



*Stockholm Resilience Centre Annual Report 2014*

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## Stockholm Resilience Centre Annual Report 2014

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# Chair's preface

“It is with great pleasure and excitement that I have taken on the role as Chair of the Stockholm Resilience Centre’s governing board”, says Frances Westley



**Frances Westley,**  
Chair of the Board

**I HAVE HAD THE PRIVILEGE** of following the Centre from its start in 2007, and from the vantage point of an external social scientist who knows it well, I have watched the Centre’s focus on social-ecological systems research, biosphere stewardship and resilience for sustainable development move from the periphery to the centre of scientific focus, not just in Sweden but around the world. We live in an era of not only rising global environmental risks, but also intertwined challenges to humans and nature that increasingly, and often abruptly, affect social and economic development in new ways. Those ways are often unexpected, such as the fact that the dwindling freshwater supply to the mega city São Paulo is driven in part by droughts triggered by climate change and deforestation of the Amazon rainforest. There is also increasing evidence of contagion, of the propensity for the impacts of events in one part of the world cascading and connecting across scales and across geography, so that those changes propagate and trigger changes in other systems. The financial and food price crises that simultaneously hit the world in 2008 are examples of this. This new global era, the Anthropocene as it has been termed, needs new frameworks and new research methodologies if it is to be understood. We need to find dynamic ways to connect the best the disciplines have to offer and to do it quickly and elegantly. A resilience lens is of great value in capturing the significance of how periods of incremental change interact with periods of rapid change, delivering insights for science, practice and policy.

Reality triggers new questions concerning how communities, nations, businesses and the world community at large – despite deepening ethnic, religious and financial cracks in the social fabric of many nations and regions – can collaborate on building a pathway to sustainable development, for the benefit of mankind. Meeting the proposed UN Sustainable Development Goals (SDGs) to achieve a world where poverty and hunger are alleviated, the big health and educational challenges are resolved and effective governance, equity and transparency are at the heart of all nations’ pursuit of development within safe boundaries for a stable and resilient planet will require nothing less than major transformations. It is rewarding to note that the Stockholm Resilience Centre places emphasis on advancing research concerning transformation pathways towards sustainability, and will be hosting in October 2015 the 2nd international research conference on transformations – People and the Planet in the Anthropocene.

A key feature of the Centre’s ability to advance interdisciplinary sustainability science is the support it receives from Stockholm University. The University’s support for research, and, in particular, its academic programmes – from the Centre’s MSc programme on Social-Ecological Resilience for Sustainable Development to its new PhD program in Sustainability Science with a focus on Biosphere Stewardship – is key. We draw on all four faculties – law, social sciences, humanities, and natural sciences – and this depth and breadth is a prerequisite for success. I look forward to continued support for the Centre’s integrated, ambitious and internationally outstanding research and educational agenda in the coming years.

## Vision & Mission

The vision of the Stockholm Resilience Centre is a world where social-ecological systems are understood, governed and managed, to enhance human well-being and the capacity to deal with complexity and change, for the sustainable co-evolution of human civilizations with the biosphere.

The mission of Stockholm Resilience Centre is to advance research for governance and management of social-ecological systems to secure ecosystem services for human well-being and resilience for long-term sustainability. We apply and further develop the scientific advancements of this research within practice, policy and academic training.

# Directors' view

The tag-line of the Stockholm Resilience Centre – *Sustainability Science for Biosphere Stewardship* – is probably more important than our actual name. It emerged after carefully re-crafting the research framework for the Centre

We have set out to be an internationally leading research institution at the frontier of sustainability science. All of our sustainability science is anchored in the fundamental starting point that human societies are embedded parts of the biosphere and shape it from local to global scales.

It may sound trivial, but a biosphere-based sustainability science is in fact a very clarifying identity for our inter- and transdisciplinary research. We live in an increasingly interconnected and global society with interactions ultimately framed by a resilient biosphere.

From this vantage point we explore the challenges of stewardship of the biosphere and ecosystem services for our own sustainable development. This requires the use of multiple theories and methods and collaboration with a diversity of competencies from philosophy, behavioural sciences, and economics, to geography, ecology and Earth system science. It requires the integration of an understanding of Earth system dynamics, from local ecosystems to the biosphere as a whole with an understanding of how human agency, behaviour, incentives, power, and institutions interact with and shape these dynamics. Fundamental aspects like democracy, health, security, poverty alleviation, equality, human rights, and peace all rest on the life-support capacity and resilience of the biosphere.

At the Centre, we seldom pursue research strictly along disciplinary lines. Our focus is on understanding the new

dynamics of intertwined and complex social-ecological systems in the Anthropocene and dealing with questions relevant for societies – such as how we can feed humanity within planetary boundaries. Such a question requires collaborative research across disciplines applying different theories and methods, drawing upon in-depth disciplinary knowledge and interdisciplinary competencies where the collision between knowledge systems and evidence from multiple sources becomes the intellectual mix that triggers new findings. Whether the research should be disciplinary, or interdisciplinary in its own right becomes less important compared to finding the right depth and mix of approaches that can help address such questions.

Surprise, in all facets of life, has increasingly become part of normality in the Anthropocene, where social, economic and environmental dynamics occur at higher speed and magnitude, and across scales, than before. This is why we find that applying a resilience lens to our research is often useful. It provides us with a way to analyse and understand what it takes for social-ecological systems to persist and develop along current pathways in the face of change or transform into new pathways, and reconnecting development to the biosphere. *Sustainability Science for Biosphere Stewardship* is the tag-line and the cornerstone of our research.



**Johan Rockström,**  
Executive director



**Carl Folke,**  
Science director



**Olof Olsson,**  
Deputy director

# A “hybrid board” for the future

When the Centre board was re-structured in 2014, Frances Westley, a long-time scientific and strategic partner, stepped up as Chair. Few could be better qualified for the job

**FRANCES WESTLEY** is based at the University of Waterloo and is one of the most respected researchers on social innovation and strategic change in Canada. With this vast experience and expertise, she considers the role as Chair for the Centre to be extremely exciting.

“Since the Stockholm Resilience Centre was established in 2007, it has become the best known centre for resilience research in the world,” says Westley. “At the same time, the Centre itself has grown from a small organisation to a rather big one, now employing around 100 people. The transition it is now facing is an important and exciting one, because it needs to maintain the unique culture and climate of the small and innovative organisation, while establishing the structures needed to run a large organisation.”

As the JW McConnell Chair in Social Innovation at the University of Waterloo, managing this type of transition is something that Westley has experience with, and she is more than happy to offer her expertise as Chair of the board. As a long-time partner of the Centre, including the role as a board member, she is also in a good position to assess and support the Centre’s progress.

“The Stockholm Resilience Centre is sometimes criticized as too generalist - that it’s a mile wide and an inch deep – which is always the critique of interdisciplinary work. Anyone exposed however to the published research, or given the opportunity to hear presentations from the Centre’s PhD students, can’t help but be impressed by the strong disciplinary basis undergirding their work,” Westley says. “The research of both faculty and students is strong, well-informed and powerfully grounded. At the same time, it is designed to create openings and opportunities to connect the ideas with others from other disciplines.”

She believes this is what sets the Centre apart from others: the capacity to not simply gather different disciplines under one roof but to also make sure they connect.

“What is truly exciting is the process where you sit down together to talk about your respective findings and about how the findings add up to a better understanding of the research field as a whole, and the implications of that research for policy, practice and action” she says. “Doing this is still more of an art than a science. It requires a specific way of working and communicating and is perpetuated by culture. As the Centre grows, these are the qualities that are so important to nurture in the face of change, and the board can certainly help in the process.”

She describes the new board as a kind of “hybrid board.” One part consists of international advisors with immense experience of the kind of work done at the Centre, including new areas, such as increased focus on development work. Another part represents Stockholm University, providing extensive knowledge about the structures and institutions of the university.



PHOTO: COURTESY OF UNI. OF WATERLOO

*“I feel honoured to have been asked to be chair of the board at this very important time.”*

**Dr Frances Westley, University of Waterloo**

Together, they represent a vast range of expertise and experiences that can help guide the Centre in its continuing growth.

“The Centre does not rest on its laurels – the researchers and students are continuously taking on new challenges, while keeping a strong emphasis on synthesis and connection.” says Westley. “In this work, the board has a role in helping to support these initiatives and maintaining key links to the university and the broader academic world. We can act as a strategic sounding board for new ideas and directions, and offer advice about the best structures and systems to support this work. We are lucky to have the board that we have, alongside the continuity of the excellent leadership of the Centre, and established and emerging researchers advancing the science. “

**The Stockholm Resilience Centre board members:**

Chair: Prof. Frances Westley, Waterloo University, Canada,

Prof. Karin Bäckstrand, Department of Political Science, Stockholm University, Sweden

Prof. Stephen R Carpenter, University of Wisconsin-Madison, USA

Prof. Deliang Chen, University of Gothenburg , Sweden

Prof. Sara A. O. Cousins, Stockholm University, Sweden

Prof. Qin Dahe, Macao Polytechnic Institute, China

Prof. Gretchen Daily, Stanford University, USA

Prof. Jonas Ebbesson, Stockholm University, Sweden

Prof. Peter Hambäck, Stockholm university, Sweden

Prof. Simon Levin, Princeton University, USA

Prof. Bonnie McCay, Rutgers University, USA

Dr. Leena Srivastava, Vice Chancellor TERI University and Hony. Executive Director at TERI, India

Pavan Sukhdev, Visiting Fellow at Yale University,

Founder-CEO of GIST Advisory, Study Leader of TEEB



From left: Line Gordon, Stephen Carpenter, Pavan Sukhdev, Carl Folke, Jonas Ebbesson, Thomas Nilsson, Frances Westley, Johan Rockström (hidden), Peter Hambäck, Deliang Chen (hidden), Emina Muratspahic (hidden), Olof Olsson at a board meeting at the Centre. Not present at the meeting were Simon Levin, Karin Bäckstrand, Sara Cousins, Bonnie McCay, Leena Srivastava, Gretchen Daily and Qin Dahe.

# Biosphere-based Sustainability Science

Sustainability Science incorporates diverse research paths seeking ways to understand and help facilitate transitions toward sustainability. It is a broad multi- and interdisciplinary field defined by the problems it addresses rather than by the disciplines it employs

**MANY REMAINING SUSTAINABILITY** challenges are complex, and addressing them requires complex research approaches. For us, interdisciplinarity is a means, not a goal. Our academic track record is proof of the diversity and scope of the field in which we are operating. Since 2007, we have been published in more than 200 different international peer-reviewed scientific journals, described as either natural science, social science, or interdisciplinary journals.

The research focus of Stockholm Resilience Centre is sustainability science for biosphere stewardship. The research framework of the Centre emphasizes that people are embedded parts of the biosphere and shape it – from local to global scales, from the past to the future – and that we now are living in the Anthropocene. The framework clarifies that all people on Earth are fundamentally dependent on the collective work of the Earth's ecosystems, the biosphere, and that sustainability is not just social or economic but that human progress rests on a resilient biosphere.

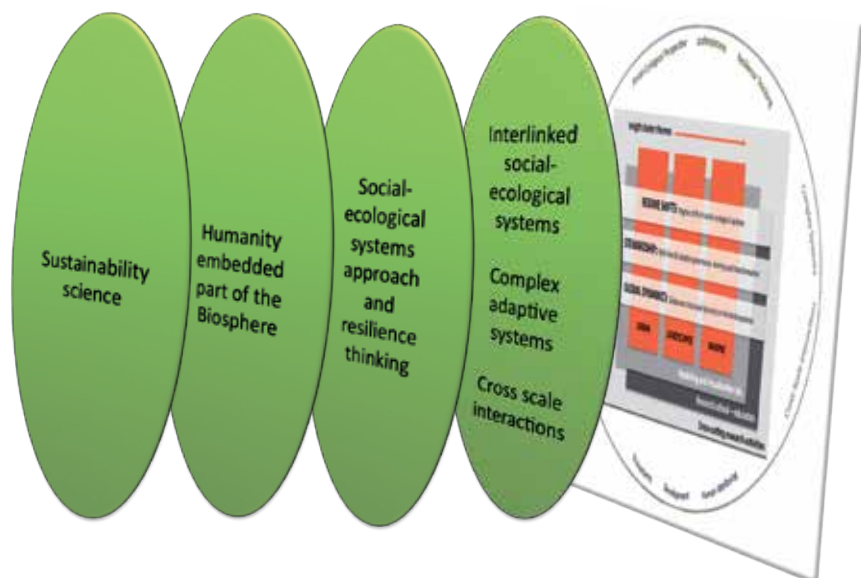
The environment is not viewed as a mere input among many others for human well-being but serves as a foundation for social and economic development. It makes clear that fundamental issues for humanity like democracy, economic development, health, security, poverty alleviation, equality, human rights, and

peace all rest on the resilience of the biosphere. It makes clear that environmental issues are about our own future on Earth. It makes clear the challenges and opportunities that emerge for humans to become stewards of the biosphere and sustain development for current and future generations.

The social-ecological approach is about understanding intertwined social-ecological systems and the cross-scale dynamics of the Anthropocene. We are not constrained by, but often use, resilience thinking as a lens to ask new questions and analyze complex systems and particularly complex adaptive social-ecological systems. Capturing the interplay between periods of incremental and abrupt changes – and how to

adapt, persist and even transform into new development pathways in the face of dynamic change – is a research frontier, even in our interactions with policy, practice, and the arts.

Within this framework, Centre researchers are using a diversity of theories, approaches, methods and perspectives, including co-production of knowledge together with practitioners and other stakeholders. The research of the Centre requires in-depth collaboration, not only among the researchers in Stockholm, but also with our international networks of collaborators and together with diverse stakeholders. Without such collaboration, the complexity of a wide range of issues would be too difficult to grasp.







# Research highlights

## Wallenberg Foundation finances prominent collaboration with Stanford University

Over the past decade, two ideas have received significant attention within the sustainability science community: the first is that living natural capital – the Earth’s lands and waters, and the biodiversity they embody – has tremendous, but often unrecognized, value that should be factored into decision-making. The second is that resilience – the capacity of a system to adapt or transform in the face of dramatic change – is essential to long-term sustainability. These twin ideas have resulted in insights that now appear in the management thinking within pretty much all aspects of agriculture, water, energy, health, fisheries, forestry, mining and cities.

The Swedish Marianne and Marcus Wallenberg Foundation has decided to fund a scientific leadership programme that aims to develop these concepts further. Together, the Beijer Institute of the Royal Swedish Academy of Science, Stanford University and the Centre will form a strategic partnership to make this knowledge maximally useful through major new tools, approaches, and interdisciplinary innovation. The effort will be led by senior research staff from Stanford and from the Centre but also engage top young scientists who will become key individuals in this area for the future.

“The time is now ripe to formalize a research and scientific leadership platform for new theory, analysis, and

synthesis on the management and governance of natural capital, resilience, and the biosphere,” says Centre science director, Carl Folke.

“This is a perfect moment to bring together the complementary approaches of Stanford’s Natural Capital approach and the Centre resilience thinking,” Folke continues.

The scientific content of the programme will focus on the following: characterizing, managing and governing natural capital and ecosystem services; linking social and economic development to biosphere stewardship; providing sustainable and healthy food and water for a rapidly urbanizing world; and addressing human behavior, cognition, and mental well-being in an urbanizing, highly dynamic world.

The programme has a budget of approximately nine million SEK for the period July 2015-December 2019.



Carl Folke



Steve Lade

## A closer look at social and biophysical boundaries

How do we provide adequate and equitable access to resources such as food, water, health care and energy while not overstressing critical physical boundaries such as climate change? Centre researcher Steve Lade has received funding from FORMAS to develop innovative modelling and synthesis approaches to explore the

crucial interactions between social and biophysical boundaries. Specifically, the project will look at the degree to which approaching one social or biophysical boundary affects the distance to other boundaries. Utilising his modelling expertise from his background in theoretical physics, Steve Lade hopes the four-year project will engage not only the international scientific community, but also key actors within business and science. “The research will help inform a large business and policy user community amongst whom the planetary boundaries framework has already gained considerable traction,” he says.

## Funding boost to assess regime shifts in the Anthropocene

Centre researcher Oonsie Biggs received a four-year junior research grant from the Swedish Research Council to continue her work on assessing regime shifts in social-ecological systems. The grant will also provide resources to develop new approaches for assessing how much of the world is at risk of particular regime shifts. To do this, she will focus on the example of bush encroachment and use remote sensing and GIS data to develop process-based statistical models. “This project will help improve our scientific understanding and societal capacity to anticipate and build resilience to high-impact environmental regime shifts,” says Oonsie Biggs.

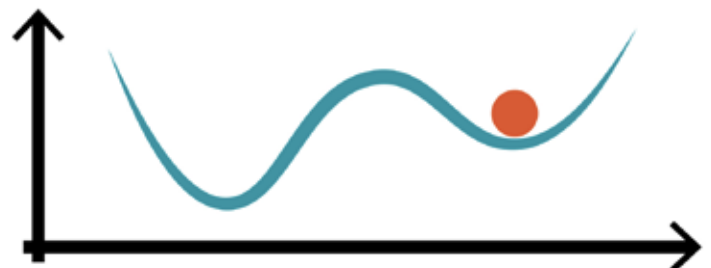


ILLUSTRATION: JERKER LOKRANTZ/AZOTE

### Understanding of the links between ecosystem services and poverty in southern Africa

There is growing interest in the potential for ecosystem service-based approaches to contribute to poverty alleviation and advance sustainable and equitable development. With a focus on southern Africa, Centre re-

searchers Thomas Elmqvist, Oonsie Biggs and Maria Tengö will evaluate the implications for ecosystem service-based poverty alleviation strategies. "We will combine qualitative and quantitative approaches, including GIS analyses, statistical modelling, surveys, PhotoVoice and focus group interviews," Biggs explains. The three-

year project, which is funded by the Swedish Research Council, aims to build capacity and further develop science-policy networks through SAPECS, a Centre-led spin-off from PECS (Programme on Ecosystem Change and Society) engaging scientists, practitioners and students in southern Africa.



