., adaptation research, resource management, policy studies, and adult learning, were invited to share latest research outcomes and engage in a collaborative reflection around the challenges of environmental governance in an increasingly complex world. Adaptation, collaborative learning and knowledge integration were the topics on which the event has focused.

Scientific Summary in Swedish

Syftet med detta internationella symposium var att föra samman forskare och praktiker för att skapa en dialog mellan tre olika forskningsfält; naturresursförvaltning; politiska studier, och vuxenutbildning. Inbjudna deltagare gavs möjlighet att dela med sig av de senaste forskningsrönen och delta i en gemensam reflektion kring de utmaningar som vi står inför inom ramen för miljöstyrning i en alltmer komplex värld. Anpassning, kollaborativt lärande och kunskapsintegrering utgjorde tre specifika områden som belystes i syfte att dra lärdomar om hur miljöstyrning kan bli mer ändamålsenlig i dagens samhälle.

1 Introduction

Sustainability addresses the social, the economic and the ecological dimensions of development. In order to move toward the integration of the three, it is assumed, there is a need for environmental and resource management approaches that support disciplinary cooperation, exchange and learning across different levels (Boström 2012; Luks and Siebenhüner 2007). As a normative objective sustainability is located within contemporary governance approaches where a range of different stakeholders are seen to have an active role, and where the process is as important as are the outcomes (Adger 2003; Bell et al., 2012; Siebenhüner 2005). The underlying rationale is that by involving stakeholders in the governing process, different knowledge and information can be accessed and used to develop a more comprehensive understanding of and commitment to the issue at stake. Local context and behaviours of individuals could be better understood and uncertainty reduced (Grey et al., 2012) and in result of this, the complexities inherent in coupled social–ecological systems can be more adequately addressed. However, rather than merely seeking for an accumulation or transfer of knowledge, it is the very integration of knowledge that appears to offer better opportunities for governance of coupled social–ecological systems (see e.g. *ibid*). Knowledge integration is here understood as the mixing and blending of knowledge in order to produce a novel and more comprehensive understanding of the issue at stake.

Yet, there are difficulties to achieving (meaningful) knowledge integration. Critics highlight that knowledge systems are unique to communities and often develop historically and independently from one another (Folke, 2004; Banjade et al., 2006; Ojha et al., 2007). For this reason knowledge integration requires that stakeholders engage with one another's views, claims and values in ways that allow for open questioning of the underlying assumptions, and make overt judgments over right and wrong. Participatory approaches are a natural way of promoting knowledge integration for sustainability in an increasingly complex world. Scholars have become engaged in a lively debate on knowledge integration in relation to participatory processes for sustainable resource and environmental management and have produced evidence that *learning processes* are an important process characteristic. Not only does learning help to take stock of information and facilitate an understanding of claims but also learning helps to open up the repertoire of possible options for/solutions to pressing environmental issues. As such the attention moves from *how to facilitate discussion toward a certain outcome* (e.g., agreement on solutions to a flooding problem) to *how to create the conditions for a transformative change*, which is more long-term and can challenge how issues and solutions are framed (e.g., reframing and collaborative action on water management).

Triggered by the emerging interest in transformative change, the research community is increasingly viewing learning as a social, interactive process and examines the potential learning outcomes of participants in stakeholder engagement processes. However, constrained by disciplinary boundaries such analyses often fall short of including, and account for, the insights and knowledge from **adult education** and cognate areas. In turn, this leads to research that overlooks certain aspects (e.g., what counts as a proof of learning, how to assess knowledge acquisition), but also that underestimates others (e.g., trust and power relations are modestly considered in the natural resource management literature). Also, to date there has been little exploration of the insights found within **policy sciences**, and more precisely from deliberative democracy where the effects of prolonged interaction on a given topic within a deliberative process are well explored and documented. Both disciplinary domains can offer valuable insights into the study of learning and knowledge integration in the context of participatory approaches. The purpose of this symposium was to bring together experts from these different social science domains and spanning different theoretical perspectives and empirical insights, to create opportunities for exchange and cross fertilisation of ideas.

Objective and scope

The objective of this event was to bring together researchers as well as practitioners with expertise in different areas (i.e., resource management, policy studies, and adult learning) for an informed discussion, cross-fertilisation of lessons learned and ideas for future research directions, that will enable us to better understand how environmental governance can become more effective in overcoming the challenges of sustainable development.

As a field of scientific inquiry environmental governance is concerned with the study of how different actors get organized and coordinate (with a special attention to formal arrangements/institutions) around use and management of natural resources/ the environment. Environmental governance is an interesting research field; it is open to interdisciplinary engagement and critique that over the years has grown substantially extending the early period inquiry into formal arrangements (e.g., Weale et al., 2000;) to include present day interest for informal arrangements (e.g., Ostrom,1990) and other topics. Environmental governance is not a disciplinary domain *per se* and perhaps also for this reason is nicely open for transdisciplinary dialogue – allowing that space is given for practitioners, decision-makers and stakeholders who are asked to contribute with their expertise and knowledge. Coherently with this, in addition to having invited scholars to offer a perspective from within *governance and resource management*, *policy studies* and *adult learning*, we invited also practitioners to share their stories from the field.

