



3rd German Future Earth Summit

From Knowledge to Action
8 - 9 February 2018
Berlin, Germany

As contribution to



Supported by



German Committee
Future Earth

Program & Content

p.2-3 Welcome

Overview

p.4 - 7 Day One

p.8 - 9 Day Two

p.10 - 11 Site Plan

Details

p.12 - 25 Parallel Sessions

p.26 - 41 Parallel Roundtables

p.42 - 45 Early Career Scientists

p.46 - 87 Research Blog Posts

Extras

p.90 - 99 Short Biographies

p.100 - 107 Working Groups

p.108 - 109 Co-Design Project Groups

p.110 - 111 Science Platform

Sustainability 2030

p.112 - 115 Future Earth Knowledge

Action Networks (KANs)

p.116 - 117 Venue

A very warm welcome

On behalf of the German Committee Future Earth and the Deutsche Forschungsgemeinschaft, we are delighted to welcome you to our third national conference on global sustainability – the 3rd German Future Earth Summit. In the past six years, we have explored with all of you the question of how science can productively interact with decision-making processes to address global sustainability. For example, our 2016 Report “The contribution of science in implementing the sustainable development goals” suggests that scientific knowledge is essential to support and guide decision-making to successfully implement political frameworks such as the 2030 Agenda and the Paris Agreement. However, in light of urgency to reach these goals, the scientific community is challenged more than ever to provide solution-oriented insights. It needs to develop pathways to address urgent societal and environmental challenges.

Today, our global sustainability science community is confronted with three big challenges: (1) assessing and communicating science that can provide a knowledge base for sustainability, (2) identifying and closing knowledge gaps, and (3) generating (new) solution-oriented knowledge together with relevant societal actors.

This calls for the scientific communities not only to work across knowledge domains but also across nations and regions. We can capitalize from the opportunity to share global insights, compare regional approaches, and grow international networks by engaging with research communities supported by WCRP, Future Earth and beyond.

The first German Future Earth Summit in 2014 focused on new areas for integrated science for Germany. A total of 75 research topics and concepts were discussed. The conference highlighted the need and willingness of the German community to integrate knowledge from

different domains and disciplines in order to address the role of human activity in the “Anthropocene” and within the context of sustainable development. The second Summit highlighted cross-cutting issues around theory, data, assessment and interactive learning. This resulted in the call for a stronger support of self-organisation of the German community and the need of facilitated discussions on possible contributions to Future Earth’s Knowledge Action Networks. To this end, the German Committee Future Earth has established working groups as well as co-design project groups. And today, this third Summit will focus on the opportunity provided by engaging with Knowledge Action Networks to further advance integrated knowledge generation on global sustainability.

The German Committee Future Earth provides a platform for German researchers to support all these efforts on global sustainability research. Moreover, the German Committee Future Earth partners with the solution network SDSN Germany and supports science informed decision-making at the national level via the newly established ‘Science Platform Sustainability 2030’ of Germany.

Today, our aim is to develop and realise the opportunities provided by Future Earth and WCRP communities in Germany and beyond. This summit will facilitate networking and sharing of ideas during the many sessions and roundtables. You are also invited to comment on the online research posts on our conference website.

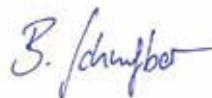
We are looking forward to your ideas and critical thoughts, lively discussions and a lot of insights on knowledge in the context of societal action towards global sustainability.



Martin Visbeck

Chairman

German Committee Future Earth



Bettina Schmalzbauer

Executive Director

German Committee Future Earth



Overview

Day One

Thursday
8th of February

Workshop Early Career Scientists
7th of February
Page 44

When?

Where?