Thomas Elmqvist



Oonsie Biggs



Maria Tengö

### Connected risks, connected solutions – Exploring solutions and challenges towards transformative change of governance.

Humanity seems to be moving towards a new predicament of multiple, global and interconnected risks. The global food crisis in 2008-2009 coincided with the financial crash of 2009, and recurrent outbreaks of novel infectious diseases, and the cascading impacts of ongoing climate change, are other recent examples.



Victor Galaz

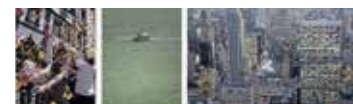
The report is the result of collaboration between scholars from a broad range of disciplines in several parts of the world including Jonas Tallberg (political science, Sweden), Ellen Hey (international law, Netherlands), Arjen Boin (crisis management, Netherlands) and Frances Westley (innovation studies, Canada), amongst others.

"These interconnected trends pose fundamental challenges to international institutions, law, networks and partnerships. We wanted to explore what builds a global capacity to cope with surprise, shocks and propagating failures, from multiple disciplinary perspectives", says Centre researcher Victor Galaz, coordinating author of the report "Connected Risks, Connected Solutions?"

The report was funded by the Global Challenges Foundation. The foundation works to raise awareness of the greatest threats facing humanity – in particular climate change, other environmental damage and political violence – and how these threats are linked to poverty and the rapid growth in global population.

The report includes the following four main messages:

- Social science insights about the governance of connected global risks remain fragmented, but are complementary.
- Different models of governance address different critical functions needed to govern global connected risks.
- There are several highly policy-relevant research gaps with respect to innovation, legitimacy, and adaptability in the face of change.
- Transformative changes of the governance of global environmental risks are, indeed, possible.



### Connected Risks, Connected Solutions



Victor Galaz (coordinating author) with contributions from Diego Galafassi, Jonas Tallberg, Ellen Hey, Arjen Boin, Claudia Duarte-Lima, Jake Dunagan, Frances Westley, Per Olsson, Robert Osterberg



### Changing Planet: New cluster on global change research

How is the human enterprise shaping the biosphere and how can we become better stewards of planet Earth? These were some of the questions that in 2014 drove researchers to form a new research cluster called 'Changing Planet'. The cluster primarily consists of researchers from the Stockholm Resilience Centre, the Beijer Institute of

Ecological Economics and the Family Erling Persson Program – Global Economic Dynamics and the Biosphere. 'Changing Planet' is a response to the increasing need for improved understanding of interactions between people and ecosystems on larger scales. While previous research has done a great job mapping and quantifying the linkages of many biophysical components on the planetary scale, there is still a poor understanding of social-ecological connectivity at that scale, argue the researchers behind the initiative.

"The pace and extent of global changes means there is a pressing need to develop our understanding of how social processes are interconnected and how they drive and interact with the processes of the biosphere," explains Beatrice Crona, member of the steering group.

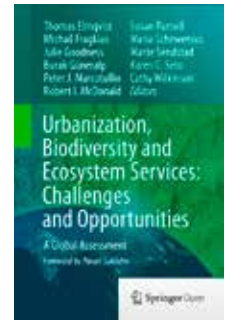
For more information, go to [www.changingplanet.se](http://www.changingplanet.se)

### Landmark report on biodiversity and urbanisation celebrates one year

As the Cities and Biodiversity Outlook (CBO) saw its first anniversary, there was good reason to celebrate. Since the launch in 2013, the CBO's scientific foundation – *Urbanization, Biodiversity and Ecosystem Services* – was published as an open access book by Springer and downloaded more than 145,000 times. Within only nine months after the launch, the book became one of the 30 most downloaded books in the Springer col-

lection of more than 170,000 titles. After one year it became the fifth most downloaded book in Springer's Life Sciences series and the geographical distribution included downloads in more than 100 countries.

The CBO was produced by Stockholm Resilience Centre together with the Secretariat of the Convention on Biological Diversity (CBD), in partnership with UN-Habitat and ICLEI – Local Governments for Sustainability.



### Johan Rockström receives the Woods Hole Research Center's Lawrence S. Huntington Environmental Prize

The Woods Hole Research Center is based in Massachusetts, US, and works at the intersection of land and climate to investigate the causes and impacts of climate change.

The prize recognises leaders "who advance or promote research and communication on climate, earth sciences, and conservation." As such, prize recipients recognise the interrelationships of global systems and planetary scale thinking.



PHOTO: COURTESY OF WOODS HOLE RESEARCH CENTER

# Model Calendar



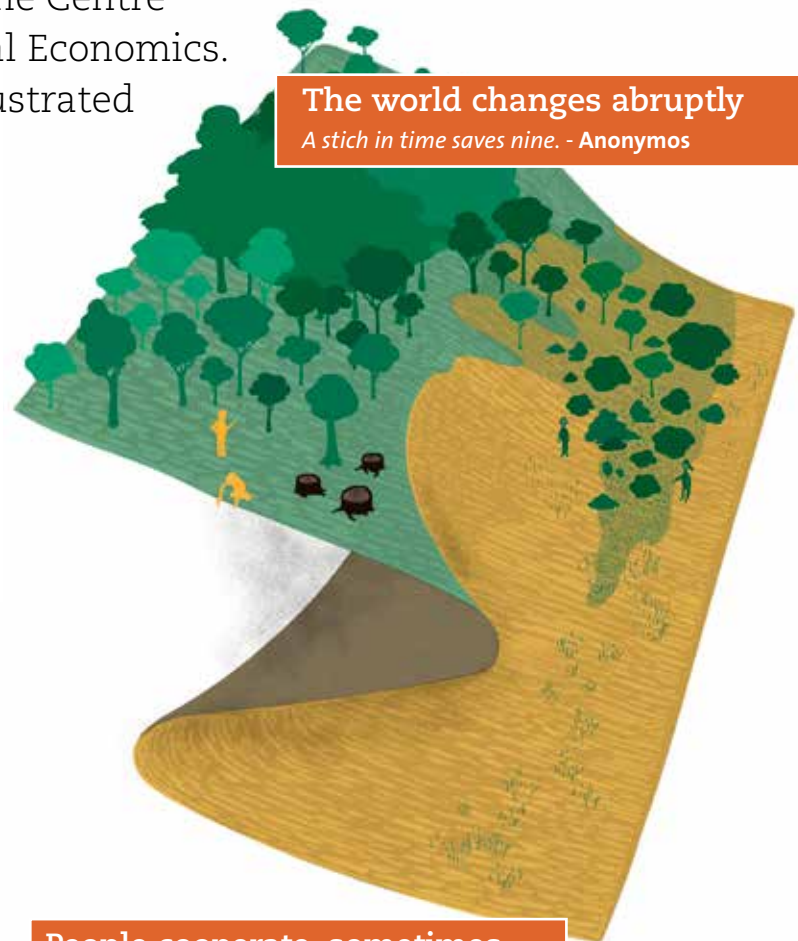
During 2014 a group of researchers gathered the models that are often used at the Centre and the Beijer Institute of Ecological Economics. The models were explained and illustrated in a wall calendar for 2015

“Our thinking in social-ecological systems research is influenced by many models,” say Nanda Wijermans and Caroline Schill, two of the creators of the calendar. “This calendar is a result of monthly dinners and discussion over the course of a year where we have identified a selection of models that shaped our thinking about social-ecological systems and made an effort to explain and illustrate them.”

Download the calendar on the Centre website. Search word: Model calendar

**The world changes abruptly**

*A stich in time saves nine. - Anonymos*



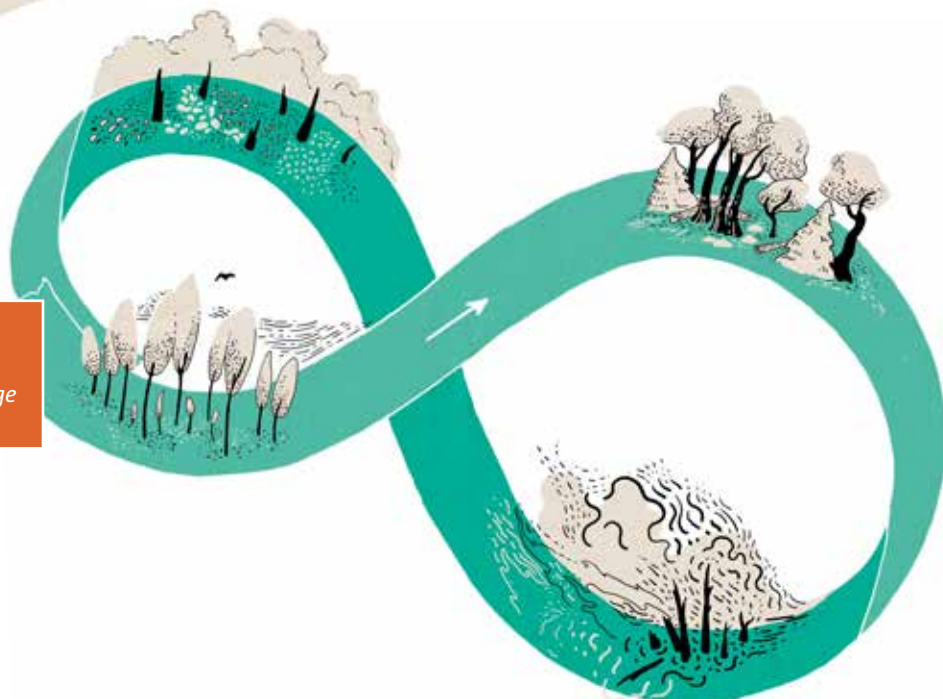
**People cooperate, sometimes**

*The most powerful force ever on this planet is human cooperation – a force for construction and destruction. - Jonathan Haidt*



**The world is adapting**

*It is not the strongest or the most intelligent who will survive but those who can best manage change. - Charles Darwin*



# Scientific publications

A selection of publications featured on our website



PHOTO: AUSTRALIAN CUSTOMS AND BORDER PROTECTION SERVICE

## Catching up on fisheries crime

How Interpol and international networks join forces to stop illegal fishing

Österblom, H. 2014. *Catching up on fisheries crime*. *Conservation Biology* 28(3): 877-879.



PHOTO: STEVEN ZEEF/AZOTE

## Looming on the conservation horizon

15 poorly known issues that may influence conservation in 2014

Sutherland, W.J., R. Aveling, T.M. Brooks, M. Clout, L.V. Dicks, L. Fellman, E. Fleishman, D.W. Gibbons, B. Keim, F. Lickorish, K.A. Monk, D. Mortimer, L.S. Peck, J. Pretty, J. Rockström, J.P. Rodriguez, R.K. Smith, M.D. Spalding, F.H. Tonneijck, A.R. Watkinson. 2014. *A horizon scan of global conservation issues for 2014*. *Trends in Ecology & Evolution* 29(1): 15-22.



PHOTO: BENT CHRISTENSEN/AZOTE

## Back to the future

Unrealistic to think coral reefs can return to pristine conditions, more pragmatic management approaches needed

Graham, N.A.J., J.E. Cinner, A.V. Norström, M. Nyström. 2014. *Coral reefs as novel ecosystems: Embracing new futures*. *Current Opinion in Environmental Sustainability* 7: 9-14.



PHOTO: GUNNAR ANEEN/AZOTE

## The pisces as parts of the whole

A strategy for implementing ecosystem-based fisheries management in the Baltic Sea

Moellmann, C., M. Lindegren, T. Blenckner, L. Bergström, M. Casini, R. Diekmann, J. Flinkman, B. Muller-Karulis, S. Neuenfeldt, J. O. Schmidt, M. Tomczak, R. Voss, A. Gårdmark. 2014. *Implementing ecosystem-based fisheries management: From single-species to integrated ecosystem assessment and advice for Baltic Sea fish stocks*. *ICES Journal of Marine Science* 71(5): 1187-1197.



PHOTO: WIKIPEDIA COMMONS

## Children of the involution

Why history matters in the creation of social-ecological traps

Boonstra, W.J., F.W. de Boer. 2014. *The historical dynamics of social-ecological traps*. *Ambio* 43(3):260-274.



PHOTO: SANDRA THUNANDER

### A resilient contract with the ancestors

Amid social and environmental change, can an ancient Malagasy agropastoral tradition survive?

von Heland, J., C. Folke. 2014. *A social contract with the ancestors: Culture and ecosystem services in southern Madagascar*. *Global Environmental Change* 24: 251-264.



PHOTO: NILS KAUTSKY/AZOTE

### An ocean of innovation

How theories of innovation and agency can explain the emergence of Marine Spatial Planning

Merrie, A., P. Olsson. 2014. *An innovation and agency perspective on the emergence and spread of Marine Spatial Planning*. *Marine Policy* 44: 366-374.



PHOTO: EXPLAIN THAT STUFF/FICKER

### Planet tinkering reconsidered

Using sulphate aerosols to tackle dangerous climate change unlikely to be a game-changer

Barrett, S., T.M. Lenton, A. Millner, A. Tavoni, S. Carpenter, J.M. Anderies, F.S. Chapin III, A.-S. Crépin, G. Daily, P. Ehrlich, C. Folke, V. Galaz, T. Hughes, N. Kautsky, E.F. Lambin, R. Naylor, K. Nyborg, S. Polasky, M. Scheffer, J. Wilen, A. Xepapadeas, A. de Zeeuw. 2014. *Climate engineering reconsidered*. *Nature Climate Change* 4:527-529.



PHOTO: STEVEN ZEPH/AZOTE

### Lessons learned from Stockholm

Paper summarises 15 years of Centre research in the Stockholm urban region

Andersson, E., S. Barthel, S. Borgström, J. Colding, T. Elmqvist, C. Folke, Å. Gren. 2014. *Reconnecting cities to the Biosphere: Stewardship of green infrastructure and urban ecosystem services*. *Ambio* 43(4):445-453.

### The case of nature in cities

Special issue of *Current Conservation* on why it's time to start thinking of cities as more than grey patches of asphalt and concrete

Scherveniens, M., Tengö (editors), *Special issue: What is the scope of nature in cities?* *Current Conservation* 8:1.



PHOTO: ANDRE MASL ENNIKOV/AZOTE



PHOTO: STUART KININMONTH

## Not just drawings on a map

Five features that can improve conservation efforts within marine protected parks

Edgar, G.J., R.D. Stuart-Smith, T.J. Willis, S. Kininmonth, S.C. Baker, S. Banks, N.S. Barrett, M.A. Becerro, A.T.F. Bernard, J. Berkhout, C.D. Buxton, S.J. Campbell, A.T. Cooper, M. Davey, S. Edgar, G. Foerster, D.E. Galvan, A.J. Irigoyen, D.J. Kushner, R. Moura, P.E. Parnell, N.T. Shears, G. Soler, E.M.A. Strain, R.J. Thomson. 2014. Global conservation outcomes depend on marine protected areas with five key features. *Nature* 506(7487):216.



PHOTO: INGEMAR PETERSSON/AZOTE

## One fish or two fish?

Consistent misreporting of fish catches in the Baltic Sea has severe consequences for marine ecosystems  
*Hentati-Sundberg, J., J. Hjelm, H. Österblom. 2014. Does fisheries management incentivize non-compliance? Estimated misreporting in the Swedish Baltic Sea pelagic fishery based on commercial fishing effort. ICES Journal of Marine Science* 71(7): 1846-1853.



PHOTO: ROBERT KAUTSKY/AZOTE

## Revealing parallels and synergies

New approach helps connect actors with diverse knowledge about social-ecological governance

Tengö, M., E.S. Brondizio, T. Elmquist, P. Malmer, M. Spierenburg. 2014. Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. *Ambio* 43(5): 579-591.



PHOTO: JOHAN ENQVIST

## Citizen networks in the Garden City

Citizen networks important for ensuring successful management of urban ecosystems in growing cities

Enqvist, J., M. Tengö, Ö. Bodin. 2014. Citizen networks in the Garden City: Protecting urban ecosystems in rapid urbanization. *Landscape and Urban Planning* 130: 24-35.

## Beyond marginally greener agriculture

Centre researchers suggest policies and research for more resilient agriculture

Bennett, E.M., S.R. Carpenter, L.J. Gordon, N. Ramankutty, P. Balvanera, B. Campbell, W. Cramer, J. Foley, C. Folke, L. Karlberg, J. Liu, H. Lotze-Campen, N.D. Mueller, G.D. Peterson, S. Polasky, J. Rockström, R.J. Scholes, and M. Spierenburg. 2014. Toward a more resilient agriculture. *Solutions* 5 (5):65-75.



PHOTO: JERREN LOKRANTZ/AZOTE





PHOTO: ANDRÉ MASLÉNNIKOV/AZOTIE

## Beyond the quantity to the quality of green areas

Centre researchers propose a complementary approach to managing biodiversity in urban landscapes  
 Andersson, E., J. Colding. 2014. *Understanding how built urban form influences biodiversity*. *Urban Forestry & Urban Greening* 13(2):221-226.