Workshops themes and key concepts

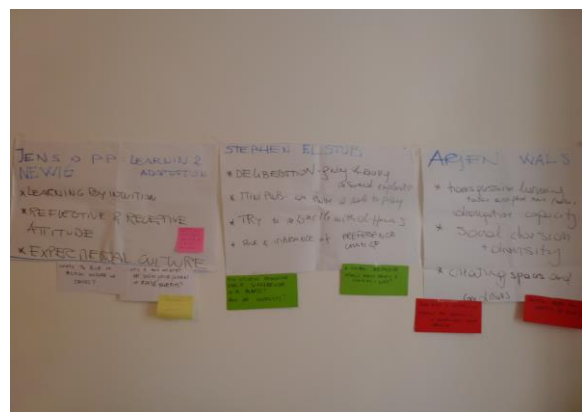
Adaptation, collaborative learning and knowledge integration and their respective environmental governance challenges, represented the key themes of the symposium. In order to ensure additional thematic focus we organized the event along two subject areas each of which was covered during one of the two days.

Subject Area A: Participatory approaches: adaptation, learning and complex environmental issues. This subject area aimed to explore theoretical arguments for, and practical challenges to and opportunities for, learning-based adaptation in the context of complex environmental issues. We had short presentations from invited speakers as well as group work around the following research questions: How and when are learning and adaptation linked? What are the challenges of and opportunities for learning based participatory processes? When does it work, and when does it not?

Subject area B: Participatory approaches: knowledge integration for improved governance. This subject area aimed to explore theoretical arguments for, and practical challenges to, knowledge integration in the context of complex environmental issues. Activities included short presentations from invited speakers as well as group work around selected research questions: What does knowledge integration involve? What are the challenges of knowledge integration processes (epistemological, ontological, etc)? What are the opportunities of knowledge integration to inform and support governance processes? Who is/should be involved in knowledge integration? Who is refraining from knowledge integration and why?



Picture 1: Participants gathering in the morning of day one



Picture 2: Summary of key note presentations day one

2 Summary of the Sessions

The symposium lasted two days, where participants had an opportunity to share the latest research outcomes and engaged in a collaborative reflection around current governance challenges. Participation was based on invitation and speakers were selected on the basis of their expertise and work done in one of the thematic areas listed above, with consideration of balanced distribution of expertise across topics of interest.

On both days we started with *key note presentations* which were focused on conceptual and theoretical aspects, then followed by presentations of research projects focused on examples from empirically based research.

Subject Area A: Participatory approaches: adaptation, learning and complex environmental issues

Jens Newig opened the program of the first day with a key note speech titled *Policy Learning and Evidence-based Governance in Mandated Participatory Planning: The Case of Flood Risk Management in Europe* during which he presented the outcomes of empirical research that looks into environmental governance and decision-making. Among other things, his research shows how policy-makers use intuition combined with scientific evidence during decision-making processes and provides empirical evidence to the long ago raised question put forward by Beierle (2002) - confirming that good process characteristics and outcomes are related.

Stephen Elstub departed from the perspective of deliberative democracy by introducing the pillars of deliberative democracy research. He clarified that some view deliberative democracy as a critique to decision-making procedures that are based on the aggregation of votes and the competition of interests since deliberative democracy is emphasizing reasoning, human exchange and reflection. His key note speech, titled *Analysing the Potential for Deliberative Democracy to Generate Preference Adaptation and Learning on Complex Environmental Issues: Lessons from Mini-publics*, offered insight into the mini-publics and the way these can contribute to shape preferences.

Arjen Wals offered an environmental education perspective on the challenges of environmental governance. His key note speech titled *Hybrid Learning in Vital Coalitions: Utilizing Conflict and Diversity to Overcome Mal-adaptive Resilience while Creating Space for Counter-hegemonic Thinking and Practices* exposed the need for alternative approaches, un-learning and disruptive

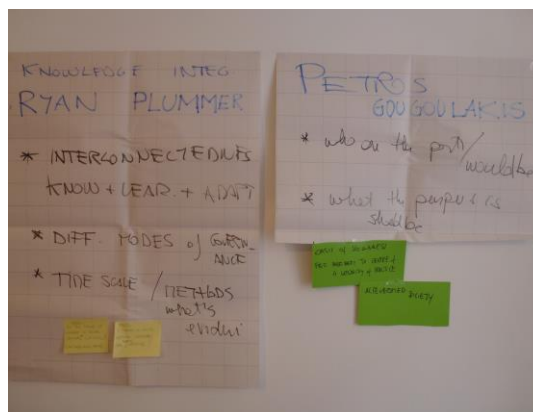
capacity. Starting with a reflection on values that underlay our society and on how the ideas of what constitutes true change over time, he made an argument for subversive thinking and action of the kind that can shake hegemonic forces which have led us to the currently unsustainable situation. Yet, the question of what kind of learning we need in order to be able to tackle wicked problems is open to discussion, and he brought forward the idea that there should be also some un-learning. To conclude Arjen commented that one key challenge of contemporary environmental governance is to bring together evidence based decision-making with ethic and intuition-based decision-making.