From 9:00 **Registration**

Umwelt-
forum

10:00-10:15 Welcome remarks

Großer Saal

Christiane Joerk, DFG

10:15-10:45 Introductory session

Großer Saal

Moderated by Armin Grunwald

**Future Earth Knowledge Action Networks: current
and future guiding principles**

Amy Luers, Future Earth

Future Earth in Germany

Martin Visbeck, German Committee Future Earth

**10:45-12:30 Panel discussion "Science, policy &
global sustainability" (in German)**

Großer Saal

Moderated by Jan Martin Wiarda

Input statement

Armin Grunwald, KIT-ITAS

Discussion with

Claudia Kemfert, DIW

Reinhold Leinfelder, FU Berlin

Imme Scholz, DIE

Barbara Unmüßig, Heinrich-Böll-Stiftung

12:30-14:00 Lunch

Community Forum I

14:00-14:30	The international Future Earth program: KAN development, implementation and activities – first examples	Großer Saal
	Moderated by Daniela Jacob	

In dialogue with

Philip Vergragt, Tellus Institute & KAN Development Team on Sustainable Consumption and Production
Chadia Wannous, United Nations Office for Disaster Risk Reduction & KAN Development Team on Health
Anna Zivian, Ocean Conservancy & KAN Development Team on Ocean

14:30-14:45	Break, change building
--------------------	-------------------------------

14:45-16:45	Parallel interactive sessions "Future Earth Knowledge Action Networks (KANs)"	Neue Mälzerei / Umwelt-forum
--------------------	--	------------------------------

incl. coffee break

KAN session on "Natural Assets" Shifting the paradigm - seeking alternative land management approaches for sustainable agriculture	Elysium
---	---------

organised by C. Krug, University of Zürich, A. de Bremond, University of Bern; K. Krewenka, Universität Hamburg; G. Schütte, Universität Hamburg

KAN session on "Sustainable Development Goals" SDGs and trade-offs: Biomass as an example for the role of science in policy formulation and implementation	Seminar I/II
---	--------------

organised by U. R. Fritzsche, II/NAS

When?	Where?
KAN session on "Water-Energy-Food Nexus" Challenges of the Water-Energy-Food Nexus	Plenarsaal
organised by J. Friedrich, <i>KIT</i> , S. Köpke, <i>University of Kassel</i> , K. Krumme, <i>University of Duisburg-Essen</i> , H. Lehn, <i>KIT</i> , A. Melkonyan, <i>University of Duisburg-Essen</i> , W.-R. Poganietz, <i>KIT</i> , A. Ploeger, <i>University of Kassel</i> , S. Withanachchi, <i>University of Kassel</i>	
KAN session on "Finance and Economics" Reconnecting Economics and Finance to the Earth	Kuppelsaal Nord
organised by R. Cremades, <i>Climate Service Center Germany</i> , A. Haas, <i>Institute for Advanced Sustainability Studies Potsdam</i> , L. Zsolnai, <i>Corvinus University of Budapest</i>	
KAN session on "Transformations" Transformative indicators and the transformation of work	Winterkirche (Umwelt-forum)
organised by K. Schleicher, <i>Center for Transformation Research and Sustainability - TransZent</i> , G. Jochum, <i>TU Munich</i> , H. Haake, <i>Wuppertal Institute</i> , A. Cárdenas, <i>ISF Munich</i>	
KAN session on "Systems of Sustainable Consumption and Production" Global responsibility and spillovers in achieving the SDGs	Kuppelsaal Süd
organised by H. Hoff, <i>PIK/SEI</i> , S. Malelu, <i>GIZ</i> , N. Löhr, <i>GIZ</i> , Philip Vergragt, <i>Future Earth SSCP KAN</i>	
Parallel Open Space	Großer Saal (Umwelt-forum)

16:45-17:00 *Break, change building*

17:00-18:00 **Lightning talks**

Moderated by François Buscot

Großer
Saal

Research blog post award "Global Sustainability"

**Working groups of the German
Committee Future Earth:**

Sustainable work by G. Jochum, *TU Munich*;

Urban sustainability transformations

by K. Krellenberg & F. Koch, *UFZ*;

Social innovations by A. Ernst, *Kassel University*,
B. Blättel-Mink, *Frankfurt University*;

Societal resilience and climate extremes
by I. Chabay, *IASS Potsdam*;

Sustainable consumption by D. Fischer, *Leuphana
University* & M. Jaeger-Erben, *IsiNova*;

Shipping emissions by W. Rickels, *IfW*

**German network of Early Career
Scientists in Future Earth**

**18:00 - 18:15 Conclusion day 1 with highlights
of sessions and Open Space**

Großer
Saal

18:15 - 21:00 Get together

Umwelt-
forum

Day Two

Friday
9th of February

When?