PHOTO: TOM HERMANSSON SNICKARS/AZOTIE

## Two steps forward, two steps back

Transforming to community based management of marine resources is no linear process

Abernethy, K.E., Ö. Bodin, P. Olsson, Z. Hilly, A. Schwarz. 2014. *Two steps forward, two steps back: The role of innovation in transforming towards community-based marine resource management in Solomon Islands*. *Global Environmental Change* 28:309-321.



PHOTO: TONY SVENSSON/AZOTIE

## Social networks matter

Navigating existing social networks and planning for future ones are important in co-management of resources on the coast

Sandström, A., B. Crona, Ö. Bodin. 2014. *Legitimacy in co-management: The impact of preexisting structures, social networks and governance strategies*. *Environmental Policy and Governance* 24(1): 60-76.



PHOTO: A. G. FARRAN/DUNAMID FLICK

## Consistent responses to unpredictable events

Similarities found in global networks' response to large-scale abrupt crises

Galaz, V., H. Österblom, Ö. Bodin, B. Crona. *Global networks and global change-induced tipping points*. *International Environmental Agreements: Politics, Law and Economics* doi:10.1007/s10784-014-9253-6.



PHOTO: LE CARLSSON/AZOTIE

## Redefining the biodiversity boundary – beyond the count

Researchers argue that genetic and functional diversity as well as biome health are important metrics for biodiversity

Mace, G.M., B. Reyers, R. Alkemade, R. Biggs, F. Chapin, I. Stuart, S.E. Cornell, S. Diaz, S. Jennings, P. Leadley, P.J. Mumby, A. Purvis, R.J. Scholes, A.W.R. Seddon, M. Solan, W. Steffen, G. Woodward. 2014. *Approaches to defining a planetary boundary for biodiversity*. *Global Environmental Change* 28: 289-297.



PHOTO: ANDRÉ MASJENNIKOV/AZOTE

### If at first you don't succeed

“Learning by doing” in resource management is put to the test in modelling scenarios

Lindkvist, E., J. Norberg. 2014. *Modeling experiential learning: The challenges posed by threshold dynamics for sustainable renewable resource management. Ecological Economics* 104: 107-118.



PHOTO: RAINFORREST ACTION NETWORK/ELICKR

### Business-as-usual interrupted

Degradation of biodiversity and ecosystem services could be far greater than was previously predicted. New study identifies key policy and management opportunities that can reduce or avoid damaging shifts

Leadley, P., V. Proenca, J. Fernandez-Manjarres, H. M. Pereira, R. Alkemade, R. Biggs, E. Bruley, W. Cheung, D. Cooper, J. Figueiredo, E. Gilman, S. Guenette, G. Hurtt, C. Mbow, T. Oberdorff, C. Revenga, J. P. W. Scharlemann, R. Scholes, M.S. Smith, U.R. Sumaila, M. Walpole. 2014. *Interacting regional-scale regime shifts for biodiversity and ecosystem services. BioScience* 64(8): 665-679.



PHOTO: NIKLAS VIRESEN/AZOTE

### Mapping out a resilient future

Human development within Earth's safe operating space is possible

Gerst, M.D., P.D. Raskin, J. Rockström. 2014. *Contours of a resilient global future. Sustainability* 6(1): 123-135.



PHOTO: TOM HERMANSSON SNICKARS/AZOTE

### Matching strategy with opportunity

Changing the trajectory of marine resource governance requires addressing the social context of change-makers

von Heland, E., J. Clifton, P. Olsson. 2014. *Improving stewardship of marine resources: Linking strategy to opportunity. Sustainability* 6(7): 4470-4496.



PHOTO: EWA WISNIEWSKA/AZOTE

### What makes the urban ecosystem tick?

Understanding how urban ecosystems function is important for ensuring human well-being and preventing continued biodiversity loss

Haase, D., N. Frantzeskaki, T. Elmquist. 2014. *Ecosystem services in urban landscapes: Practical applications and governance implications. Ambio* 43(4-SI): 407-412.

PHOTO: ANDERS TEDHOLM/AZOTE



### No panacea

Social learning important, but no guarantee for improved natural resource management

Nykvist, B. 2014. Does social learning lead to better natural resource management? A case study of the modern farming community of practice in Sweden. *Society & Natural Resources* 27(4): 436-450.



PHOTO: STEVEN ZEH/AZOTE

### The final Wild West

Increasing exploitation of ocean areas beyond national jurisdiction present serious governance challenges

Merrie, A., D.C. Dunn, M. Metian, A.M. Boustany, Y. Takei, A.O. Elferink, Y. Ota, V. Christensen, P.N. Halpin, H. Österblom. 2014. An ocean of surprises: Trends in human use, unexpected dynamics and governance challenges in areas beyond national jurisdiction. *Global Environmental Change* 27: 19-31.



PHOTO: NICOLAS DESAGHER/AZOTE

### No ecosystem is an island

Why countryside biogeography rather than island biogeography is essential to conservation strategy in agricultural ecosystems

Mendenhall, C.D., D.S. Karp, C.F.J. Meyer, E.A. Hadly, G.C. Daily. 2014. Predicting biodiversity change and averting collapse in agricultural landscapes. *Nature* 509(7499): 213-217.

PHOTO: FREDRIK WILDE/AZOTE



### Urban sustainability – a child's play?

Children who spend more time in nature show a better understanding of both natural resources and environmental degradation

Giusti, M., S. Barthel, L. Marcus. 2014. *Nature routines and affinity with the biosphere: A case study of preschool children in Stockholm*. *Children, Youth and Environments* 24(3), 16-42.

PHOTO: EDGENE WEITLICKER



### Safe and just regional social-ecological systems

Researchers propose a framework for defining a safe and just operating space integrating social wellbeing into planetary boundaries on regional levels

Dearing, J.A., R. Wang, K. Zhang, J.G. Dyke, H. Haberl, M.S. Hossain, P.G. Langdon, T. Lenton, K. Raworth, S. Brown, J. Carstensen, M.J. Cole, S.E. Cornell, T.P. Dawson, C.P. Doncaster, F. Eigenbrod, M. Floerke, E. Jeffers, A.W. Mackay, B. Nykvist, G.M. Poppy. 2014. *Safe and just operating spaces for regional social-ecological systems*. *Global Environmental Change* 28:227-238.

PHOTO: MAX TROELL/AZOTE



### Farming aquatic animals for global food system resilience

Does aquaculture add resilience to the world's food portfolio?

Troell, M., R.L. Naylor, M. Metian, M. Beveridge, P.H. Tyedmers, C. Folke, K.J. Arrow, S. Barrett, A.-S. Crepin, P.R. Ehrlich, Å. Gren, N. Kautsky, S.A. Levin, K. Nyborg, H. Österblom, S. Polasky, M. Scheffer, B.H. Walker, T. Xepapadeas, A. de Zeeuw. 2014. *Does aquaculture add resilience to the global food system? Proceedings of the National Academy of Sciences of the United States of America* 111(37): 13257-13263.



PHOTO: ANDRE MASLÉNNIKOV/AZOTE

### Three keys to successful SDGs

Researchers identify conditions necessary for the SDGs to be effective in the Anthropocene

Norström, A.V., A. Dannenberg, G. McCarney, M. Milkoreit, F. Diekert, G. Engström, R. Fishman, J. Gars, E. Kyriakopoulou, V. Manoussi, K. Meng, M. Metian, M. Sanctuary, M. Schlüter, M. Schoon, L. Schultz, M. Sjöstedt. 2014. *Three necessary conditions for establishing effective Sustainable Development Goals in the Anthropocene*. *Ecology and Society* 19(3): 8.



PHOTO: MARTIN ALMQVIST/AZOTE

## Diversity in fishers' behaviour; a matter of style

Inefficient fisheries management can be effectivised by further classifying fishing practices and styles

Boonstra, W.J., J. Hentati-Sundberg. *Classifying fishers' behaviour: An invitation to fishing styles. Fish and Fisheries* doi:10.1111/faf.12092



PHOTO: BENGT EKBERG/AZOTE

## The hidden cost of coerced resilience

Centre researchers look into forced resilience of intensive agriculture, forestry, fisheries and aquaculture systems

Rist, L., A. Felton, M. Nyström, M. Troell, R.A. Sponseller, J. Bengtsson, H. Österblom, R. Lindborg, P. Tidåker, D.G. Angeler, R. Milestad, J. Moen. 2014. *Applying resilience thinking to production ecosystems. Ecosphere* 5(6): 73.



PHOTO: MAX TROELL/AZOTE

## Out of tune

Farming of bluefin tuna is increasing, but official estimates are far below actual production

Metian, M., S. Pouil, A. Boustany, M. Troell. 2014. *Farming of bluefin tuna: Reconsidering global estimates and sustainability concerns. Reviews in Fisheries Science & Aquaculture* 22(3): 184-192.



PHOTO: OSKAR HENRIKSSON/AZOTE

## Winners and losers – the ups and downs of marine conservation

Study highlights that people's experiences with marine reserves are affected by a range of social conditions

Cinner, J.E., T. Daw, C. Huchery, P. Thoya, A. Wamukota, M. Cedras, C. Abunge. 2014. *Winners and losers in marine conservation: Fishers' displacement and livelihood benefits from marine reserves. Society & Natural Resources* 27(9):994-1005.



PHOTO: HASSE DAHL GREEN/AZOTTE

### Survival of the best fit

Results of conservation efforts are linked to the match between social-ecological structures and processes

*Bodin, Ö., B. Crona, M. Thyresson, A.-I. Golz, M. Tengö. 2014. Conservation success as a function of good alignment of social and ecological structures and processes. Conservation Biology 28(5):1371-1379.*



PHOTO: TORBJORN KAPFAZOTE

### Fit to work

Management of fragmented urban landscapes is challenging; network analysis can help improve it

*Bergsten, A., D. Galafassi, Ö. Bodin. 2014. The problem of spatial fit in social-ecological systems: detecting mismatches between ecological connectivity and land management in an urban region. Ecology and Society 19(4):6.*



PHOTO: Ulf GRÖNBÄCK/AZOTTE

### A need to see the forest and the trees

How farmland abandonment is reported and assessed impacts if it's seen as threat or opportunity and can have implications for policy

*Queiroz, C., R. Beilin, C. Folke, R. Lindborg. 2014. Farmland abandonment: Threat or opportunity for biodiversity conservation? A global review. Frontiers in Ecology and the Environment 12(5): 288-296.*

# Books

## The Anthropocene Gap – Will technology save the day?

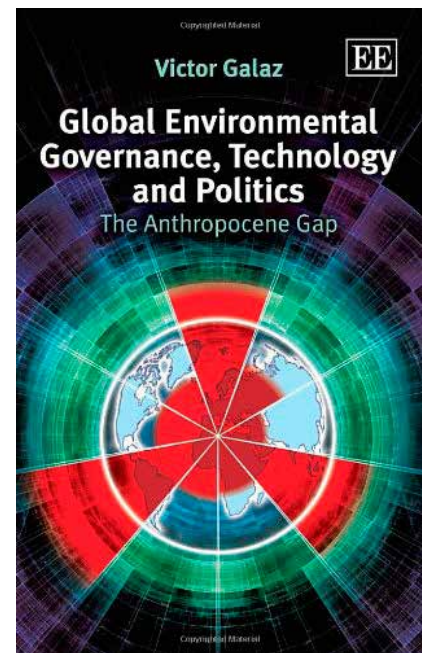
Victor Galaz discusses how technology poses novel risks, but also provides new possibilities

We live on an increasingly human-dominated planet. Our impact on the Earth has become so big that researchers now suggest that it merits its own geological epoch - the 'Anthropocene' – where humanity is influencing every aspect of the Earth on a scale akin to the great forces of nature. But with the Anthropocene comes the 'Anthropocene Gap', society's current failure to address the most profound environmental challenges of our time.

This is the subject of a book by Centre researcher Victor Galaz, entitled "Global Environmental Governance, Technology and Politics - The Anthropocene Gap", published by Edward Elgar in 2014. The book combines theory development and case studies of 'planetary bounda-

ries', emerging infectious diseases, financial markets and geoengineering to further explore the meaning behind the 'Anthropocene Gap'. Galaz explores how technological change not only poses new environmental risks, but also new possibilities for collective action.

"I elaborate on the argument that our transition into the Anthropocene presents fundamentally different environmental political challenges than those experienced before. For example, we need to develop institutions and governance mechanisms that are robust enough to deal with the increasingly complex environmental issues we are facing while also allowing for fail-safe experimentation and continuous learning," Galaz explains.



## Building water resilience for human prosperity

Introducing a new framework for water governance and management

Water is the bloodstream of nature, and wise stewardship of freshwater is central to human development and prosperity. But over-use and mismanagement of freshwater resources now threatens the functioning of ecosystems that are crucial to human activities.

If the pressure on the water cycle becomes too great, it can

lead to unpredictable and potentially irreversible changes that affect human development and wellbeing.

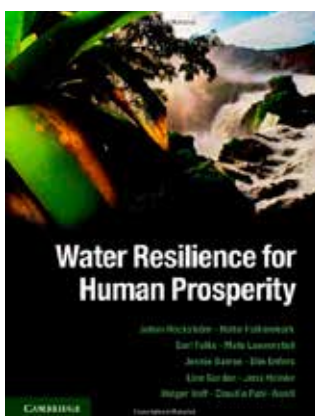
"Water Resilience for Human Prosperity" was published in 2014 and written by Centre researchers and colleagues from Stockholm Environment Institute, the Potsdam Institute for Climate Impact Research and the Institute for

Environmental Systems Research at the University of Osna-brück. The book analyses the problems and provides examples of successful water resource management with a particular focus on what builds resilience.

"We have looked at feedbacks in social-ecological systems, the processes that maintain a system as it is, and that can be changed by external pressures, causing the system to radically change. Understanding these feedbacks can be of help in building water resilience," says Centre researcher Line Gordon, co-author of the book.

The authors argue that through careful management of water resources, and knowledge of the interaction between humans and nature, we can maximise the sustainable use of limited available resources.

The key message of Water Resilience for Human Prosperity is that by identifying and understanding the available water resources, and how it generates multiple benefits for humans and nature, we can find solutions that provide prosperity longer and for more people.





## Reflections on people and the biosphere

Carl Folke reflects on 30 years of research in new photo book. The book *Reflections* by Carl Folke and designer/art director Lars Hall was released in 2014. The art-science book is accompanied together with a set of unique photos from the Stockholm Archipelago during the

Using quotes from songs by international artists, and insights from his own and others' research on social-ecological systems, Carl Folke describes the dynamic relationship between humans and the biosphere in a thought-provoking manner. The images and the text interact with a rhythm, reminding us again and again of the importance of reconnecting our social and economic systems to the biosphere.

“The whole book represents a mind-shift, from treating the planet as an externality to recognizing that we are for our own development strongly dependent on the resilience of the biosphere – the thin layer of life that we are embedded parts

of “ explains Carl Folke. In *Reflections* he has chosen to work with an artistic expression to communicate scientific insights, adding a perspective that can complement those research findings that clarify the need to reconnect to the biosphere.

The photos in the book are from Lars Hall's personal collection, and the result of documenting a particular location in Stockholm's northern archipelago with a strong sense of place in nature. From the exact same spot at Grillskäret island, seasons and changes throughout the day have been documented with his camera for 30 years. The result is a unique exposé





PHOTO: LARS HALL

# phere

s – on People and the Biosphere by Centre Science Director  
 ce book features insights from 30 years of resilience research  
 e same time period



of nature's shifting scenes – from a peaceful atmosphere to the dramatically menacing.

Lars Hall is legendary within the field of design through his work at Hall&Cederquist during the 1970s and Lars Hall Design AB from 1990 onwards. He has been a key advocate for the photographic image via the gallery Camera Obscura that he established back in the 1970s.

The book project was exhibited as an installation at the art museum Artipelag, where the slide show “Reflections on Mankind and the Biosphere” was on display during the summer of 2014. Selected parts of *Reflections*, published by Langen-

skiöld Publishers in 2014, will be shown mid-April to mid-May 2015 as an outdoor exhibition at the Raoul Wallenberg's Square, Nybroplan in central parts of Stockholm.