The day continued with short presentations of research discussing results and examples from the field. **Björn Nykvist** presented a case study of the Mälardalen Region, Sweden, where he assessed the adaptive capacity and coordination challenges in local-regional ecosystem service management. He concluded that adaptation had been largely reactive amongst stakeholders. **Ross Mitchel** offered a perspective on collaborative learning and knowledge integration in the context of the extractive sector by discussing the details of a project in Panama. The study highlighted the importance of social networks and catalysts. **Fred Saunders** presented empirical work across four small fishing communities that adopted an action research approach inspired by ideas from political ecology. **Bernd Siebenhüner** analysed the work on climate adaptation undertaken by the “nordwest2050” research project in the Metropolitan Area of Bremen-Oldenburg, Germany, with special attention to stakeholder participation and to how the nordwest2050 activities were received by these. Resistance to change, politicisation of science, unresolved conflicts and clashes between different forms of political legitimisation were identified among key barriers to social learning processes.

Åse Johannessen reflected on the lessons learned from an action research project on sanitation and hygiene undertaken in the Philippines. Based on 15 interviews with urban stakeholders in Cebu city in the Philippines she discussed mechanisms for stakeholders accepting interventions meant to mitigate for threats from extreme water events. **Gregor Vulturius** presented empirical research on barriers to individual engagement with climate change adaptation among forest owners in Sweden and the effectiveness of climate change communication to raise awareness and promote behavioural change for adaptation. **John Forrester** followed with a presentation and discussion on the differences between people’s prospections vs. stakeholder perceptions when it comes to contemporary environment issues and the search of solutions to complex problems. **Thomas Hahn** introduced the audience to the “International Dialogue Seminars” undertaken in Ecuador, by discussing and analysing the different worldviews underlying the controversy over monetary valuation emerged at the 10th meeting of the Convention on Biological Diversity (CBD) in 2010, in Japan.



Picture 3: Key note Ryan Plummer



Picture 4: Summary of key note presentations day two

Subject area B: Participatory approaches: knowledge integration for improved governance.

On the second day, **Ryan Plummer** offered a perspective on participatory approaches and knowledge based on an adaptive co-management framework. He shared the results of a study where they have used social network analysis and which suggests that networks between people have an important role. This research confirms the usefulness of participatory process for climate change adaptation directed to stakeholders and the potential of these for enhancing knowledge and creating learning opportunities. Also, this work suggests that studies of this type should explore the possibility to use a longitudinal research design because this would allow for measurements/observations at multiple intervals over a longer time period allowing for a more accurate and in depth understanding of the implications a given interventions can have and the type of dynamics it can trigger.

Gougoulakis Petros introduced to the audience a long held tradition of Swedish study circles/Folkbildning and discussed the relevance of these for acquiring a sense of citizenship and community from an adult education perspective. Petros shared ideas about the ways in which interaction within study circles help participants to develop a sense of community and a sense of self as part to this community. A need for reflection in this challenging time was emphasized and the type of relationship modern society has with time (always slipping and never be enough) was questioned.

After the two key notes also the second day continued with short presentations of research discussing empirical data and examples from the field. **Björn Hassler** summarized the results of an analysis based on secondary sources where he focused on the role of knowledge and incentives in Baltic Sea eutrophication abatement initiatives. **Magnus Boström** reflected on the role of reflexivity in the context of environmental governance and how it fosters the process of

knowledge integration. **Rasmus Kløcker Larsen** presented a study looking into the issue of permit practices of Saami Reindeer Herding Community. **Karin André** introduced a study looking into science-based stakeholder dialogues on climate change adaptation in the Swedish Forestry Sector reflecting on what factors influence adaptation and what helps to overcome barriers to this, while **Åsa Gerger Swartling** built on that presentation by focusing on the specifics of the role and opportunities for knowledge integration on adaptation within Swedish forestry. **Ben Garside** together with **Marissa Van Epp** concluded the session by sharing the outcomes of their work on a “Social learning monitoring framework” meant to be used to explore if and how projects and interventions funded by their and partner organizations have performed in terms of transformative change. The framework appears as a useful tool for practitioners who need information about interventions progress but also for scholars who are busy with the study of theoretical and conceptual aspects of learning based transformative change processes.