Where?

Community Forum II

9:00-10:00

Dialogue

"Stakeholder partnerships and initiatives:
lessons learned"

Moderated by Patrick Hostert

Umwelt-
forum

Input statements

John Ingram, University of Oxford
Matthias Bergmann, ISOE

Großer
Saal

In dialogue with

Matthias Bergmann, ISOE, Anita Engels, Universität
Hamburg, John Ingram, University of Oxford
Florian Koch, UFZ, Asun St. Clair, DNVGL

10:00 - 10:15

Break, change building

10:15-12:15

Parallel roundtable discussions "Managing expectations"

incl. coffee break

Umwelt-
forum
/ Neue
Mälzerei

**The role of social sciences and the humanities at
the interface of environmental sciences and
international political fora**

organised by M. Akhtar-Schuster & C. Textor, DLR

Elysium

**Policy pathways for healthier, more equitable and
more environmental sustainable lifestyles**

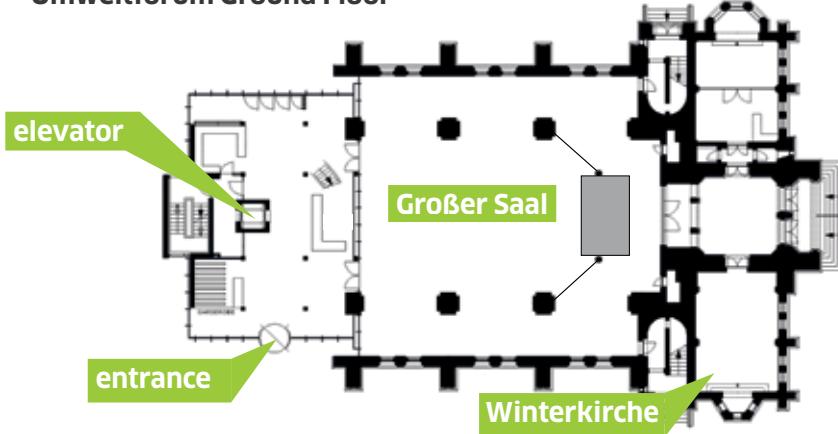
organised by R. Strube & F. Grossi, Collaborating
Centre on Sustainable Consumption and Production