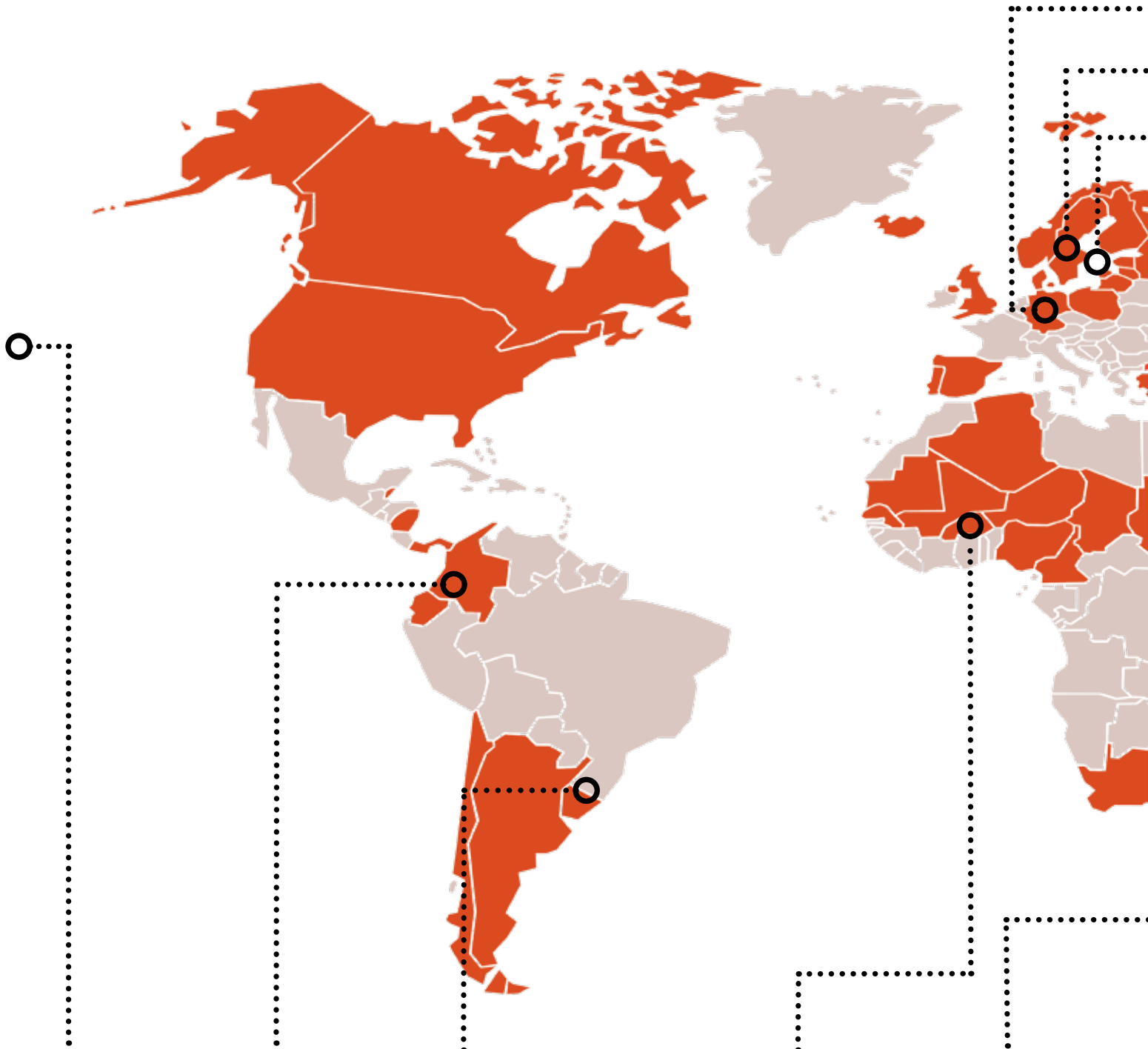
*“The photos and the selected music quotes capture the emotional connection to the biosphere that we all are a part of.”*

**Dr Carl Folke, Centre science director**

# Where in the world are we?

Examples of where Centre research is conducted around the world

See more examples via our online research map, [www.stockholmresilience.su.se/map](http://www.stockholmresilience.su.se/map)



### US-HAWAII

Study shows that algae-eating fish are key to avoiding regime shifts on Hawaiian coral reefs

### ECUADOR

The Quito II dialogue included 90 participants exploring ways to scale up financing for biodiversity

### URUGUAY

Smarter water management crucial for Uruguay's growing livestock production

### WEST AFRICA SAHEL

Ecosystem services is a good lens for integration of knowledge on how trees contribute to livelihoods

### TANZANIA

Holistic approaches to sub-Saharan farming can unlock poverty traps

Short movies describe the science and practice behind common property initiatives in cities

Sea birds are important indicators for what goes on beneath the sea surface

Study lists six steps to boost organic farming and decrease pressure on the Baltic Sea

The rise and fall of the Soviet Union contributed to marine regime shifts

Changes in the Arctic will affect ecosystems, communities and industrial infrastructure

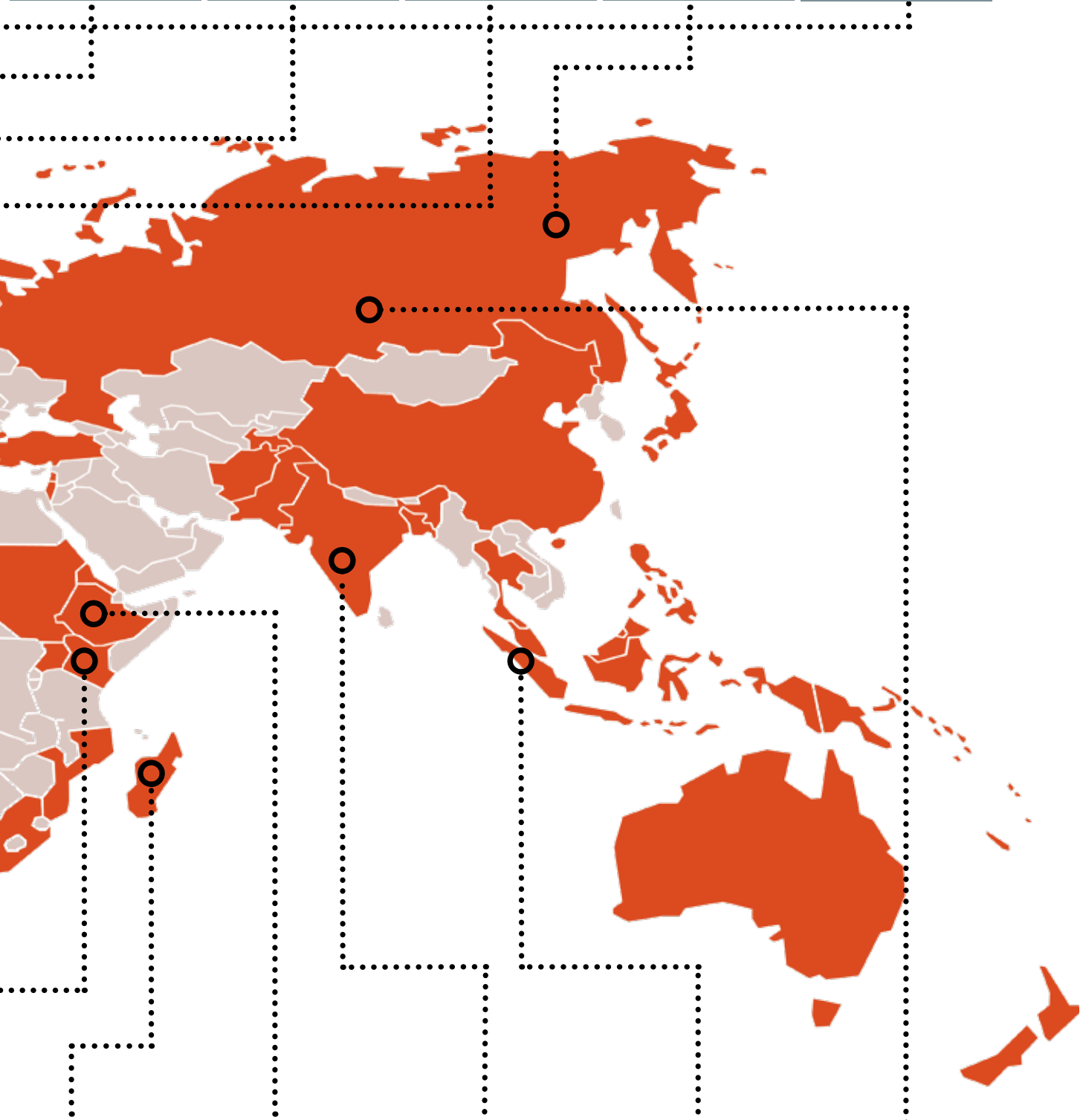
GERMANY

SWEDEN

BALTIC REGION

RUSSIA

THE ARCTIC



MADAGASCAR

ETHIOPIA

INDIA

INDONESIA

UZBEKISTAN

A contract with the ancestors influences the long-term persistence of the agropastoral system in Androy

New assessment tool can help optimise water harvesting and boost food security in Ethiopia

Citizen networks are important for ensuring successful management of urban ecosystems in growing cities

Study shows that history matters in the creation of social-ecological traps

Reducing climate change vulnerability around Amudarya River delta is possible but measures are considerable

# Policy, practice and outreach



PHOTO: TOM HERMANSSON SNICKARS/AZOTE

## SwedBio – a bridging organisation

SwedBio is an international knowledge interface working with ecosystem governance and management through a resilience perspective

SwedBio bridges and facilitates learning and innovations between knowledge systems and cultures on issues such as poverty alleviation, equity, sustainable livelihoods and governance of social-ecological systems rich in biodiversity. It helps develop new policies and methods by facilitating multi-actor dialogues and contributions to strategic programmes in developing countries. It has been part of Stockholm Resilience Centre since 2011 and collaborates closely with a growing number of Centre researchers.

During recent years, SwedBio has played a unique role as organiser and facilitator of dialogues between diverse actors such as UN organisations, governments, scientists, civil society – including indigenous peoples' and local communities' organisations – as well as the private sector. In this spirit of dialogue and co-generation of knowledge, SwedBio also contributes to method developments related to resilience as-

essments such as the Multiple Evidence Base approach and Biodiversity Financing Mechanism, including Safeguards.

SwedBio is mainly funded by the Swedish International Development Cooperation Agency (Sida). It contributes to international processes such as the Convention on Biological Diversity (CBD), the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) and the UN-led process to develop Sustainable Development Goals (SDGs). Through financial support, SwedBio also contributes to strategic programmes in developing countries, collaborations that often also result in mutual learning.

“The close collaboration with Centre researchers has created important synergies for learning and method development that have been beneficial for both SwedBio and the researchers,” says Maria Schultz, director of SwedBio.

## Towards Sustainable Development Goals

Stockholm Resilience Centre and SwedBio continue to be involved in the post-2015 development agenda and the UN Sustainable Development Goals (SDGs)

Most work in relation to the SDGs has taken place through or within the Sustainable Development Solutions Network (SDSN), launched in August 2012 by UN Secretary-General Ban Ki-moon, to bring together academia, business, administrations and civil society to discuss strategies for sustainable development in the light of the post 2015 development agenda. Centre Director Johan Rockström is part of the Executive Committee, which acts as the board of the network. The network has twelve thematic groups whose work is solutions-oriented and provides high quality information to decision makers and the public within their respective theme.

For 2015, the Centre is continuing its collaboration with SDSN, focusing on a new ground breaking project “The World in 2050” lead by SDSN together with the Earth Institute at Columbia University, the International Institute for Applied Systems Analysis (IIASA), and the Centre. The project aims to explore the implications of the necessary transformative sustainable development pathways and the possible

‘degrees of freedom’ to meet economic development goals within a safe operating space of a stable planet.

Centre professor Thomas Elmqvist participated at the Open Working Groups 7<sup>th</sup> meeting in New York on the development of Goal 11 on resilient and sustainable urbanisation. Together with the SDSN urban team, he co-authored an analysis of the targets and indicators related to goal 11, highlighting the need to apply a multiple scale approach for resilience and for sustainability analyses to be meaningful.

Together with researchers at the Centre, SwedBio has had an active dialogue and contributed with comments and inputs for outcome drafts from the SDG’s Open Working Group meetings and SDSN, both regarding the Goals and Financing Sustainable Development. The areas that have been given main focus are those related to the Planetary Boundaries and the research at the Centre such as ecosystem services, biodiversity, marine issues, agriculture and urban issues.



PHOTO: E. HERMANSSON-TORÖK

## Contributing to Convention on Biological Diversity

Stockholm Resilience Centre and SwedBio active at COP 12



PHOTO: E. HERMANSSON-TÖRÖK

Centre researcher Thomas Elmqvist (third left) at the Biodiversity Summit for Cities and Subnational Governments.

The 12th Conference of the Parties of the Convention on Biological Diversity (COP12) took place in Pyeongchang, Republic of Korea 6 – 17 October 2014. The results of COP 12 indicate that, while progress is being made in conserving and sustainably using biodiversity, governments need to increase efforts if they are to end biodiversity loss.

Pernilla Malmer and Maria Schultz from SwedBio were nominated by the Swedish government and were part of the Swedish delegation. They contributed to discussions on bio-cultural diversity including indigenous peoples and local

communities, and financing for biodiversity. COP12 adopted guidelines for the integration of biodiversity and poverty eradication for sustainable development, after negotiations chaired by SwedBio. Maria Schultz was also a member of the High-Level Panel on Global Assessment of Resources for Implementing the Aichi Biodiversity Targets under the Convention on Biological Diversity, resulting in a report that was well received during COP12.

Centre researcher Claudia Ituarte-Lima was present as an environmental law specialist advising negotiations on safeguards under Biodiversity Financing Mechanisms. The report “Biodiversity financing and safeguards: lessons learned and proposed guidelines” by her and colleagues formed the decision on voluntary guidelines for safeguards in Biodiversity Financing Mechanisms.

Ellika Hermansson Török, Thomas Elmqvist and Louise Hård af Segerstad from the Centre took part in the Biodiversity Summit for Cities and Subnational Governments, and hosted a launch of the SwedBio financed new urban capacity building programme Urban Natural Assets for Africa together with partners.

All in all, the Centre and SwedBio arranged seven side events with partners on different issues and contributed as speakers or moderators to another seven side events during two intense conference weeks.

## Community Based monitoring welcomed by COP12

Multiple Evidence Approach receives international recognition

SwedBio has over the last decade supported partner organizations among indigenous peoples and local communities in the development of community-based monitoring of the status and trends of biodiversity and local resources in their territories. This bottom-up approach to monitoring was welcomed at the 12<sup>th</sup> Conference of the Parties of the Convention on Biological Diversity (COP12) and will be further piloted and used. Combined with a Multiple Evidence Base (MEB) approach, community-based monitoring can support efforts to reach the Aichi Targets for biodiversity.

The MEB approach aims to connect knowledge systems on an equal basis as a means to generate new and deeper insights, which are legitimate, credible and useful for all involved actors. It has been developed in transdisciplinary collaboration between Centre researchers, SwedBio and partners on the ground. MEB has received significant attention in the science-policy-practice community and is recognized as a great opportunity by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

COP12 also saw the ground-breaking agreement to change the terminology to “Indigenous peoples and local communities” after negotiations chaired by SwedBio staff member and Swedish delegate Pernilla Malmer. The (s) in “peoples” provides recognition for their diverse cultures and knowledge. This decision follows in line with the UN Declaration on the Rights of Indigenous Peoples.

*Read more about the work around MEB on the Centre website. Search for: “Multiple evidence base”*



PHOTO: P. MALMER



Concluding panel with Francisco Prieto – Ecuador Ministry of Environment, Walter Schuldt – Ecuador Ministry of Foreign Affairs, Seukwoo Kang – COP12 host Republic of Korea, Braulio Dias – Executive Secretary of CBD, Hem Pande – Ministry of Environment India, Maria Schultz – Stockholm Resilience Centre, and Sabino Francis Ogwal – National Environment Management Authority, Uganda.

## The Quito II Dialogue helped facilitate key negotiations on biodiversity financing

Following the success of the 2012 Quito dialogue, SwedBio co-organised a second multi-actor dialogue to explore ways to scale up the mobilization of financial resources for the Aichi Biodiversity Targets under the Convention on Biological Diversity

The Quito II dialogue was convened by the governments of Ecuador, India, Japan, Republic of Korea, Norway, Sweden, Uganda, the European Commission and the Secretariat of the Convention on Biological Diversity (CBD).

Nearly 90 participants – nominated via the CBD Secretariat – attended the dialogue, including representatives from government, civil society, indigenous peoples and local communities, intergovernmental institutions and academia.

“It was acknowledged that biodiversity financing such as Payments for ecosystem services or ecological compensation (biodiversity offsets) can be implemented in very different ways, tailored to the political cultures in different countries. Strong opinions concerning the role of the ‘market’ could therefore be processed during this dialogue seminar”, says Centre researcher Thomas Hahn.

“The importance of legal systems and safeguards that can contribute to socio-ecological benefits and equitable governance was discussed, building on a report on safeguards by SwedBio/Stockholm Resilience Centre,” says Claudia Ituarte-Lima, researcher at the Centre and lead author of the report “Biodiversity financing and safeguards: lessons learned and proposed guidelines.” This report became an information document for CBD COP12, which took place in the Republic of Korea in 2014. It also formed the decision on voluntary guidelines for safeguards in Biodiversity Financing Mechanisms that was adopted by the 193 CBD parties at COP12.

The dialogue offered an opportunity for mutual learning between diverse actors, and was considered by the CBD Secretariat to have facilitated the negotiations at COP12. The Quito II co-chairs’ report became a background document to the CBD negotiations. The outcomes were presented in the first day of the preparatory negotiations of COP12, and the dialogue was referred to in the negotiation text and final CBD-COP 12 Decision.

*Download the Quito II co-chairs’ report and the Safeguards report from the Centre website, search word: Quito II dialogue.*

The aim of Quito II was to contribute to shared understanding and clarification of a number of issues related to the mobilization of financial resources:

- values and mainstreaming of biodiversity
- governance, safeguards and equity
- financing mechanisms and incentives such as payment for ecosystem services and compensation schemes
- the role of private and financial sectors
- fiscal reforms and international levies
- synergies for biodiversity financing with climate change financing, Sustainable Development Goals and overseas development assistance.



PHOTO: STOCKHOLM RESILIENCE CENTRE/FAI FOOD FORUM

Marie Söderqvist, Director General at Livsmedelsföretagen; Lena Ek, Minister for the Environment; Ove Andersson, vice Chairman, Swedish Medical Association; and Centre Director Johan Rockström discussing how different sectors can cooperate to promote a healthy and sustainable food system.