3 Concluding Reflections

The international symposium on environmental governance in an increasingly complex world brought together researchers and practitioners who shared research outcomes, viewpoints and agreed that research seeking to advance understanding of learning and knowledge integration needs to be transdisciplinary. This is a challenge as there are a several barriers to this type of engagement as are, for instance, institutional barriers, lack of resources, opportunity costs, risks of reputation downfall, etc. Also, transdisciplinary engagement requires all sides to hold an open mind and listen carefully. A participant warped it up nicely: “*disciplines are moving conversations going in different directions and there is a need for reflective moments looking within and outside these*” (JF, Stockholm, 2015). Indeed, transdisciplinarity is not only a question of terminology and the meaning attached to terms and concepts (i.e., when words/terms used across specialties might be same but used in different ways) but it is about bringing together in useful ways descriptive, normative and practice-oriented forms of knowledge. It is about awareness and recognition of the ways in which underlying assumptions of how things are (can be) linked, and of what tools are (can be) used in the investigation of these, which contribute to shaping perspectives on the problem domain. There are opportunities attached to collaborative encounters of this kind where perspectives (scholarly and practical) can intertwine, challenge each other and shake up established viewpoints. Participants agreed that encounters of this type are useful, needed, and should be sought more often for the purpose of furthering our understanding of current environmental challenges. There are opportunities in embracing diversity rather than striving for consensus

Knowledge integration and learning were key topics of this event. Both were approached from a normative perspective – as both are seen as a necessary precondition for transformative

change toward more sustainable futures. Participants' presentations and discussions covered issues of when, how and under what conditions transformative change can occur and have recognized that a change process of this type is a long term endeavour (exceeding the short time-frame of conventional research projects) that requires a great deal of openness and commitment from a range of actors involved. It is context dependent and thus researchers should be embedded and be cautious of generalized models so often advocated by the academic community. A participant commented that "*there is a need for wisdom and creativity, and we should allow for subversive and disruptive action*" which can shake established (economic and intellectual) powers (AW, Stockholm, 2015). A further aspect that surfaced is that while examples of successful interventions cases are often described in papers and books, negative ones characterised by stagnation, downfall, and conflict are underreported. Yet, understanding a negative course of action might help as much as understanding what triggers positive change.

Participants agreed that transdisciplinary engagements can engender new types of opportunities for research and practice and that we should explore research paradigms which allow us to bring together different types of data and methods. The organizers of this Symposium hope that the event will serve as a source of inspiration, awareness raising about transdisciplinary engagements in the field of environmental governance and will serve as a seed for future collaborative endeavors within and beyond the group of participants.



Picture 5 and Picture 6: Coffee breaks

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WORKSHOP PROGRAMME

Appendix 1 Program

DAY 1 – Participatory approaches: <i>adaptation, learning and complex environmental issues</i>	
09:30 - 09:40	Registration
09:40 - 10:00	Opening by the workshop organizers Romina Rodela and Åsa Gerger Swartling
10:00 - 12:00	<p>Subject area A: Participatory approaches: adaptation and learning Key note presentations (Moderator: Romina Rodela)</p> <p>Jens Newig - Policy Learning and Evidence-based Governance in Mandated Participatory Planning: The Case of Flood Risk Management in Europe</p> <p>Stephen Elstub - Analysing the Potential for Deliberative Democracy to Generate Preference Adaptation and Learning on Complex Environmental Issues: Lessons from Mini-publics</p> <p>Arjen Wals - Hybrid Learning in Vital Coalitions: Utilizing Conflict and Diversity to Overcome Mal-adaptive Resilience While Creating Space for Counter-hegemonic Thinking and Practices</p>
12:00 - 13:30	Lunch Break
13:30 - 15:00	<p>Short presentations from selected speakers Focus: Challenges from the field (Moderator: Annika Nilsson)</p> <p>Björn Nykvist - Assessing the Adaptive Capacity of Multi-level Governance. Learning and Coordination Challenges in Ecosystem Service Management in the Mälardalen Region, Sweden</p> <p>Ross Mitchel - Knowledge Integration and Collaborative Learning in the Context of the Extractive Sector (co-authored with Bryan Leach)</p> <p>Fred Saunders - A Transformative Methodology with Small-scale Fishers</p> <p>Bernd Siebenhüner - Barriers to Social Learning in the Field of Climate Adaptation: Why Participation is More About Conflict than Consensus</p>
15:00 - 15:15	Coffee break
15.15 - 16.45	<p>Short presentations from selected speakers Focus: Challenges from the field (Moderator: Kate Lonsdale)</p> <p>Åse Johannessen - Learning to Build Resilience in Water, Sanitation and Hygiene (WASH) - A Case Study of Cebu City, The Philippines (co-authored with Christine Wamsler and Sophie Peter)</p> <p>Gregor Vulturius - Assessing the Effectiveness of Science Communication and Participation in Promoting Adaptation</p> <p>John Forrester - Framing Stakeholder Views to 'Fit' Into Complex Solutions to Complex Problems</p> <p>Thomas Hahn - The Role of International Dialogue Seminars for Clarifying How Payments for Ecosystem Services (PES) and Biodiversity Offsets Can be Framed to Safeguard Biodiversity and Equity and Hence be Adapted to the Political and Cultural Contexts of Different Countries (co-authored with Maria Schultz)</p>
16.45 - 17.45	Group work on selected questions/issues
17:45 - 18:15	Summary of discussions and wrap up of day one
18:15	Chill out and drinks
19:30	Catered dinner in loco