Seminar
I/II

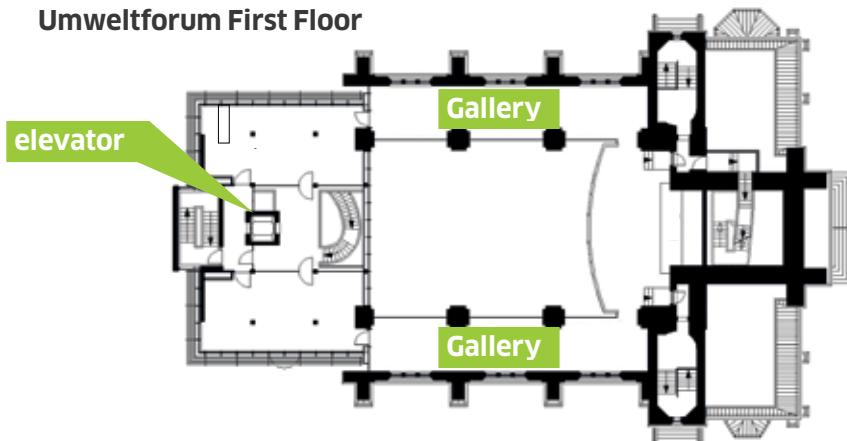
Societal resilience and climate extremes	Plenarsaal
organised by P. Mahrenholz, UBA, D. Frank, MPI for Biogeochemistry, F. Kreienkamp, DWD, M. Reichenstein, MPI for Biogeochemistry, J. Scheffran, Hamburg University	
Town and country in the flow - creating sustainable climate landscapes	Kuppel-saal Nord
organised by N. J. Schneivoigt, Universität Bonn, H. Wolpensinger, WILA Bonn, C. Oldenburg, Universität Bonn, A. Rienow, Ruhr-Universität Bochum, F. Thonfeld, Universität Bonn, A. Valentin, WILA Bonn	
What do stakeholders expect from science with regard to indicators on global responsibility?	Winterkirche (Umwelt-forum)
organised by A. Kloke-Lesch & J. Sturm, SDSN Germany	
Beyond “speaking truth to power”? The implications of co-creation for research and policy advice	Kuppel-saal Süd
organised by J. Spangenberg, UFZ, J. Herberg, IASS Potsdam	
12:15-13:15 Lunch	Umwelt-forum
Science Forum	
13:15 - 14:45 "The way to go: sustainability in science and research"	Umwelt-forum
Moderated by Karen Pittel & Josh Tewksbury	
In dialogue with Katharina Helming, ZALF Claudia Schmitt, Universität Hamburg Jana Holz, netzwerk n Christoph Hansert, DAAD Adolf Kloke-Lesch, SDSN Germany	Großer Saal
14:45 - 15:15 Highlights roundtable discussions & closing remarks	Großer Saal