## Innovation, food and the Baltic Sea at Almedalen political week

Stockholm Resilience Centre contributed to a number of events during Almedalsveckan 2014 – the political forum held in Visby on the Swedish island of Gotland every summer

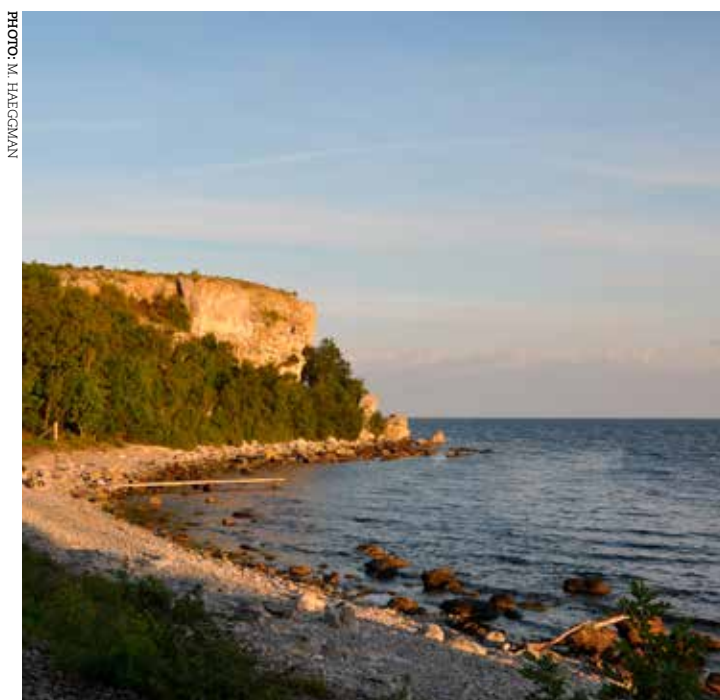


PHOTO: M. HÄGGMAN

The seminars which the Centre organized or where part of, revolved around issues concerning ways forward for Sweden in innovation and competition such as how to improve the outcomes of innovation investments, how to improve the Baltic Sea and how to solve environmental and health challenges in food production.

The Centre also arranged a field-trip to the island of Stora Karlsö for a number of members in the Swedish Parliament. Stora Karlsö is a field site where Centre researchers have a long tradition of studying sea bird populations and their interactions with the Baltic Sea ecosystem. The visit provided an opportunity for discussions, for participating in research activities (bird ringing) and for a moment of reflection in nature, during an otherwise very hectic week of debating.

The island of Stora Karlsö is home to the Common Murre and has the largest seabird community in the Baltic Sea. Studies of the Murre population in the island have led to important insights about interactions between humans and nature.



## Joining together for the urban future of Mälardalen

A day for joint learning, inventory of knowledge and identification of future challenges

The rapidly changing Mälaren region has over the last ten years become an increasingly interesting region for research on urban-rural issues and is now also one of the regional case studies within the research programme PECS.

On 7 November 2014 the Urban research theme at the Centre organised a conference, gathering a group of 70 actors from the Mälaren region in Sweden, including municipal planners, NGOs, grass root activists, and representatives from associations and state agencies. The purpose was to share research findings and discuss the future of the region.

”Over the years we have been collaborating with different actors in the region. They have contributed with important data and information for our research, and we are now see-

ing practical results from the work we have been doing,” says Sara Borgström, urban researcher at the Centre and coordinator of the conference.



PHOTO M. HAEGGMAN

## Documenting coral conservation efforts in Hawaii

A video documentary to present the state of coral reefs and the people working to save them

Coral Guardians is a project that combines cultural activities and scientific exchange to highlight successful coral reef stewardship and contribute to mutual learning. It is hosted by Albaeco and done in cooperation with Stockholm Resilience Centre. The main activity in the project is to co-arrange coral reef conservation seminars fully integrated in concerts.

In November 2014 Coral Guardians went on a network-

ing and learning journey to Hawai'i. Centre communicator Marika Haeggman, together with saxophonist Anders Paulsson and producer Mathias Walin, met with researchers, teachers, students, musicians, community leaders, scientists and volunteers engaged in marine issues and coral reefs. Many of the meetings were documented on video and will be presented in a documentary during the spring of 2015.



PHOTO M. WALIN

## LEAD – Resilience thinking, exponential technologies and sustainable leadership

### Training programme on resilience thinking and exponential technologies

During the fall of 2014, the four-month long training programme LEAD – Resilience thinking, exponential technologies and sustainable leadership programme - gathered future leaders and change makers from Lithuania, Latvia, Estonia, Poland, Moldova, Ukraine, Russia and Sweden to explain more about concepts like the Anthropocene, resilience thinking, social-ecological systems, exponential technologies, and how they relate to human wellbeing and transformations for sustainability.

The programme, which was a joint initiative between the Centre and the Swedish Institute, consisted of three modules: the first and last held in Stockholm and the second one in Tallinn, Estonia. During the modules, lectures, workshops and discussions covered the current reality of global environmental change linked to the latest insights on artificial intelligence, sensor networks, robotics, machine learning and other aspects of exponential technologies.

“By combining our research with the diverse set of backgrounds, skills and ideas of these change makers we could

generate exciting new ideas and solutions to a specific problem which in turn could contribute to large-scale, transformative change,” says Centre researcher and programme coordinator Per Olsson.



CREDIT: C. MORIN

## Visualising resilience research

### Creative collaboration to communicate complex concepts

Research at the Centre deals with many concepts that tend to be rather complicated to communicate to non-technical audiences such as governments, funding agencies and the members of the public. As a part of the on-going efforts to communicate scientific findings in new and creative ways, Centre researchers and communications team took part in an educational collaboration with Berghs School of Communication in the spring of 2014.

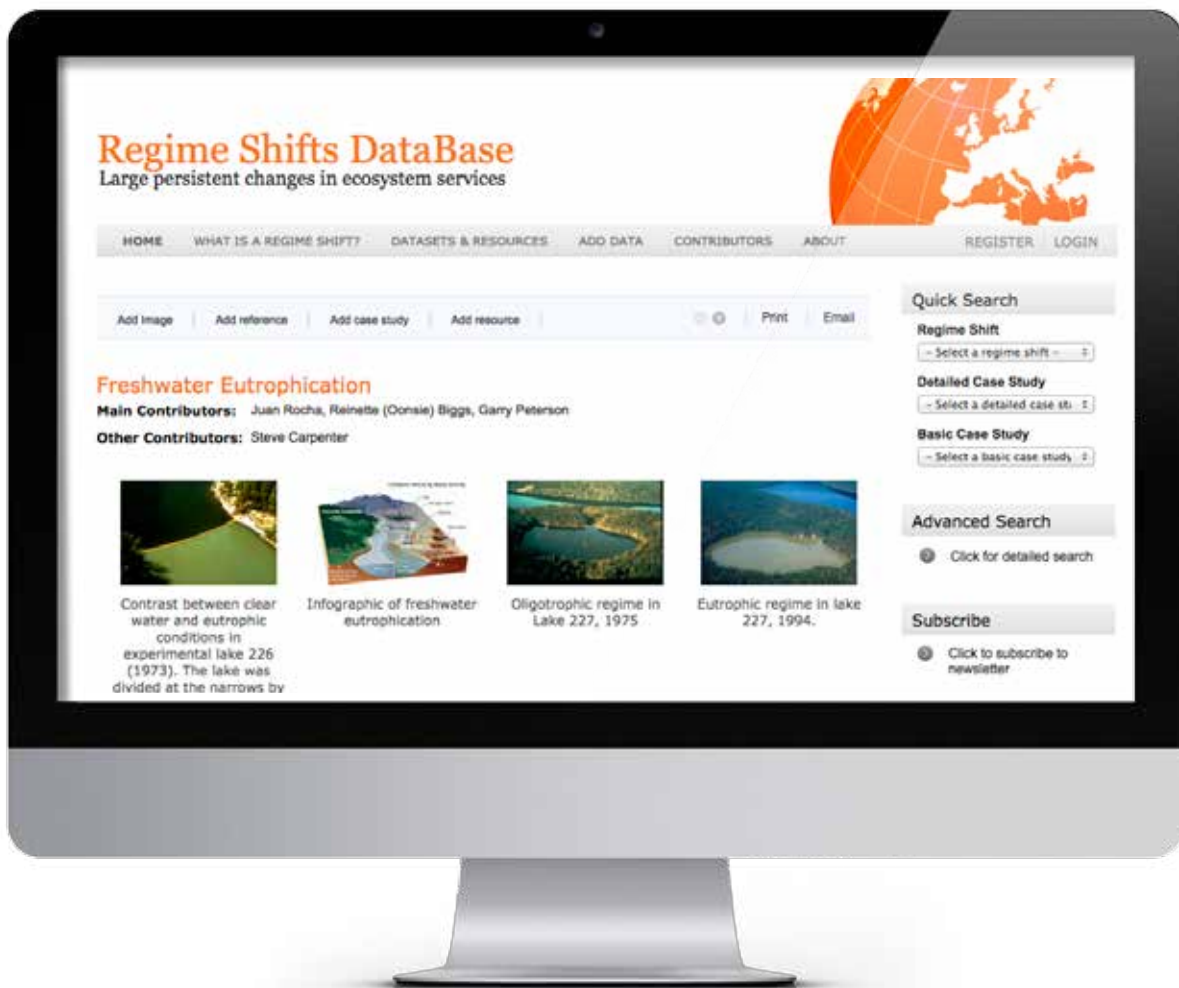
Berghs School of Communication is a leading institution in advertising and marketing education in Sweden. The col-

laboration with the Centre was initiated through Pål Pettersson, Course Director at Berghs' Department of Graphic Design. The course itself was curated by Joe Coppard, Creative Director, and Centre researcher Victor Galaz together with a group of colleagues.

“As scientists, we are used to communicating through long pieces of text, and occasional tables and figures. This joint project allowed us all to work more creatively, and sometimes with quite complex scientific concepts. The end result: stunning pieces of art with a deeper message,” Victor Galaz explains.



PHOTO: M. JANGC/VIEMO



## Examples of regime shifts from around the world

The regime shifts database aims to improve understanding of changes that impact ecosystem services and human wellbeing

What do coastal marine eutrophication, West Antarctic ice sheet collapse and bush encroachment have in common? They are all considered to be regime shifts, or large, persistent changes in the structure and function of social-ecological systems, with substantive impacts on the suite of ecosystem services provided by these systems.

Regime shifts are notoriously difficult to predict. They typically cause substantial changes in ecosystem services that come as a surprise, and by the time society reacts, these changes are most often difficult and costly to reverse.

The first online database of regime shifts was officially launched in 2014, after five years of development. It provides researchers, practitioners and students with an extensive portfolio of different examples of regime shifts that have large impacts on ecosystem services and human well-being. Each example is accompanied by an in-depth description of how the regime shift works, the impacts it has, and how

managers can build resilience to the shift, as well as an assessment of how well the regime shift is understood. The website, [www.regimeshifts.org](http://www.regimeshifts.org), is a product of the Regime Shifts theme at the Centre and the idea of researchers Oonsie Biggs and Garry Peterson.

“Better understanding of regime shifts is important as they may have substantial impacts on human economies, societies and well-being,” Oonsie Biggs says.

The website aims to help build a community of regime shift researchers and practitioners, by enabling people to contribute or suggest their own examples of regime shifts for inclusion in the database. The database already features contributions from many people from around the world.

“By collecting a wide range of examples of regime shifts, we can better understand how the drivers and impacts of regime shifts vary in different contexts, and more importantly, potentially identify new types of regime shifts.”

# Seminars and events

## Resilience 2014 – Montpellier, France

In May 2014 the third Resilience Conference was held in Montpellier, France, gathering more than 900 researchers, practitioners and students from around the world

Stockholm Resilience Centre was co-organiser of the conference, with Centre researcher Elin Enfors on the organising committee and Scientific Director Carl Folke on the scientific committee.

The theme of the conference was "Resilience and Development – Mobilizing for Transformation," and the objective was to explore and reinforce the links between resilience thinking and development issues.

"We wanted to try to bring together these two worlds," says Francois Bousquet, from CIRAD, one of the main organisers of the conference.

"Within both social-ecological thinking and development, resilience is no longer a buzz word but an approach that governments, NGOs and researchers try to apply. At the moment the two worlds do not really know each other, so with this conference we wanted them to meet and to see how they can work together."

Over the course of four days, 36 researchers and 17 PhD students from the Centre contributed with a total of 98 presentations and chaired 16 sessions. Seven Centre master's students contributed with presentations and posters.

The PhD students were put in charge of the closing ceremony of the conference. They took on the task combining music, theatre, research and a synthesis of the main messages, discussions and tweets from the conference.



PHOTO M. HÄGGGÄNAN



PHOTO M. HÄGGGÄNAN

Centre PhD student Vanessa Masterson presents her research during one of the off-site sessions.

Centre researcher Romina Marten facilitates a board game developed to illustrate the dynamics of resource management and cooperation.



PHOTO: R. KAUTSKY/AZOTE

The auditorium at the conference centre Le Corum housed the conference key notes and panel discussions.



PHOTO: R. KAUTSKY/AZOTE

As part of the ArtScience programme the conference hosted two photo exhibitions illustrating effects of environmental degradation.



PHOTO: M. HÄGGGÄN

A local practitioners' group presents their work with preserving a wetland during one of the off-site sessions.



PHOTO: R. KAUTSKY/AZOTE

The PhD students led the closing session of the conference, summarizing the main points and discussions from the four days through theatre, presentations and social media analysis.




EAT Director Gunhild A. Stordalen (left) together with the forum host Anne Lindmo and Centre director and Chair of the EAT Advisory Board, Johan Rockström.

## Better food for a better planet


Centre co-hosted international conference on close connections between food production, health and sustainable development

In 2014 Stockholm Resilience Centre together with the Norwegian Stordalen Foundation initiated an international high-level forum called The EAT Stockholm Food Forum, linking food, health and sustainability across the fields of academia, business and politics.

 **irinatikomirova** @irinatikomirova  
@RichardMcLellan: If you take care of your mother, she takes care of you.

 **sashitharoor** @sashitharoor  
Prince Charles to the #EATforum more people in the world are obese than hungry today. Need for integrated solutions

”The intention is to show that population growth, climate change, human health, resource management, sustainability and food security are not only fields of research – but also important political issues and exciting business opportunities,” says Centre director Johan Rockström.

 **kateraworth** @kateraworth  
The amount of food needed to end hunger globally is just 10% of what is not even being eaten. #EATforum

 **dralessandrode maio** @dralessandrode maio  
A healthy #environment is the basis of a strong #economy. We must find ways to have both. #EATforum now. #Stockholm

The forum, also known as EAT, is a global initiative, created in collaboration with prominent academic partners such as CGIAR, Harvard University, New York Academy of Sciences, Cornell University and The Sackler Institute for Nutrition Research.

### New and more integrated knowledge

The main objective of EAT is to increase interdisciplinary knowledge on food and food production, thereby improving nutrition and food safety, and tackling global challenges such as the increase in non-communicable diseases, climate change and environmental damage.

“Human prosperity is determined by our ability to be wise stewards of food, health and sustainability, recognizing that they are like the Three Musketeers, one for all, all for one,” says Centre director Johan Rockström.



Artist and designer Ron Finley, a self-proclaimed guerrilla gardener from Los Angeles, urged the participants at the EAT Food Forum to go out and “Do epic shit,” a message that hit home among the audience.

He is co-chair of the EAT Advisory Board, which also includes Richard Horton (Editor in Chief, The Lancet), Dr. Julio Frenk (Dean, Harvard School of Public Health), Professor Brian Wansink (Director, Cornell University Food and Brand Lab), Professor Anthony Costello (Co-Director, the UCL), Lee Howell (Managing Director, World Economic Forum) and Michiel Bakker (Director, Global Food Services, Google Inc.).

### Spearheading a new approach

The inaugural EAT forum took place in Stockholm, Sweden, 26-27 May 2014 and gathered leaders and experts from all over the world.

From H.R.H. The Prince of Wales to President Bill Clinton via a wide array of experts on nutrition, non-communicable diseases and sustainable business strategies, the message was

 **anthonymcostello** @anthonymcostello  
 @PeterBakker Corporate socialresponsibility is dead.  
 You hav to completely transform your business for  
 sustainability. #EATforum

clear: what you eat not only determines your health but also the health of our planet.

“We become what we eat. The planet becomes what we eat. We need to find inter-connected solutions, across sectors. The right choice of food can not only help save the planet and improve our health, but also create new business opportunities. EAT will spearhead a holistic approach to today’s food related challenges,” says Gunhild Stordalen, director of the EAT Initiative.

The forum was not just about addressing the nexus of food, health and sustainability; it was just as much about creating a “double triple helix” to merge science, business and policy with the aforementioned issues. A general consensus from the first forum was that we have the knowledge, and now is the time to act.

The second EAT Stockholm Food Forum will take place 1-2 June 2015. Confirmed speakers include Prime Ministers Stefan Löfven (Sweden) and Erna Solberg (Norway) in addition to Paul Bulcke, CEO of Nestle and Lee Howell, Managing Director of the World Economic Forum.