DAY 2 - Participatory approaches: knowledge integration for improved governance	
09:00 - 10:00	<p>Subject area B: Participatory approaches: knowledge integration for improved governance</p> <p>Key note presentations (Moderator: Romina Rodela)</p> <p>Ryan Plummer - Learning and Network Effects from Adaptive Co-management: A Study of Participatory Decision-making for Climate Change Adaptation (co-authored with Julia Baird)</p> <p>Gougoulakis Petros - Folkbildning and Adult Education in Times of Social Acceleration</p>
10:00 - 10:30	Coffee Break
10:30 - 12:00	<p>Impulse short presentations from selected speakers</p> <p>Focus: Challenges from the field (Moderator: Chris Raymond)</p> <p>Björn Hassler - Is Adaptive Governance to be Expected?: The Role of Knowledge and Incentives in Baltic Sea Eutrophication Abatement</p> <p>Magnus Boström - Reflexivity, Knowledge and Governance</p> <p>Rasmus Kløcker Larsen - Integrating Cumulative Effects through Collaborative Learning - Saami Reindeer Herding Community Invites Public Authorities to Reflect on their Permitting Practices (co-authored with Kaisa Raitio)</p>
12:00 - 13:30	Lunch Break
13:30 - 14:45	<p>Short presentations from selected speakers</p> <p>Focus: Challenges from the field (Moderator: Toby Gardner)</p> <p>Karin André - Experiences of Science-based Stakeholder Dialogues on Climate Adaptation in the Swedish Forestry Sector: Reflections on Methodological Challenges of Conducting Transdisciplinary Research</p> <p>Åsa Gerger Swartling - Knowledge Integration for Adaptation to Climate Change: A Case Study of Swedish forestry</p> <p>Ben Garside - Social Learning for Transformational Change: Building a Cross-Institutional Monitoring Framework and Support Network (co-authored with Marissa Van Epp)</p>
14:45 - 15:00	Coffee break
15:00 - 16.30	Group discussions
16.30 - 17.30	Wrap up of day two and summary of the workshop

Appendix 2 Participants, Speakers and Moderators

Karin André is a Research Fellow at SEI where she works within the Mistra-SWECIA research programme on climate change adaptation in the Swedish forestry sector. Karin holds a PhD in Water and Environmental Studies from Linköping University and her research interests include: the relation between science and practice and the role of stakeholder interaction and dialogue in managing complex environmental issues; methods and tools related to stakeholder engagement and participatory approaches; and organizational challenges of climate adaptation processes in private and public sectors.

Magnus Boström is Professor in Sociology at Örebro University, with an orientation towards environmental sociology. In his research, Boström focus on the themes environment, politics and organization and their intersection. His research and teaching interest generally concern politics, governance, participation, communication, organization, and responsibility in relation to transnational environmental and sustainability issues. Boström is also studying how various factors shape green consumerism and organized activism.

Stephen Elstub is a Senior Lecturer in Politics at the University of the West of Scotland. His research interests are on the critical intersection between normative political theory and empirical political science, in relation to deliberative democracy and its institutionalisation. In particular, he has both conceptual and empirical research interests in multi-level governance and the role of civil society within these processes and in the relationship between deliberative democracy and environmental sustainability in theory and practice. He is the author of *Towards a Deliberative and Associational Democracy* (Edinburgh University Press 2008), editor of *Democracy in Theory and Practice* (Routledge 2012) and co-editor of *Deliberative Democracy: Issues and Cases* (Edinburgh University Press 2014). He is the editor in chief of the *Journal of Deliberative and Participatory Democracy* and associate editor of *Representation*. He was also the convenor of the UK Political Studies Association's Participatory and Deliberative Democracy Specialist Group from 2009-14.

John Forrester is a Social Anthropologist using maps and models to explore the complex relationships behind stakeholders' understanding of environmental issues. He does this so that 'situated knowledge' may feed into scientific and policy knowledge co-creation processes to help generate 'clumsy' solutions to wicked/messy problems. Having worked with the Stockholm Environment Institute at York since 1997 on multidisciplinary and transdisciplinary communication, John is currently researching community resilience in the face of climate change-influenced natural disasters using social network mapping and participatory agent-

based modelling. John is author/joint-author of more than 20 peer-reviewed publications and over 25 other publications.

Toby Gardner works at the Stockholm Environment Institute where he has been a research fellow since January 2014. He has over ten years' experience working on science and science-policy issues related to sustainability, with a strong emphasis on the management and conservation of biodiversity and ecosystem services in multiple-use agriculture-forestry landscapes, and the difficulties of balancing environmental concerns with rural development priorities. Before joining SEI Toby was at the University of Cambridge for five years, where he helped found the Sustainable Amazon Network, a large interdisciplinary research consortium focused on understanding land-use sustainability challenges facing rural development in the eastern Brazilian Amazon. As part of his work at SEI Toby co-leads the SEI Producer to Consumer Sustainability Initiative, and is actively involved in work on land-use sustainability across the tropics, as well as a number of international science-policy fora, including around the issues of REDD+, sustainable forest management and biodiversity offsets. He has published extensively on issues relating to biodiversity, environmental sustainability land-use change in the tropics with over 80 peer-reviewed publications.