Site Plan

Umweltforum Ground Floor



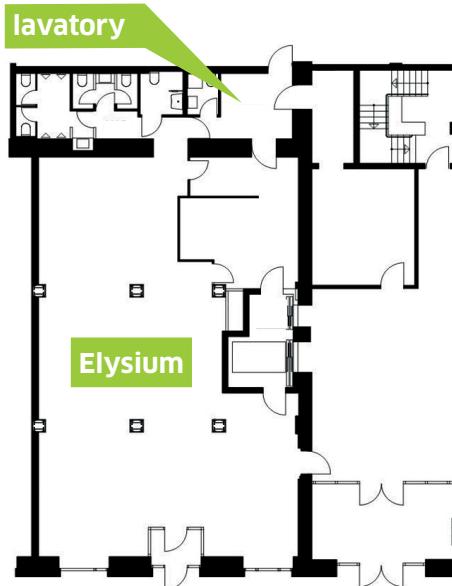
Umweltforum First Floor



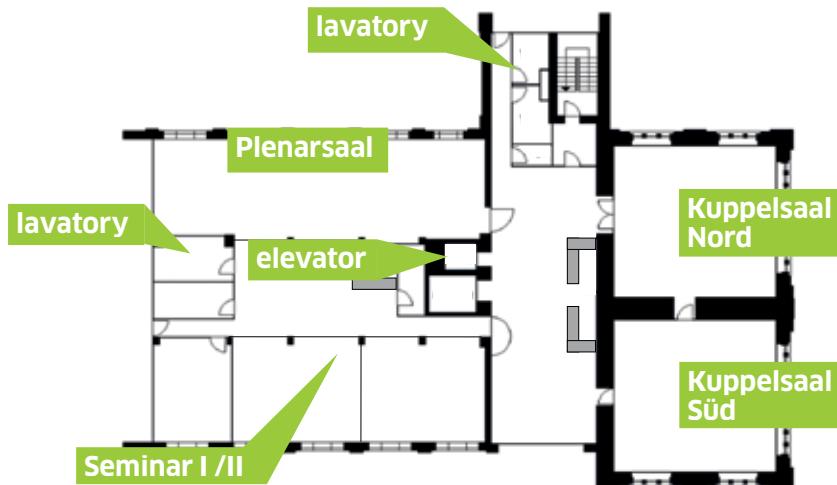
Umweltforum Second Floor

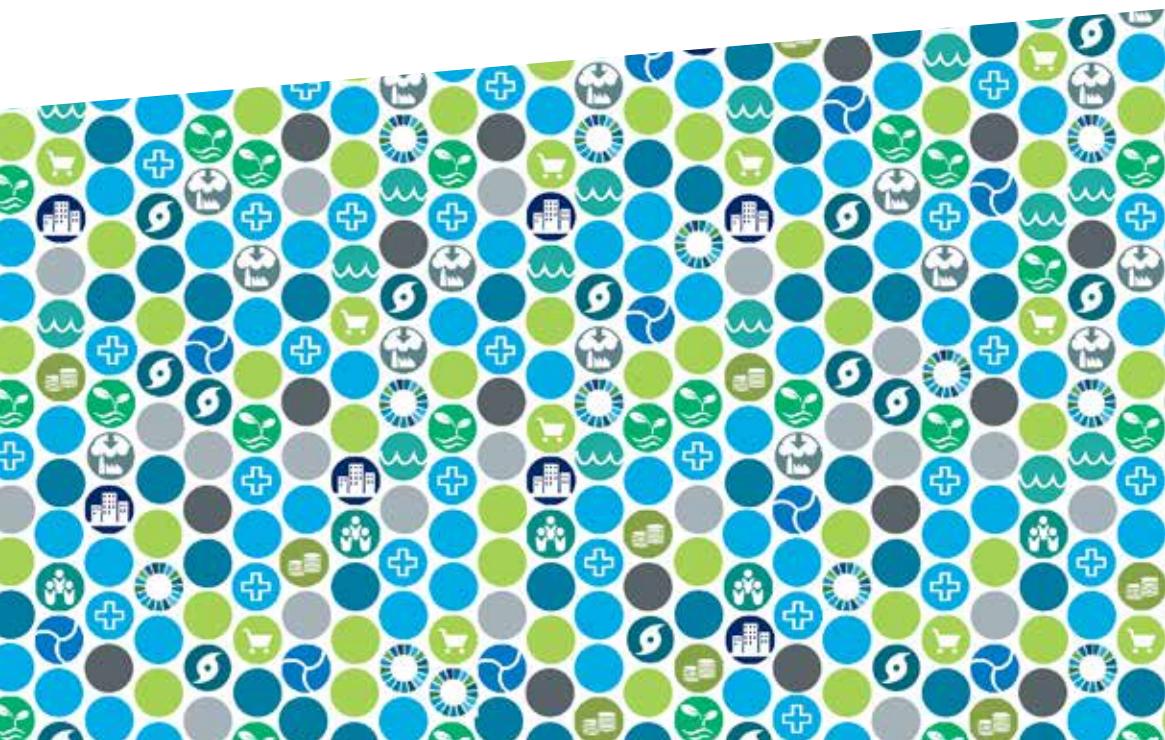
lavatory

Neue Mälzerei Ground Floor



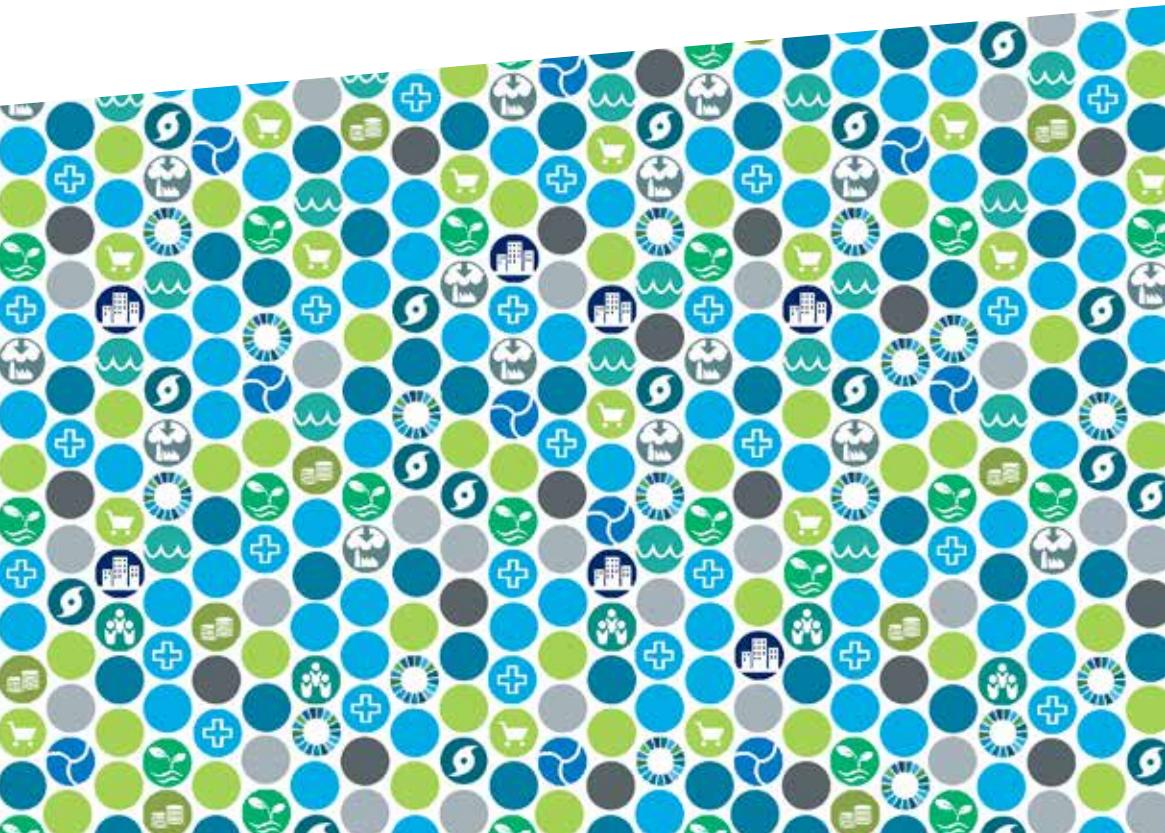
Neue Mälzerei Fifth Floor





Details

Parallel Sessions Knowledge Action Networks



Topic:
KAN Natural Assets

Session organisers:
Ariane de Bremond, *Universität Bern*;
Kristin Krewenka, *Universität Hamburg*;
Cornelia Krug, *Universität Zürich*, Gesine
Schütte, *Universität Hamburg*

Speakers:
Ariane de Bremond, *Universität Bern*;
Kristin Krewenka, *Universität Hamburg*;
Gesine Schütte, *Universität Hamburg*

Moderation:
Cornelia Krug, *Universität Zürich*; Kristin
Krewenka, *Universität Hamburg*; Gesine
Schütte, *Universität Hamburg*

Shifting the paradigm – seeking alternative land management approaches for sustainable agriculture

It has been recognised that humans depend on natural assets for their well-being. At the same time, ecosystems are degrading mainly due to land use and climate change, and are less and less able to provide benefits. Furthermore, benefits derived from ecosystems are often distributed unfairly, and unequally. To conserve ecosystems and maintain the benefits for humans, there is a need to ensure the sustainable and responsible use of natural assets.

Fair stewardship and the sustainable use of natural assets are the ultimate aims of the Natural Assets KAN. Contributing activities should improve the comprehension of interdependencies between biodiversity, ecosystems and their services and amend effective management and governance approaches.

Feeding the growing world population and trying fulfil additional demands, while conserving natural assets is one of the most pressing challenges today. In the face of climate change and a growing world population, it becomes even more urgent to solve this paradox, particularly in drylands.

Especially small-scale farmers in countries of the south are likely to be most negatively affected by climate change and have to deal with ecological constraints. But highly industrialized and ambiguous conservation agriculture is limited in fulfilling demands of sustainable agriculture. Besides, in industrialized countries, the demand for a change of agricultural production systems is growing.