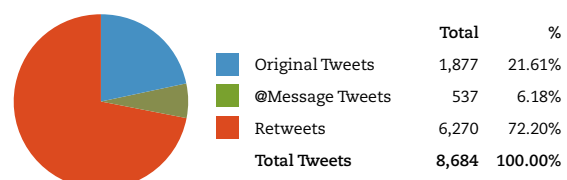
For more information, go to [www.eatforum.org](http://www.eatforum.org)



Professor Walter Willett from Harvard School of Public Health is an international authority on nutrition. He presented perspectives on what is needed for a healthy and sustainable diet.

Over the course of two days **2185** people contributed on social media, sending **8684** tweets with a combined reach of **5,606,745**.

The issues raised in the tweets reflected the interdisciplinary nature of those in the room and those following the forum online. The most popular hashtags after #EATforum itself was #food, #health and #sustainability.



## An urban-focused research network

Centre hosted Sweden's first national gathering of urban researchers with an interest in urban, natural capital, and sustainability issues

More than 30 of Sweden's most prominent researchers on urbanisation came together over two days in November 2014 to discuss research areas and initiate a nation-wide scientific network.

Urban sustainable development is high on the international science-to-policy agenda, and in the last decade new centres for urban research have been established in Sweden. The aim of the conference was to identify opportunities for future research, and ensure that Sweden keeps its place amongst the

world-leading countries in urban research.

"We found that there are many interesting possibilities for new collaborations and for learning from each other. This was only the beginning of a conversation that will continue and we are very happy that it has been initiated," says Centre researcher Erik Andersson, one of the conveners of the conference.

A follow-up conference will take place in the early summer of 2015.



PHOTO: ERIK LOKRANTZ/201E

## The Rockefeller programme on social innovation

Finishing up successful first year with a diverse group of system entrepreneurs

The Rockefeller Foundation Global Fellowship Program on Social Innovation brought together a diverse group of 18 system entrepreneurs, committed to integrating social innovation into their work and interested in addressing the root causes of problems affecting poor or vulnerable populations by transforming the systems we live in – political, economic, legal, educational, environmental, and social. The programme

was designed by the Stockholm Resilience Centre and the Waterloo Institute for Social Innovation and Resilience at the University of Waterloo in Canada. The programme ran between May 2013 and February 2014. The fellows participated in four intensive modules, each held in a different international location over this period. Through a series of presentations, small group exercises and site visits, fellows were introduced to new perspectives and skills to apply to the challenges facing their own organizations and networks.

"The goal of the programme was to support entrepreneurship aimed at not just helping systems improve and adapt, but instead to fundamentally alter the systems that create problems in the first place," says Centre researcher Per Olsson who helped design and run the programme. "The fellows in this first year of the programme have been able to integrate resilience into the ways they look at and solve problems; this is an important part of transformation towards sustainability."



PHOTO: REBELLAGIO CENTRE



## Education for sustainable development

### Gathering educators, teachers and researchers to discuss education for sustainable development

Educators, teachers and researchers from all over Sweden gathered at the Swedish Museum of Natural History in Stockholm from 17 to 18 November 2014 for a two-day conference on how to strengthen education for sustainable development in Sweden.

The conference was organized by Stockholm Resilience

Centre together with the Swedish Museum for Natural History and the Swedish International Centre of Education for Sustainable Development (SWEDESD). The aim was to allow participants to reflect on key competences and methods for effective education for sustainability. Lecturers included Wolfgang Brunner, Program Specialist at SWEDESD, as well as Centre researchers Johan Rockström, Lisen Schultz and Per Olsson.

The conference concluded with a discussion involving members of the Swedish delegation to the UNESCO World Conference on Education for Sustainable Development, which took place in Nagoya a week before the conference in Stockholm. The delegation presented the outcomes of the World Conference and the new Global Action Program (GAP) on Education for Sustainable Development. Discussions were held on possible and plausible ways of implementing GAP, and in doing so also improving the quality of the Swedish educational system.



PHOTO H.KARLSSON

## Opening act at the Baltic Sea Festival 2014

### Using music and theatre to communicate research insights on seabirds and the Baltic Sea

People from around the Baltic Sea come to Stockholm every year to enjoy world-class music played at the Baltic Sea Festival. The festival, launched in 2003, is a cooperation between Berwaldhallen (Sweden), conductor Esa-Pekka Salonen (Finland) and the Marinski Theatre (Russia).

The festival aims to promote environmental leadership and bring people together to discuss the challenging questions about the Baltic Sea, using music as a platform. The environmental issues in the Baltic Sea can only be solved if all the countries work together.

Stockholms Resilience Centre, together with the Långsjö theatre group, opened the festival in 2014, in a performance playing with the idea of going beyond boundaries, by breaking down borders between science, music and dance. The performance told the story of how Centre researchers work with sea birds and how their research has guided them towards important insights about the complex interactions between humans and nature in the Baltic Sea.

The performance is the result of a collaborative process



PHOTO MATTIAS AHLIN/SVERIGES RADIO

between the Centre and Långsjö theatre, where methods from theatre and other creative professions have been important for supporting and facilitating learning in the multidisciplinary research group working with the Baltic Sea at the Centre.

## Stockholm Seminars 2014

The Stockholm Seminars feature some of the most prominent experts on global sustainability

The seminars are hosted by Albaeco, Stockholm Resilience Centre, the Beijer Institute of Ecological Economics, the International Biosphere Geosphere Programme (IGBP) and the Swedish Secretariat for Environmental Earth System Sciences (SSEESS).

### 31 January

Greg Ayers

*Environmental observations as a basis for environmental intelligence*

### 13 March

Meryl J. Williams

*What are the social and economic benefits of Women's empowerment in fisheries and aquaculture?*

### 21 March

Steve Evans

*Where does industry fit into a sustainable future?*

### 1 April

Stuart Kininmonth

*Reefs in peril: understanding the plight of the world's coastal treasures*

### 24 April

Han Quinli

*The new research agenda of UNESCO's Man and the Biosphere Programme*

### 15 September

Simon Levin

*Obstacles and opportunities in environmental management*

### 19 September

Gunther Pauli

*Steering society towards sustainability by designing new competitive business models*

### 24 September

William F Laurance

*Ecosystem decay of a fragmented Amazonian rainforest*

### 20 October

Xuemei Bai

*Urban System Dynamic, Experiments, and Sustainability Transition*

### 15 December

George Sugihara

*Correlation and Causation*



PHOTO: | LOKRANTZ/AZOTE

## Internal seminars

In 2014 the Stockholm Resilience Centre internal seminars had a special focus on resilience thinking and social sciences

The PhD course “Why bother with Durkheim?” introduced participants to several classic social science perspectives on the collective dimensions of causes, outcomes and solutions to environmental problems. A blog accompanied the course and initiated vibrant discussions among the wider resilience research community about the role of sociological classics in contemporary social-ecological research.

“Slow talks” were introduced in the autumn to complement the speed talk lunches and to replace the Resilience Dialogues. The slow talks will provide opportunities for deeper reflections on new research questions, concepts, methods and critique.

### Internal seminars 2014:

#### 23 January

*Why bother with Durkheim? – using (classical) social science to understand the social dynamics of social-ecological systems*

Wijnand Boonstra and Simon West

#### 30 January

*Karl Marx – the first ecological sociologist?*

Wijnand Boonstra

#### 13 February

*Emile Durkheim – functionalist embarrassment or proud heritage of systems thinking?*

Simon West

#### 20 February

*Max Weber – the interpreter of (human) nature*

Wijnand Boonstra

#### 27 February

*Social science and global environmental change*

Wijnand Boonstra and Simon West

### Resilience dialogue

#### 22nd April

*Frontiers of Resilience Research – Reflecting on the results from a Delphi process*

*What key questions were identified?*

*Where is Stockholm Resilience Centre located in this research landscape?*

### Critical Reflection Seminar Series

#### 30 October

*Social-ecological systems, socationature or something else? Conceptualising society-environment dynamics*

Andrea J. Nightingale – University of Gothenburg, Sweden

### Slow talks

#### 10 November

*Weber slowly – the relevance of Max Weber (one of the classic thinkers in sociology) for resilience thinking.*

Wijnand Boonstra – Introduction

Maja Schlüter – Modelling Weber

Johan Enqvist – Social-ecological drivers behind urban environmental movements

Simon West – Resilience thinker as vocation?

#### 27 November

*Responding to critique*

Garry D Peterson, Thomas Hahn, Lisen Schultz, Magnus Nyström

#### 8<sup>th</sup> December

*What are the key competences that PhD students need to develop during their time at Stockholm Resilience Centre in order to advance the field of sustainability science?*

Lisen schultz, Jonas Hentati Sundblad, Andrew Merrie, Garry Petersen

### Open spaces

The Monday speed talk lunches have been running for one and a half years and remain highly popular. The speed talks are opportunities for any employee at the Centre to use four minutes to bring up an issue. Each lunch session consists of ten four minute speed talks. The speed lunches enable staff and visitors to get an overview of what is going on at the Centre and have also been a platform for supporting each other, initiating research collaborations and developing new ideas.

The Brown Bag Lunch (BBL) seminars are mostly used to provide all employees a chance to meet with visiting guests and discuss issues on the wider sustainability research agenda. Stockholm Resilience Centre is spoiled with a flow of interesting guests from all over the world. In 2014 there were 40 BBLs, of which 35 were held by external guests, covering questions on research, policy, practice and culture.

## Stockholm Workshops in Sustainability Science

The Stockholm Workshops reflect the Stockholm Resilience Centre's culture of collaboration. We gather interdisciplinary leading international scholars and interdisciplinary teams of competence to address problems, methods, issues, and challenges in sustainability science and biosphere stewardship

The workshops involve leading international scholars and some are transdisciplinary in scope by engaging diverse interest groups and stakeholders.

The workshops are organised by Centre researchers and those reported here are held in Stockholm or in collaboration with our partners in various parts of the world.

### **Fisheries workshop series, Stockholm and Gothenburg**

The Department of Political science at Chalmers University in Gothenburg has a long tradition of investigating marine governance in the developing world and is working with global data sets from the social sciences. The marine theme has a tradition of investigating marine governance in social-ecological systems, and is increasingly working with global data sets from the natural sciences (the searounds database) within the Nereus programme. A set of workshops explored the potential for collaboration between the Gothenburg and Stockholm based groups, with an ambition to produce joint papers and applications. Henrik Österblom from Stockholm Resilience Centre and Sverker Jagers from Gothenburg organised and convened the meetings.

### **The Baltic Seabird project**

The Baltic Seabird project is investigating ecosystem change in the Baltic Sea through the study of seabirds. Experts on seabird ecology from the Centre teamed up with experts on animal movement behaviour (Lund University) and fisheries science (Swedish Agricultural Sciences) to collaborate around diverse data sets and outcomes from collaborative field activities. This will contribute to an increased understanding of the complex interactions in the Baltic Sea.

### **Natural Capital & Resilience Workshops: Frontiers in Research, Policy and Practice.**

Two workshops were held at the Royal Swedish Academy of Sciences in February and October 2014 with the aim of integrating theories on natural capital and resilience thinking into key decision context. Led by Gretchen Daily (Stanford University) and Belinda Reyers (The Council for Scientific and Industrial Research, CSIR), the workshop gathered researchers from the Stockholm Resilience Centre, the Programme on Ecosystem Change and Society (PECS), the Southern African Program on Ecosystem Change and Society (SAPECS) in addition to colleagues from Lund, Cambridge, China, Colombia, and India. The Marianne and Marcus Wallenberg

Foundation has further provided funds for a strategic partnership between Stanford University, Stockholm Resilience Centre and the Beijer Institute to develop new tools, approaches, and interdisciplinary innovation for natural capital and biosphere stewardship.

### **Ocean Science meeting: Multiple drivers affecting ecosystem function in estuarine and coastal waters**

The aim of this session, which took place at the international Ocean Science meeting in Honolulu, Hawaii, February 2014, was to present the effects of multiple external drivers on ecosystem function and dynamics in estuarine and coastal waters. The session helped improve the understanding of general and specific ecosystem responses to the compound effects of external drivers as well as describing the risk for potential regime shifts or severe changes in water quality.

### **Manufacturing industries and global supply chains for sustainability**

On 20 March, Stockholm Resilience Centre organized a workshop with Dr. Steve Evans, Director of the Centre for Industrial Sustainability at the University of Cambridge, and his research group. The focus of the workshop was on how manufacturing industries, global supply chains and the built environment can contribute to the sustainability and resilience of social-ecological systems.

### **The Role of Change Labs in Sustainability Transformations**

On 23 April, Stockholm Resilience Centre organized a workshop with Jake Dunagan, Institute for the Future, and Frances Westley, University of Waterloo, on change labs as a model for co-creation and their role in sustainability transformations. The discussions focused on research questions about how such labs could 1) increase the transformative capacity to sustainability, 2) provide organizational structure and innovation space for co-creation of knowledge together with a broad range of stakeholders, and 3) produce prototypes of social-ecological innovations that can help create a good Anthropocene.

### **Programme on Ecosystem Change and Society (PECS)**

In early May 2014, PECS and Stockholm Resilience Centre organized a PECS workshop in Montpellier, France. The workshop, which gathered 30 researchers involved in a variety of

PHOTO: LARS WIKLUND



PECS projects and working groups, provided the participants with much-needed time to collaborate on ongoing papers, proposals and projects. Speed-talk sessions (in plenary) were held throughout the workshop and there were opportunities for updates. The workshop also provided an opportunity to network with researchers from the Resilience Alliance Young Scholars network.

#### **Resilience Alliance Young Scholars**

The Resilience Alliance Young Scholars (RAYS) is a broadly interdisciplinary group of early career scientists interested in social-ecological systems and resilience thinking. Co-organized by the Centre, RAYS hosted its biannual workshop in Mourèze, France, 3-4 May 2014. The focus of the workshop was to finalize a set of publications.

#### **The Ocean Tipping Point project**

In May 2014, a workshop was organised within the Ocean Tipping point project. The workshop gathered researchers from the Centre and the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, California. The purpose was to compare marine regime shifts in a social-ecological context and the reasons behind it. Nine common questions were developed on the challenge of understanding and managing social-ecological tipping-points and regime shifts.

#### **The Baltic Health Index**

In mid May 2014, Centre researcher Thorsten Blenckner co-chaired a scientific workshop on the development of a Baltic Health Index – a regional assessment of the state of the Baltic Sea. The workshop gathered 30 experts, representing important stakeholders in the region. The workshop was a joint initiative with the Ocean Health Index team led by Ben Halpern (California, US) and Baltic Ecosystem Adaptive Management (BEAM), together with the Stockholm University Baltic Sea

Centre and Stockholm Resilience Centre. The aim was to build a network of collaborators, provide training about the Ocean Health Index, and to discuss the potential for a Baltic Health Index.

#### **Breaking the Silos: towards an integrative research agenda on the health and sustainability dimensions of food**

Under the auspices of the EAT Initiative, of which Stockholm Resilience Centre is a partner, a workshop was organized in late May 2014 at the Royal Swedish Academy of Sciences. The purpose was to bring together members of the EAT Initiative's Advisory Board and leading scientists from the Centre to discuss areas of collaborative research across EAT's academic partner network, including Harvard, UCL, Cornell, Universities of Oslo and Copenhagen. A White paper on the various dimensions of the research landscape concerning the food-health-sustainability nexus was developed.

#### **Emerging linkages between neuroscience, environmental behavior and policy**

The BENN programme (Behavior, Economics and Nature Network) hosted a workshop at the Royal Swedish Academy of Sciences 2-5 June 2014. It explored potential intersections between neuroscience and behavioral economics that can leverage insights for a better stewardship of our biosphere. The workshop developed a position paper and a collaborative research project combining technologies of behavioral neuroscience and behavioral economics to answer questions regarding environmental decision-making. Researchers from Karolinska Institutet interacted with researchers from Arizona State University, Universities of Maine, Minnesota, Wageningen, Oslo, de los Andes, de la República Uruguay, Warsaw, London School of Economics, the Beijer Institute and Stockholm Resilience Centre.



PHOTO: M. HÄGGMAN

### **Analyzing the dynamics of social-ecological systems: Towards a typology of social-ecological interactions**

In early June 2014 the ERC-funded project SES-LINK, which is led by a range of Centre researchers, organised a workshop designed to discuss a modelling framework that could be used to analyse the evolutionary dynamics of social-ecological systems as they arise from micro-level social-ecological interactions. It also looked at the development of a typology of social-ecological interactions. The workshop involved experts in modelling social-ecological systems from Arizona State University, London School of Economics, University of Twente, University of Osnabrück, and Manchester University.

### **Urban InVest**

Centre researchers co-hosted in June 2014 a workshop in Stockholm with the Natural Capital Project on developing an urban module within InVEST. InVEST is a suite of software models used to map and value the goods and services from nature that sustain and fulfill human life. The toolset currently includes sixteen distinct InVEST models suited to terrestrial, freshwater, and marine ecosystems.

### **The Urban Sustainable Development Goals**

In August 2014, Centre researchers co-hosted with the Sustainable Development Solutions Network (SDSN) a workshop in London. The workshop focused on analyzing targets and indicators specifically connected to urban development.

### **Social norms, multiple equilibria and the environment.**

The 22<sup>nd</sup> annual Askö meeting, which took place in mid-September 2014, explored the concept of norms and the role of norms in the Anthropocene. Some 20 internationally renowned researchers discussed whether social norms can help solve large-scale collective action problems like climate change. Based on the discussion and insights from the workshop, the core writing team has drafted a science-policy piece on the topic.