Ben Garside is a Researcher in the International Institute for Environment and Development's (IIED) Sustainable Markets Group. Areas of research interest include: sustainable, pro-poor business models; monitoring and evaluation and better measuring impact; local involvement in decision making on decentralised energy access and ICTs; and developing better understandings of the role of social learning approaches in building adaptive capacity and resilience. Working with the Climate Change and Social Learning (CCSL) initiative (<http://ccsl.wikispaces.com/>), Ben has helped develop a monitoring and evaluation framework intended to better understand social learning by applying the framework over a range of different scales and institutions. Ben's current social science orientated research is complemented by an engineering background with extensive experience in ICT consultancy and telecoms prior to working at IIED. He has a Master's degree in Development Management from the London School of Economics.

Åsa Gerger Swartling, PhD in Sociology, is a Senior Research Fellow at the Stockholm Environment Institute and Affiliated Researcher at the Stockholm Resilience Centre. She specialises in participatory approaches to environmental management and policy. Her ongoing research focuses on stakeholder participation, collaboration and learning in the context of climate change adaptation in Sweden. She currently leads the programme component "Regional Adaptation Processes", including the working area on The Process of Adaptation to

Climate Change under the Mistra-SWECIA programme (2008-2015). Other research projects focus on community resilience and learning in the context of disaster risks, including the emBRACE and WASH-RESCUE projects.

Michael Gilek is Associate Professor in Ecology at Södertörn University and has extensive research experience on the assessment, management and governance of chemical pollution and other ecological risks and problems in the aquatic environment. A key focus in these studies has been to analyse science-policy interactions and how fundamental governance challenges such as uncertainty and ambiguity are addressed. In his current research MG leads international interdisciplinary studies analysing marine spatial planning and environmental governance in the Baltic Sea.

Petros Gougoulakis is Associate Professor of Education and employed at the Department of Education, Stockholm University. Since 1993 he has taught educational sciences in teacher education and developed courses within the discipline of adult education and learning. In his thesis and in other publications he has studied the Swedish Popular Adult Education /folkbildning/ and its pedagogy from a civil society, a state and a participant perspective. In addition to the popular education-related learning he has in his research explored the issue of adult educators' skills and qualifications in relation to current educational policy notions of lifelong learning. He has extensive experience of international academic research cooperation and is currently Visiting Professor at Graduate School of Education and Human Development in Nagoya, Japan.

Åse Johannessen is a Systems Ecologist (MSc in Biology 1999) with expertise in integrated water resources management and its intersection with risk and resilience aspects. She is Research Fellow at the Stockholm Environment Institute (SEI) often applying stakeholder participatory methodologies and using social learning theory. She is currently the researcher and project manager for WASH & RESCUE investigating resilient systems for water, sanitation and hygiene in urban areas. She is also working with the FP7 project RISC KIT investigating integrated planning for coastal risks in Europe. Prior to doing research Åse has a programmatic background, including strategy development and management at Swedish, SADC (Africa regional) and international level.

Rasmus Kløcker Larsen works as Research Fellow with the Stockholm Environment Institute and as Researcher at the Center for Sustainable Development, Uppsala University. He has specialized in fostering action learning inquiries into the implementability of policies and conditions for reconciling conflicts of interests in the governance of natural resources and

international development. The work is inherently transdisciplinary, wherein theories and methodologies are operationalised in context – inspired principally by participatory action research and critical systemic thinking. Facilitated co-inquiries are aimed at wicked and controversial resource dilemmas, striving to improve governance praxis through co-engagement with stakeholders in concrete tasks

Kate Lonsdale has worked on adaptation to a changing climate as a researcher, trainer, facilitator, consultant, mentor, evaluator and in an advisory capacity for the last 19 years in both developed and developing country contexts and in a range of settings including civil society, academia and government policy and within organizations that aim to create a bridge between these different sectors. Key lines of enquiry include: *Will climate change exacerbate existing social inequality? How do you move beyond incremental change? And how do we develop our capacity for learning into an unknown future?* Kate also has 15 years of experience in designing and facilitating inclusive and participatory research processes, workshops and events. Kate worked with UKCIP (2008-12) and prior to that with SEI-Oxford (2002-2008). She was the 2012 Victorian Centre for Climate Adaptation Research (VCCCAR) International Visiting Fellow in Melbourne focussing on how to build effective state policy-research collaborations for adaptation.

Thomas Hahn is currently Assistant Professor at Stockholm Resilience Centre and theme leader of the Stewardship research theme. I have a background in agricultural, environmental, ecological, and institutional economics with long experience in teaching these subjects. Previous research include indigenous rights and conflicts over ecosystem use, adaptive governance of social-ecological systems, ecosystem stewardship by self-organized networks, commodification of ecosystem services, and efficiency and equity of Biodiversity Financing Mechanisms (BFMs). In 2013 I was Committee secretary at the Government Offices of Sweden, writing a SOU Report on Making the value of ecosystem services visible and since 2007 I serve as board member of Sveaskog AB, the largest forest owner in Europe.