Paradigm shifts should be based on empirical research. A recent review shows that most agro-ecological studies are focusing on the effects of industrialized large-scale agriculture on biodiversity and ecosystem services. Information and data on



Neue Mälzerei
14:45-16:45, Thursday
Room: Elysium

small scale agriculture and alternative farming practices are rare or lack a systematic scientific evaluation.

Developing new management strategies for multifunctional landscapes which can better respond to multiple demands, using a mosaic of different land uses will be only possible, if alternative agricultural models and their output, their ecological impact and socioeconomic parameters will be investigated at large scale.

The interactive session aims to:

1. Introduce the conceptual framework of the Natural Assets KAN
2. Discuss the paradigm shift necessary for agriculture, in particular for marginal regions and drylands
3. Identify knowledge gaps in research and elaborate possibilities for research projects on sustainable agriculture based on mutual transdisciplinary knowledge transfer.
Planned outcomes of the session: 1) Knowledge gaps identified 2) Way forward for research on sustainable agriculture in drylands and marginal regions

Schedule:

14:45-15:15	Introduction to Natural Asset KAN; Ariane de Bremond, <i>CDE Universität Bern;</i> Cornelia Krug, <i>Universität Zürich</i>
15:15-15:30	New approaches for agriculture in marginal regions/ drylands/ semi-arid regions, Kristin Krewenka, <i>Universität Hamburg;</i> Gesine Schütte, <i>Universität Hamburg</i>
15:30-16:30	Break-out groups or World Café: How to achieve sustainable agriculture in drylands. Groups identify knowledge gaps, propose research approaches to close those gaps and highlight framing conditions to ensure success. They thematically focus on: <ul style="list-style-type: none">• Natural Assets• Socio-economics• Food Security• Climate Change• Dryland Agriculture and Ecology
16:30-16:45	Feedback from break-out groups

Topic:
KAN SDGs

Session organiser:
Uwe R. Fritzsche, IINAS

Speakers:
Hermann Lotze-Campen, PIK/SDSN;
Elmar Kriegler, PIK; Ulrike Eppeler, IINAS;
Ivonne Alva, TMG; Christine Roesch,
KIT-ITAS; Tobias Heimann, IWE;
Steffi Ober, NABU; Henrik Carlsen, SEI

Moderation:
Maja Göpel, WBGU

SDGs and trade-offs: biomass as an example for the role of science in policy formulation and implementation

The SDSN started several initiatives to generate technological, institutional and behavioural solutions for advancing sustainable development. The international SDSN project "The World in 2050" develops future scenarios to link aspects such as climate, food and water, marine ecosystems, biodiversity, public health, ending poverty and global inequality. Not only trade-offs, but also synergies and co-benefits between different SDG dimensions will be assessed.

One of the goals of this KAN session is to discuss how explicit modelling of political decision-making, policy implementation processes, and policy coherence can be improved. Another key question is how scenario-based studies can be made better accessible and more useful for policy-makers. In this KAN session, we will discuss how Future Earth could provide a valuable structural and organizational framework for such a long-term endeavour in sustainability research, with an exemplary focus on biomass.

Although the SDGs do not explicitly mention biomass, there are fundamental links: The majority of the SDGs is related to the upcoming bio-economy (BE), i.e. human use of biomass for building materials, chemicals, energy, fibres, food & feed etc. Global use of biomass is expected to increase further, driven by several SDGs, but could also be subject to sustain-ability safeguards from other SDGs. Recent analysis showed that on the target and indicator levels, the SDGs match with e.g. the GBEP sustainability indicators for bioenergy, but the SDG role as a normative framework for the BE needs further exploration.

The session will present and discuss linkages of sustainable agriculture and food systems (SDG 2), sustainable energy (7), sustainable production and consumption (12), and sustain-able land use (15). Further linkages to other SDGs (1, 3, 6, 8, 11,



Neue Mälzerei
14:45-16:45, Thursday
Room: Seminar I/II

13, 14) will be considered, following the nexus approach. The session aims to provide input to the GBEP, the 2nd Global Bio-economy Summit (April 2018 in Berlin), and the HLPF in July 2018.