### **Towards an ecosystem-based legal framework for the Baltic Sea**

Stockholm Environmental Law and Policy Centre (SELPC) and Baltic Ecosystem Adaptive Management (BEAM) hosted a transdisciplinary conference with special participation by the Swedish Agency for Marine and Water Management (HaV) in October 2014. The conference covered state-of-the-art research and management regarding a legal framework for ecosystem-based management of the Baltic Sea. The conference was chaired by Centre board member Jonas Ebbesson and Centre researcher Thorsten Blenckner.

### **Baltic Ecosystem Adaptive management (BEAM) research areas**

During a two-day workshop, which took place at the Centre in mid-October 2014, new findings within the Baltic Ecosystem Adaptive Management (BEAM) research areas were synthesized. Areas such as nutrient enrichment, laws and manage-

ment, climate change, hazardous substances and ecosystem functioning were put into a holistic overview. The workshop provided an opportunity to supply input concerning possible developments within the research areas, listen to inspiring keynotes and mingle with colleagues. The workshop was chaired and organized by Centre researcher Thorsten Blenckner.

### Policies for Resilience and Development

Stockholm Resilience Centre, the Beijer Institute, the Environmental Economics Unit, Gothenburg University and the University of Dar es Salaam jointly organised a workshop in Dar es Salaam 20-21 October 2014. The aim of the workshop was to advance the content of research projects described within a funding proposal to Sida for capacity building and research in developing countries. The workshop brought together research networks on environmental economics (EFD initiative, SANDEE, LACEEP, EEPSEA) and ecosystem services and resilience (SAPECS, SPACES), as well as key science-policy partners from the CGIAR system (WLE, WorldFish) and ICSU-ROA in Pretoria.

### Spatial Fisheries Data Analysis

Stockholm Resilience Centre, Princeton University, the Kenya Marine and Fisheries Research Institute and SLU - the Swedish University of Agriculture - together hosted a workshop on 19 November 2014. Organized and led by Centre researcher James Watson, the workshop developed a comparative analysis of marine ecosystem organization, with a focus on economic risk in fishing communities in the Baltic and US.

### Seafood System Dynamics: pathways to sustainable freshwater use in an era of uncertainty.

A group consisting of invited participants from Wageningen University, Virginia University, WorldFish and Leiden University met at The Royal Swedish Academy of Sciences on 25-26 November 2014. The aim of the workshop was to jointly develop the knowledge foundation concerning how seafood relates to freshwater consumption and scarcity, and to structure an output in the form of a global review paper.

### The Urban Planet

Stockholm Resilience Centre, together with Urbanization and Global Environmental Change, organized a Future Earth Fast Track Initiative workshop in Taipei in November 2014. The aim of the workshop was to scope content for a book on interdisciplinary approaches to the urban Anthropocene.

### Emerging methods for empirical analyses of social-ecological systems

Participants from the Centre, the Swedish Agricultural University, Scripps Institution of Oceanography, Princeton University, University of Amsterdam and NOAA met in December of 2014 in Ekskåret, Stockholm archipelago, in a workshop focusing on methods for studying the dynamics of complex adaptive systems. Discussions and analyses centred around newly emerging time series methods designed for uncovering dynamics and causality in complex systems, such as social-ecological systems.



PHOTO: M. HAEGEMAN

## Transdisciplinary workshops

### **Societal transformations facing Climate Change: The case of a Low Carbon Society by 2050 in the Stockholm-Mälars Region**

An international workshop was organized by Centre researchers Stephan Barthel and Uno Svedin at the Sigtuna Foundation in Sigtuna, Sweden, 20-21 February 2014, financed by the COMPLEX/WP4. Half of the 30 participants represented a deliberately mixed composition carefully selected to represent a wide and diverse group of stakeholders in the Stockholm-Mälars region. The other half were scholars of a wide range of disciplinary backgrounds, including experts in transformation and resilience thinking. The aim was to increase understanding about framings and values of stakeholders, and to explore and co-produce new perspectives on a potential transition to a low carbon society in the Stockholm-Mälars Region. The workshop resulted in a scientific rapport as a deliverable to the COMPLEX project.

### **Second Dialogue Seminar on Scaling up Finance for Biodiversity**

The Resilience and Development Programme (Swedbio) at Stockholm Resilience Centre organized an international workshop in Quito, Ecuador in April 2014, focusing on financing for biodiversity. The results from the workshop fed into the 12th meeting of the Convention on Biological Diversity in the Republic of Korea, October 2014. The Dialogue Seminar is further described on page 31 in the Annual Report.

### **Social-Ecological Innovations in the Anthropocene**

Stockholm Resilience Centre organized a workshop on 24 June in Stockholm to explore how to advance the research and practice of sustainability transformations, social-ecological innovations and development for a just society within planetary boundaries. As a myriad of technological and social innovations are promoted to deal with sustainability challenges, the workshop asked the question of whether they contribute to the large-scale transformations that humanity needs or if they reinforce current unsustainable trajectories. The aim of the workshop was to bridge the gap between what is happening at research institutes and how the fields of international development and social innovations are advancing. The workshop convened a group of leading experts from the Centre, USAID, SIDA and other organizations across academic, public and private sectors.

### **SPACES participatory workshops in Kenya and Mozambique**

The SPACES project (Sustainable Poverty Alleviation from Coastal Ecosystem Services) aims to empirically test and understand the complex relationship between coastal ecosystem services and the wellbeing of the poor in coastal Kenya and Mozambique. During 2014 the project organized a series of participatory workshops using participatory models and scenarios with stakeholders to understand the local social-

ecological systems in terms of feedback dynamics, trade-offs and opportunities for sustainable poverty alleviation. The workshops involved experts in poverty alleviation and sustainable resource management operating in coastal Kenya and Mozambique and were arranged by Stockholm Resilience Centre and PECS researchers in collaboration with partners in Kenya, Mozambique and the UK.

### **SPACES training workshop in Sweden**

In November 2014 the SPACES project held a one and a half day training workshop in scenario development methods at the Stockholm Resilience Centre led by Mathijs van Vliet, Wageningen University. Members from the SPACES project from Kenya, Mozambique, the UK and researchers, students and staff from the Centre and KTH as well as representatives from other PECS projects such as SEEN attended the training. Theory and use of Fuzzy Cognitive Mapping and exploratory narrative scenarios for an understanding of Social-Ecological Systems was introduced, giving the SPACES team a chance to collectively learn and rehearse methods to be used in participatory workshops in Kenya and Mozambique.

### **Resilience Assessment in Eskilstuna municipality focusing on food supply**

Stockholm Resilience Centre has a collaboration with Eskilstuna municipality since 2011 when two of the municipality's strategic environmental planners pursued an interest in exploring how resilience could be applied in the municipality. In 3 workshops during 2014 a resilience assessment was carried out to investigate the food system in Eskilstuna municipality. The first workshop was held on 19 February and gathered local, regional and national actors to identify data gaps and get a broader view of the system. In two following workshops the same actors met to conduct the assessment (9-10 June and 13 November). Over the whole process Centre researchers My Sellberg, Garry Peterson, Megan Mehan, Erik Andersson, Hanna Wetterstrand and Louise Hård af Segerstad contributed to the work.

### **Risk management and building resilience**

In October 2015, a delegation from the Mexican Secretariat of the Interior and the Embassy of Mexico in Sweden visited the Centre to learn more about resilience and governance in connection with sustainable development, environmental protection and climate change adaptation. The workshop included among other things various presentations of the research and policy interface work on these topics by Stockholm Resilience Centre and the Resilience and Development Programme (Swedbio) at the Centre, in addition to presentations on civil protection and building resilience in Mexico by the Mexican delegation and on climate change by the Swedish Environmental Research Institute (IVL). The workshop was organized by Centre researcher Claudia Ituarte-Lima in collaboration with the Swedish Civil Contingencies Agency (MSB).





PHOTO: M. HAEGGMAN

# Education



PHOTO: L. DEUTSCH

## Moving into the virtual environment

### Adding a massive open online course to the education repertoire

The popular first-level course *Världens Eko* (Sustainable Perspectives on Development) broke all previous records in class size – finishing the term with 180 registered students. The regular impressive line-up still included Johan Rockström and Hans Rosling, but photographer Mattias Klum and musician Timbuktu also joined us to give their perspectives on sustainability. The course also passed the Higher Education Authority's evaluation.

#### Tenfold increase in student numbers

The Centre usually teaches about 300 students a year, in 2014 the first Centre MOOC (massive open online course) “Planetary Boundaries and Human Opportunities” had about 5600 enrolled students (read more on page 52). Plans to launch an on-line undergraduate course at Stockholm University are in development for 2015.

The MSc programme continues to run smoothly with an active new group of first-years. The second-year Master students did their traineeships and field work in Sweden, Burkina Faso, China, Uruguay, Denmark, Ecuador, U.K., Norway, Kenya, Malaysia & Indonesia.

#### Resilience Research School

There was important progress in the on-going development of the Centre's PhD programme. To help students relate their PhD project to both the Centre's research framework and the large and complex questions of sustainability and stimulate the culture of collaboration needed to become a skilled sustainability scientist the education team created the new com-

pulsory PhD course “Introduction to Resilience Thinking and Analysis.” Henrik Österblom and Magnus Nyström organized it in 2014 and the plan is to hold it every other year.

In addition to this, the Resilience Research School gave 7 courses. Wijnand Boonstra led the efforts this year to deepen students' understanding of social science. He developed and lead the course “Why read old Durkheim? Using classical social science to understand the social dynamics of social-ecological systems.” Focusing on sustainability and economy Thomas Green, postdoctoral researcher, led “Ecosystem services and economic analysis: an introduction from an ecological economics perspective,” attracting 18 students from other SU departments, KTH, SLU, Södertörn, Linköping, Helsinki and Lodz.

In addition, a collaborative effort between the Beijer Institute of Economics and the Centre resulted in the summer school course “Arctic Climate Change, Economy and Society and Arctic Resilience Report (ACCESS-ARR).” Fifteen graduate students deepened their understanding of the current status and prospects for change in the Arctic under climate change.

2014 saw also the successful defence of six PhDs, two licentiate, and 13 Master's theses. Fanny von Heland graduated from the Centre's Sustainability Science programme, and Arvid Bergström, Yihun Dile and Martina Kadin from the programme Natural Resource Management. Two students in the Centre's Resilience Research School, Matilda Valman at the Political Science Department and Lisa Segnestam at the Department of Economic History also successfully defended their theses.

## Master Theses 2014

### Sustainable Enterprising programme

Nicola Björk, Opportunities and obstacles implementing animal welfare friendly meat to the Swedish public catering sector

### Social-ecological Resilience for Sustainable Development programme

Margaret Berry, Slow food in Transition: A study of niche development in Stockholm

Hildur Hardardottir, Volunteer motivations and long-term viability of volunteer-based adaptive co-management: a case study of the Noosa biosphere reserve, South East Queensland, Australia

Dayana Hernandez, Understanding the conducive space for social learning in the context of flood risk management: a case study of the city of Cali, Colombia

Carolina Holmberg, How can traditional knowledge be mobilized in a legitimate, credible, and salient way? – A comparative study of three approaches to developing and applying indicators for Aichi Target 18

Alba Juarez Bourke, Natural resource management and participation in Doñana (SW Spain) - Elements of adaptive co-management and potential for change

Johanna Källén, The functional importance of herbivores: Tying the knot between fish biomass, parrotfish feeding and benthic structure on Kenyan coral reefs

Catarina Larsson, The role of initial ecosystem state for future resilience and ecosystem outcome

Flor Luna Estrada, Transformation of Urban Lake Governance in Bangalore India: A comparison of civic initiatives

Shauna Mahajan, Who benefits and who loses? Evaluating the impacts of community-based marine protected areas on ecosystem services and human wellbeing  
Britt Stikvoort, Thou shalt not sell nature – A study on how taboo trade-offs affect our pro-environmental behaviour

Pau Torrents, Farmers' participation in conservation of rural landscapes: A case study of the Menorca Biosphere Reserve (Spain)

Darin Wahl, Exploring pathways to transformations in post-disaster-event communities: a case study on the Mad River Valley, Vermont, USA

## PhD Theses 2014

### Sustainability Science:

Franciska von Heland, Reef Futures: Exploring the dynamics of transformative change in marine social-ecological systems

### Natural Resource Management:

Arvid Bergsten, Spatial complexity and fit between ecology and management: Making sense of patterns in fragmented landscapes

Yihun Dile, Intensifying Agricultural Water Management in the Tropics: A cause of water shortage or a source of resilience?

Martina Kadin, Seabirds as food for thought: An integrative study on seabird ecology and ecosystem services in changing marine systems

### Resilience Research School:

Lisa Segnestam, Culture and Capacity: Drought and Gender Differentiated Vulnerability of Rural Poor in Nicaragua, 1970-2010. Department of Economic History

Matilda Valman, Three faces of HEL-COM – institution, organization, policy producer. Department of Political Science.

## Licentiate Theses 2014

Maike Hamann, Mapping social-ecological systems and human well-being: A spatial exploration of the links between people and the environment in South Africa

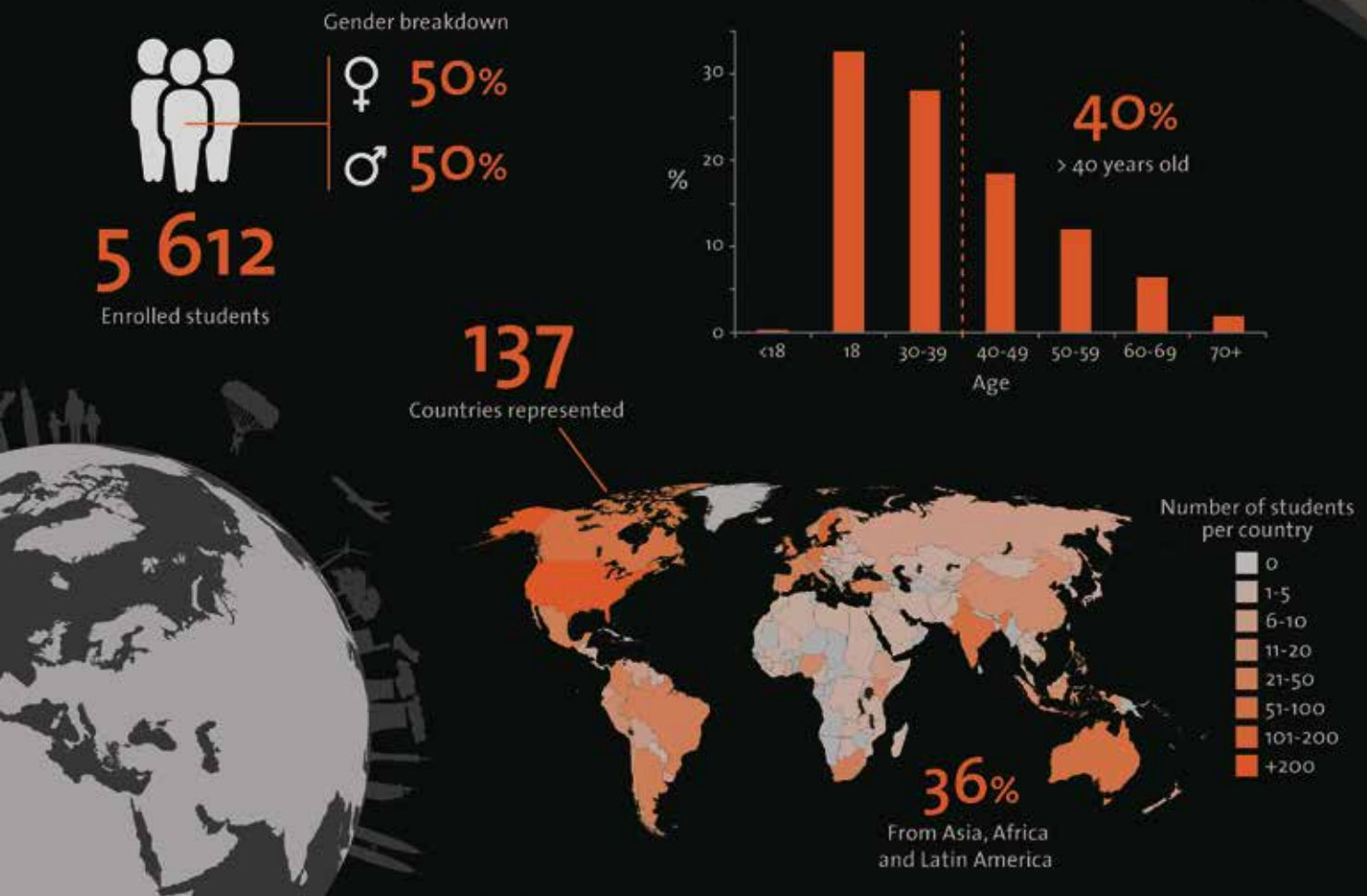
Johanna Yletyinen, Structural changes in marine ecosystems – the application of novel network approaches to understand marine regime shifts

## Previous MSc student thesis work published 2014

Enqvist, J., M. Tengo, O. Bodin. 2014. Citizen networks in the Garden City: Protecting urban ecosystems in rapid urbanization. *Landscape and Urban Planning*. 130: 24-35

Merrie, A., P. Olsson 2014. An innovation and agency perspective on the emergence and spread of Marine Spatial Planning. *Marine Policy*, 44, 366-374

# MASSIVE OPEN ONLINE COURSE (MOOC): PLANETARY BOUNDARIES AND HUMAN OPPORTUNITIES



## First ever MOOC at Stockholm University

In 2014 Stockholm Resilience Centre gave a massive open online course together with SDSNedu (Sustainable Development Solutions Network – Education), an initiative of the SDSN Association

“Planetary Boundaries and Human Opportunities: The Quest for Safe and Just Development on a Resilient Planet” was held between 17 November 2014 and 2 February 2015. The course was designed to help students explore and apply a range of emerging concepts within sustainability science, including: the Anthropocene, planetary boundaries, the social-ecological systems approach and resilience thinking.