Björn Hassler is a Researcher and Senior Lecturer in environmental policy at Södertörn University, Stockholm, Sweden. In most of his work, Hassler has departed from incentive-driven theoretical frameworks, analyzing issues related to environmental policy and international collaboration in the Baltic Sea region. Lately, the primary focus has been set on environmental hazards caused by Baltic Sea marine transportations and on environmental risks related to eutrophication and over-fishing in the Baltic Sea. At present, Hassler is coordinating the research project *Cooperating for sustainable regional marine governance: The case of fisheries and nutrient run-off from agriculture to the Baltic Sea*. Hassler has published extensively on

these matters in scientific journals such as *AMBIO*, *Marine Policy*, *Maritime Policy and Management* and *Journal of Environmental Policy and Planning* as well as in edited books on Baltic Sea environmental governance (forthcoming in 2015).

Ross Mitchell is a Senior Social and Environmental Specialist who has led environmental and industrial projects and advised on resource-based development in many countries, particularly in the Americas and Europe. He obtained his PhD in Environmental Sociology and is adjunct Professor in the Department of Rural Economy at the University of Alberta. He worked for several years as a forester, rural planner and research scientist, including with the Canadian Forest Service and Alberta Innovates. He has also contributed to or led environment impact assessments in the extractive sector for almost a decade. He currently works for Shell based in The Hague, and is responsible for coordination of early identification, pro-active management and integration of non-technical issues (both risks and opportunities) in major upstream deals, ventures and projects. Ross has extensive experience in the analysis and integration of social and environmental issues and indicators into sustainable business operations, stakeholder engagement, and policy analysis in the public and private contexts. He has over 25 peer-reviewed publications and has edited the book *Thorstein Veblen's Contribution to Environmental Sociology: Essays in the Political Ecology of Wasteful Industrialism* (2007, Edwin Mellen Press). His specialties include risk assessments, social and environmental impact assessments, public participation, international and community development, and sustainable approaches to resource management.

Jens Newig is Full Professor at Leuphana University, in Lüneburg (Germany), where he heads the *Governance, Participation and Sustainability research group*. He obtained a PhD in Environmental Law (Dresden University). His current research focuses on governance and decision-making to tackle environmental issues, from the very local to the global level. Jens has been leading several larger research projects with a total volume of more than EUR 2 Million, currently holding an ERC Starting Grant on an evidence-based approach to researching policy delivery of participatory governance (EDGE). Jens has served as reviewer for a wide range of academic funding organizations, including: The European Research Council (ERC), the German Research Foundation (DFG), the German Ministry of Education and Research (BMBF), The UK Environmental and Social Sciences Research Council (ESRC), or the Hong Kong Research Council. He has served as reviewer for more than 30 different academic journals. He has given 60+ conference presentations, 15+ on invitation. Jens has published one book, 30 articles in peer-reviewed journals and another 25 book chapters, and co-edited five books and special issues in peer-reviewed journals.

Annika E. Nilsson is Senior Research Fellow at Stockholm Environment Institute and also Affiliated Faculty in Environmental Politics at KTH Royal Institute of Technology. Her work focuses on Arctic change, with research on governance and communication at the science-policy interface. Her current work includes the Formas-funded project Arctic Governance and the Question of Fit in a Globalized World and Mistra Arctic Sustainable Development - New Governance. She is also engaged in two Arctic Council assessments: Arctic Resilience Report and in the Barents region study for Adaptation Action for a Changing Arctic (AACCA). Nilsson's special interests focus on understanding environmental governance in the Anthropocene and the need for social learning as a feature of governance in times of rapid change. She also focuses on the interplay between Arctic governance and changing global geopolitics and recently published the book 'When the Ice Break: Media and the Politics of Arctic Climate Change'. Nilsson has a PhD in environmental science and also over 20 years of professional experience as a science writer. In addition to academic publishing, she has written several popular science books and participated as a science writer in several assessments about the Arctic.

Björn Nykvist's main research interest is that of understanding how social processes influence natural resource management, environmental governance and socio-technological development. He has an interdisciplinary background and holds a PhD degree in natural resource management, and his dissertation brought together results on studies of social learning at a range of governance levels. Recent and ongoing research projects focus on three topics: Studies of policy making, technological innovations, and transitions between different socio-technical regimes, focused on low-carbon technologies and sustainable mobility. Research on social learning and adaptive governance and institutions, currently focused on a case study of management of natural resources linked to lake Mälaren. And finally, research on the policy relevance of using planetary boundaries as a framework for measuring and comparing national environmental performance.”

Ryan Plummer is Director of the Environmental Sustainability Research Centre (ESRC) at Brock University and Science Director at the Canadian Rivers Institute, Canada. His research concerns the governance of social-ecological systems. In striving to advance knowledge of collaboration and adaptation within complex systems, he has focused on the exploring their theoretical underpinnings and ethical implications, modelling their processes, examining the roles of social capital, and investigating the influences of social learning. Water resources are the context in which his research mainly occurs and he is a Faculty Investigator in the Water Policy and Governance Group. The scholarly quality of his research program was formally recognized in 2008 with the awarding of a Chancellor's Chair for Research Excellence. In 2004

he received the Faculty of Applied Health Sciences Award for Teaching Excellence and in 2008 he was selected as one of the Canada Mortgage and Housing Corporation (CMHC) Excellence in Education Award winners for Promotion of Sustainable Practices.

Kaisa Raitio is an Assistant Professor at the Division of Environmental Communication, Swedish University of Agricultural Sciences. Her primary task is to carry out research related to conflicts, democracy, social change and sustainability in natural resource politics and management. She also act as supervisor and teach on undergraduate and graduate levels. Her research combines political science, sociology, planning theory and environmental law in analysing and understanding the causes and dynamics of conflicts and collaboration in natural resource politics. The empirical focus has so far been on forests in Finland (PhD), British Columbia in Canada (post doc) and most recently in Sweden.

Chris Raymond is an interdisciplinary social scientist who has over ten years of experience in designing, leading and conducting social-ecological systems research. He is currently an Assistant Professor at the Department of Geosciences and Natural Resource Management, University of Copenhagen and Adjunct Senior Research Fellow at the Barbara Hardy Institute, University of South Australia. Between 2005 and 2008, Dr Raymond was a Project Officer in NRM Social Applications at the then Department of Water, Land and Biodiversity Conservation (South Australia). He then established and successfully ran an environmental consulting company named Enviroconnect whilst also completing a PhD in Philosophy at the University of South Australia (2009-2011). Since 2012, he has been involved in a range of research fellowships, including investigations into the social acceptability of human-induced climate change at the Australian Centre for Social Research, University of Adelaide (2011-12) and assessments of social and cultural values for ecosystem services through the Landscape and Policy Research Hub and School of Land and Food, University of Tasmania (2012-14).

Romina Rodela research centres on environmental governance, participatory processes, learning-based resource management and science-policy interfaces. She holds a PhD in Science and Technology Policy Research from SPRU, Sussex University, UK. From 2010-2012 Romina was a Marie Curie Research Fellow at the UNESCO Chair for Social learning held by Prof. Arjen Wals at Wageningen University while from 2012-2015 she was a NWO Research Fellow at the Laboratory of Geo-Information Science and Remote Sensing at Wageningen University. In 2013 she got funding under the “Grant for sustainable development research in the social sciences and humanities areas” by FORMAS and is currently managing a four year project titled “Environmental Governance in Context”.

Fred Saunders is a Post-doctoral Researcher in environmental science at Södertörn University. His academic areas of interest include social justice, sustainable development, community-based natural resource management and political ecology. In pursuing these interests he has undertaken research in East Africa on conservation and development. He also has a practitioner background working with nature conservation in Australia. Fred's current research projects include (1) Farmers, agri-environmental payments and eutrophication in the Baltic Sea Region; (2) The Political ecology of reindeer herding in the Swedish subarctic; (3) Transformative Research with small scale fishers.

Bernd Siebenhüner is Professor of Ecological Economics and Vice President for graduate education and quality management at the Carl von Ossietzky University of Oldenburg, Germany. He is coordinator of the Master's programme on Sustainability Economics and Management and holds a Ph.D. in Economics and Master's degrees in Economics and Political Science. Bernd coordinated numerous research undertakings in the fields of international organizations, global environmental governance, social learning, corporate sustainability strategies, climate adaptation and biodiversity governance, and the role of science in global environmental governance.

Marissa Van Epp is a Consultant for the International Institute for Environment and Development (IIED). Areas of research interest include: social learning; monitoring and evaluation; communication for development and research into use; climate change adaptation and food security; global deforestation and illegal logging; and Chinese environmental policy and civil society. Marissa has a Master's degree in Environment and Development from the London School of Economics as well as a Master's degree in Social Anthropology from Oxford University.

Gregor Vulturius joined SEI-Stockholm as a Research Associate in January 2013. Before that he worked for 2 years at the University of Umeå on climate change adaptation and disaster risk management. At the moment, Gregor is involved in research about climate change adaptation, science communication, forestry, disaster risk management, insurance and international climate governance. He has also recently been the coordinating lead author of a background paper for the Global Assessment Report on disaster risk reduction for UNISDR. Gregor has comprehensive skills and experience in qualitative and quantitative social and economic research. In connection to his work at SEI, Gregor is currently pursuing a PhD at the University of Edinburgh, aiming to develop an integrative understanding of the diffusion and adoption of knowledge on climate change adaptation.

Arjen Wals is a Professor of Social Learning and Sustainable Development at Wageningen University in The Netherlands and a UNESCO Chair in the same field. He is also an Adjunct Faculty member of the Department of Natural Resources of Cornell University and guest professor at Gothenburg University. Currently, he is the Director of the Centre for Sustainable Development and Food Security based at Wageningen University. A central question in his work is how to create conditions that support new forms of learning, research and outreach that take full advantage of the diversity, creativity and resourcefulness that is all around us, but so far remains largely untapped in our search for a world that is more sustainable than the one currently in prospect.