After an agreement in the spring between the Centre and SDSN, a core team at the Centre consisting of Lisa Deutsch, Director of Studies, Jonas Torrens, Research Assistant with the Planetary Boundaries Network and Andrew Merrie, Centre PhD student, joined forces to ensure that the content best reflected the cutting edge of Centre science and teaching. In the last week of August 2014, Centre researchers, the education team and the communications staff all worked closely

with the documentary film company kontentreal from New York to film over 40 video lectures. What followed was an intensive three-month process of editing and combining the videos with quizzes, homework assignments and activities to promote interaction and reflection among students.

The main instructor for the course was Centre Executive Director Johan Rockström. Lisa Deutsch, Director of Studies at the Centre, was Course Coordinator and one of the instructors. Other Centre researchers that contributed were Sarah Cornell, Garry Peterson, Carl Folke, Victor Galaz, Thomas Elmqvist and Will Steffen. Kevin Noone also participated through his long-term working relationship with the Centre.

Throughout the course, Professor Rockström, together with his colleagues from the Stockholm Resilience Centre, held live hangouts that enabled the students to ask questions



10h

Professionally produced videos



<7%

average active engagement for MOOCs\*

32%

Active engagement for entire course

400

Participants in live hangouts



1 300

Posts on the forums

2 000

Responses to forum posts

250

Average active forum users

100

quiz questions



38 720

Video views



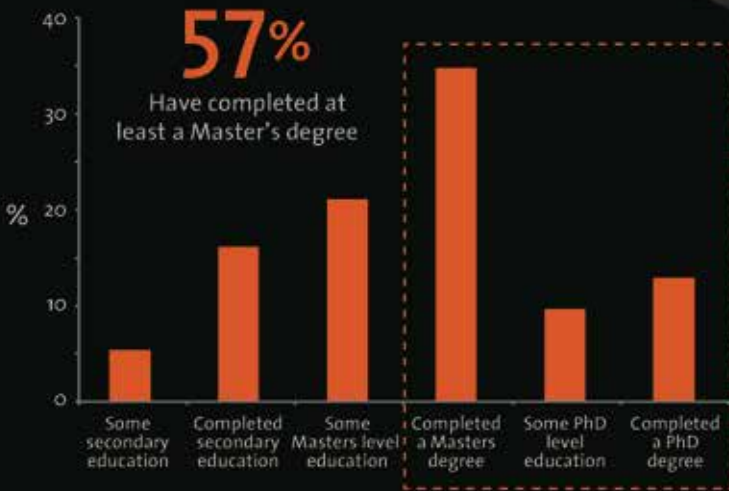
>350

Members of the #PBMOOC Facebook group



>100

Creative video submissions sharing insights and experiences of the #PBMOOC course



15%

Students completing the course

<7% average completion rate for MOOCs\*

\*Inside Higher Ed, The Times, Higher Education, May 10, 2013  
Participant demographics is based on 1800 responses to the course bill.

ILLUSTRATION: JERREY LOKRANTZ/AZOTE

about course content and the wider set of sustainable development issues. Kate Raworth contributed by leading the hangout on 'doughnut economics and planetary boundaries' hosted by Sarah Cornell.

A total of 5600 students signed up to take the course, and over 15% of them received a course completion certificate, this is double the average rate of completion for a MOOC, which is 7% according to The Times, 2013.

## What is a MOOC?

A MOOC is a massive, open, online course: a course that is free of charge and open to everyone with access to the internet.



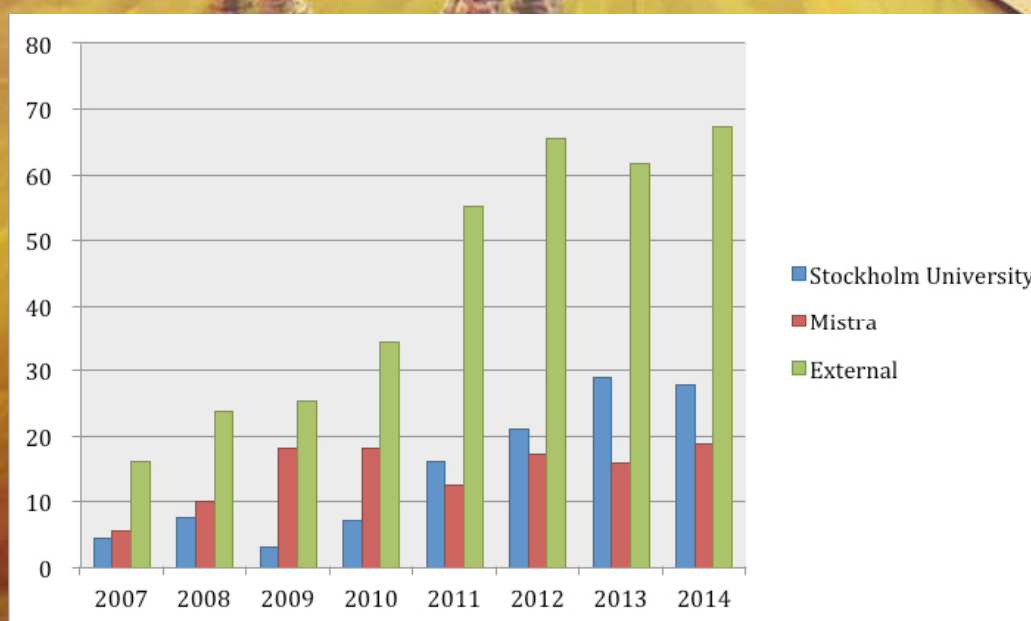
PHOTO: TAD FETTING/KONTENTREAL

# Appendix:

## Finances

2014 Total	113,7	MSEK
<b>Stockholm University</b>	<b>27,7</b>	<b>MSEK</b>
Allocated fund from Stockholm University	18,0	MSEK
Allocated External Formas funding via faculty	6,1	MSEK
Accumulated surplus from Stockholm University	3,6	MSEK
<b>MISTRA core grant*</b>	<b>18,7</b>	<b>MSEK</b>
<b>External grant total</b>	<b>67,3</b>	<b>MSEK</b>
The Swedish Research Council	5,7	MSEK
Formas	14,1	MSEK
Swedish Environmental Protection Agency	2,0	MSEK
SIDA	0,5	MSEK
SIDA (Swedbio)	18,7	MSEK
Futura	1,7	MSEK
Schwartz	1,3	MSEK
Nippon Foundation	1,0	MSEK
Global Challenges Foundation	1,5	MSEK
EU	4,7	MSEK
Swedish institute	3,1	MSEK
NERC	4,4	MSEK
Other	8,6	MSEK

\*Allocated grant from Mistra 15,8 MSEK plus accumulated surplus 0,1 MSEK



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### Books

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Rockström, J., M. Falkenmark, C. Folke, M. Lannerstad, J. Barron, E. Enfors, L. Gordon, J. Heinke, H. Hoff, C. Pahl-Wostl. 2014. *Water Resilience for Human Prosperity*. Cambridge University Press.

### Articles:

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Centre staff gathered during the 2014 retreat at Stora Karlsö.

## Centre staff 2014

### Centre Management

Carl Folke *Science director*  
Olof Olsson *Deputy director*  
Johan Rockström *Executive director*

### Administration

Astrid Auraldsson *Coordinator to executive director*  
Bengt Hall *IT-support*  
Gunnar Jacobsson *IT-support*  
Therese La Monde *Office & financial administrator*  
Christina Leijonhuvud *Affiliated administrator*  
Cecilia Linder *Human resources*  
Tanja Litvinova *Financial & HR officer*  
Emina Muratspahic *Head of administration*  
Henrik Pompeius *Fundraiser*  
Maria Schewenius *Project coordinator*  
Wenche Starck-Wistrand *Project controller*  
Agneta Sundin *Affiliated administrator*

### Practice, Policy and Communication

Maja Brisvall *Project leader*  
Anna Emmelin *Communication strategist*  
Marika Haeggman *Communication officer*  
Sturle Hauge Simonsen *Head of communication*  
Louise Hård af Segerstad *Communication strategist*  
Helene Karlsson *Communication officer*  
Mattias Klum *Affiliated Senior Advisor*  
Fredrik Moberg *Senior strategic advisor*  
Fernanda Torre *Project leader*

### Modeling and Visualisation lab

Emma Sundström *System developer*  
Örjan Bodin *Senior Lecturer*

### Resilience and Development programme (Swedbio)

Pamela Cordero *Financial controller & administrator*  
Sara Elfstrand *Programme coordinator*  
Ellika Hermansson Török *Senior advisor*  
Claudia Ituarte Lima *Advisor*  
Pernilla Malmer *Senior advisor*  
Mauricio Portilla Ospina *Project assistant*  
Maria Schultz *Director*  
Hanna Wetterstrand *Advisor*  
Marcus Öhman *Senior advisor*

### BalticSTERN Secretariat

Kerstin Blyh *Officer*  
Siv Ericsson *Head of secretariat*  
Jens Ratcovitch *Field assistant*

### Education

Lisa Deutsch *Senior Lecturer, Director of Studies (theme Landscapes and theme Urban)*  
Miriam Huitric *Programme director*

Cornelia Ludwig *Education coordinator*  
Vadym Sokol *Project assistant*

### Theme Landscapes

Jennie Barron *Affiliated researcher*  
Elin Enfors *Researcher*  
Malin Falkenmark *Affiliated senior researcher*  
Line Gordon *Senior researcher (Deputy science director)*  
Anna Helgeson *PhD student*  
Louise Karlberg *Affiliated researcher*  
Patrick Keys *PhD student*  
Steven Lade *Postdoc*  
Emelie Lindqvist *PhD student*  
Rebecka Malinga *PhD student*  
Megan Meacham (PECS) *PhD student*  
Kirill Orach *Project assistant*  
Daniel Ospina *Research assistant*  
Cibele Queiroz *Postdoc*  
Angelina Sanderson Bellamy *Researcher*  
Maja Schlüter *Researcher*  
Hanna Sinare *PhD student*  
Lan Wang *Research assistant*  
Nanda Wijermans *Postdoc*

### Theme Urban

Erik Andersson *Researcher*  
Stephan Barthel *Affiliated researcher*  
Sara Borgström *Postdoc*  
Johan Colding *Affiliated senior researcher*  
Thomas Elmquist *Professor*  
Matteo Giusti *PhD student*  
Julie Goodness *PhD student*  
Marnie Graham *PhD student*  
Tom Green *Postdoc*  
Åsa Green *Affiliated researcher*  
Joshua Lewis *PhD student*  
Jeff Ranara *PhD student*  
Magnus Tuvendal *Research assistant*  
My Sellberg (PECS) *PhD student*

### Theme Marine

Emma Björkvik *PhD student*  
Thorsten Blenckner *Senior researcher*  
Wijnand Boonstra *Researcher*  
Beatrice Crona *Senior researcher*  
Tim Daw *Researcher*  
Lisa Dellmuth *Researcher*  
Elizabeth Drury O'Neill *PhD student*  
Jonas Hentati Sundberg *PhD student*  
Jean-Baptiste Jouffray *PhD student*  
Martina Kadin *PhD student*  
Andres Marin *PhD student*  
Andrew Merrie *PhD student*  
Susa Niiranen *PhD student*  
Albert Norström (PECS) *Researcher*  
Magnus Nyström *Senior lecturer*  
Saskia Otto *Postdoc*  
Matilda Petersson *Project assistant*

Björn Schulte-Herbrüggen *Postdoc*  
Matilda Thyresson *Postdoc*  
Max Troell *Affiliated senior researcher*  
Johanna Yletyinen *PhD student*  
Rebecka Young *Field assistant*  
Matilda Valman *PhD student*  
James Watson *Researcher*  
Henrik Österblom *Senior lecturer (Deputy science director)*

### Theme Regime shifts

Oonsie Reinette Biggs *Researcher*  
Jamila Haider *PhD student*  
Maike Hamann *PhD student*  
Daniel Ospina *PhD student*  
Garry Peterson *Professor*  
Juan Carlos Rocha Gordo *PhD student*

### Theme Global dynamics

Victoria Bignet (EAT) *Project assistant*  
Marco Campenni *Postdoc*  
Jonas Colen Torrens *Project assistant*  
Robert Constanza *Affiliated senior researcher*  
Sarah Cornell *Researcher*  
Ann-Sophie Crepin *Affiliated senior researcher*  
Andrea Downing *Researcher*  
Ingo Fetzer *Researcher*  
Victor Galaz *Senior lecturer*  
Tiina Häyhä *Postdoc*  
Therese Lindahl *Affiliated researcher*  
Will Steffen *Affiliated senior researcher*  
Uno Svedin *Senior researcher*  
My Svendsdotter *Project assistant*  
Sverker Sörlin *Affiliated senior researcher*  
Brian Walker *Affiliated senior researcher*

### Theme Stewardship

Örjan Bodin *Associate senior lecturer*  
Arvid Bergsten *PhD student*  
Andreas Duit *Affiliated senior lecturer*  
Johan Enqvist *PhD student*  
Diego Galafassi *PhD student*  
Thomas Hahn *Researcher*  
Malena Heinrup *Project assistant*  
Irene Håkansson *Project assistant*  
Stuart Kininmonth *Postdoc*  
Cecilia Lundholm *Affiliated senior researcher*  
Vanessa Masterson *PhD student*  
Helen Moor *PhD student*  
Björn Nyqvist *Postdoc*  
Jon Norberg *Professor*  
Per Olsson *Researcher*  
Ryan Plummer *Senior research fellow*  
Angelina Sanderson Bellamy *Researcher*  
Annica Sandström *Postdoc*  
Lisen Schultz (PECS) *Researcher*  
Maria Tengö *Researcher*  
Franciska von Heland *PhD student*  
Simon West *PhD student*

## Resilience Research School members 2014

Rivolala Andriamparany, *PhD Stockholm Resilience Centre, Stockholm University*  
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Supervisor: Line Gordon

Simon West, *PhD Stockholm Resilience Centre, Stockholm University*  
Supervisor: Lisen Schultz

Johanna Yletyinen, *PhD Stockholm Resilience Centre, Stockholm University*  
Supervisor: Thorsten Blenckner

## Visiting researchers

### Heleen Vreugdenhil.

PhD in Policy Analysis from Delft University of Technology. The Netherlands.  
3–6 February

### Parwinder Grewal

Professor and Department Head of the Entomology and Plant Pathology Department The University of Tennessee. Institute of Agriculture. USA.  
24 March–30 June

### Sarel Cilliers

Professor. Plant Ecology, Urban Ecology. School of Environmental Sciences and Development. North-West University (Potchefstroom Campus). Potchefstroom. South Africa.  
5 April–30 June

### Roxana Borquez Gonzalez

Researcher at the Center for Climate and Resilience Research of Chile. Chile.  
21 April–2 May

### Timon McPhearson

Assistant Professor of Urban Ecology. Coordinator for Environmental Science. Tishman Environment and Design Center, The New School. USA.  
1–30 July

### Richard C. Stedman

Associate Professor. Director, Human Dimensions Research Unit. Cornell University, Ithaca. USA.  
1 August–10 December

### Egidius Kamanyi

Teaching Assistant at the University of Dar es Salaam-Tanzania.  
22–28 August

### Friederike Lempe

Phd candidate at the Thuenen-Institute of Baltic Sea Fisheries in Rostock, Germany.  
28 August–5 September

### Kirsten Abernethy

Lecturer in Environmental Social Science at the Environment and Sustainability Institute at the University of Exeter. UK.  
3 September–3 October

### Petr Matous

Associate Professor at the School of Engineering, University of Tokyo. Japan  
15–17 October

### Pascal Thoya

Research Scientist. Kenya Marine and Fisheries Research Institute. Mombasa, Kenya.  
17–20 November

### Deborah Goffner

Research Director, French National Centre for Scientific Research (CNRS). Cheikh Anta Diop University. Dakar, Senegal.  
January–December

## “Gamifying” resilience thinking

In November 2014 Centre researchers, students and partners experimented with a new way to explore resilience concepts using games and theatre. Australian Theatre company Boho present-

ed the game “The Best Festival Ever,” a blend of science and interactive performance developed in collaboration with researchers. Boho has long experience from producing science-theatre

based on climate and systems science. Much of their work is inspired by research conducted by the Stockholm Resilience Centre.



PHOTO: DINNIGAN

# Applying resilience thinking

Seven principles for building resilience in social-ecological systems



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## Applying resilience thinking

### Seven principles for building resilience in social-ecological systems

Over the past decades, few concepts have gained such prominence as resilience, the capacity of a system to deal with change and continue to develop.

This publication is a popular summary of the book “Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems”, published by Cambridge University Press (2015).

It presents a set of seven principles that are considered crucial for building resilience in social-ecological systems and discuss how these principles can be practically applied.

A resilience thinking approach investigates how these interacting systems of people and nature can best be managed in the face of disturbances, surprises and uncertainty. We define resilience as the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. But amid the enormous attention it has attracted, confusion exists. What does resilience actually mean and how it should be applied?

Read more at [www.stockholmresilience.org/applying-resilience](http://www.stockholmresilience.org/applying-resilience) and download the brochure on the same page.

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