An example will be presented which evaluates three scenarios on quantifying the relation between the BE and SDG targets. It is shown that, compared to a business-as-usual scenario, the bio-economy scenario can only be considered more beneficial for the achievement of a fraction of the SDGs, or if it is assumed that overall SDGs the positive impacts of the implementation of a bio-economy outbalance its negative impacts.

The sustainable bio-economy scenario is strongly beneficial for reaching the SDGs and the trade-offs caused by a sustainable bio-economy are nearly equivalent to the SDG inherent trade-offs. Summarized, this evaluation will demonstrate that without regulations, policies and investments ensuring sustainability, or in case the positive impacts are not allowed to outbalance the negative impacts, the common bio-economy has the potential to rather harm than support the achievement of the SDGs.

Schedule:

Speeches (10 minutes + 5 minutes discussion)

- 1. Towards implementation of the SDGs: using future scenarios on trade-offs and synergies to develop coherent policy instruments**
Hermann Lotze-Campen and Imar Kriegler, PIK, Potsdam, and SDSN Germany
- 2. SDGs and biomass: driver, safeguard or both? The role of the SDGs in framing a sustainable bioeconomy.** Ulrike Eppler, IIASA, Berlin; Ivonne Lobos Alva, TMG, Berlin; Christine Roesch, KIT-ITAS, Karlsruhe
- 3. Bio-economy and the SDGs: Does the bio-economy support the achievement of the SDGs?** Tobias Heumann, Institute for the World Economy, Kiel
- 4. Call-ins (5 minutes each to start discussion)**
Steffi Ober, NABU, Berlin
Henrik Carlsen, Stockholm Environment Institute (SEI), Stockholm

Topic:
KAN Water-Energy-Food Nexus

Session organisers:
J. Friedrich, KIT; S. Köpke, Universität Kassel; K. Krumme, Universität Duisburg-Essen; H. Lehn, KIT; A. Melkonyan, Universität Duisburg-Essen; W.-R. Poganietz, KIT; A. Ploeger, Universität Kassel; S. Withanachchi, Universität Kassel

Moderation:
A. Grunwald, KIT

Speakers:
J. Friedrich, KIT; S. Köpke, Universität Kassel; A. Melkonyan, Universität Duisburg-Essen; S. Withanachchi, Universität Kassel

Challenges of the Water-Energy-Food Nexus

Water, energy and food are highly interdependent systems. They pose diverse challenges but also represent opportunities for sustainable development. In this session participants have the chance to experience the variety of challenges in a market-place setting. The three organizing institutions will give short impulses and pitch their group work. The participants then decide which of the following groups they would like to join and have an intense group work on a certain aspect of the Nexus. To conclude participants will present the highlights to the other groups.

Group 1: Challenges of implementing solutions to design the urban Water-Energy

Nexus more sustainably Helmut Lehn, Witold-Roger Poganietz

On a pilot scale, technologies using the nexus approach to combine water and energy more sustainably already exist for urban areas. However, these alternative solutions are not being implemented on a broader scale yet as they pose diverse challenges to existing infrastructures, behavioural patterns and institutional frameworks. Therefore, the key objective of this group work is to improve the understanding of the complex interdependencies between the energy and water sector in different urban settings by facilitating an interactive exchange among the participants. This should help to identify potential tailor-made strategies to overcome the impediments of implementing more sustainable urban water-energy nexus infrastructures.

Group 2: Decentralization of Urban Food-Water-Energy Systems under Deep Uncertainty Ani Melkonyan, Klaus Krumme

Decentralization of Water-Energy-Food (WEF) systems can have positive and negative effects in urban areas regarding resilience, efficiency, and environmental



Neue Mälzerei
14:45-16:45, Thursday
Room: Plenarsaal

performance both from infrastructural and institutional perspective. New conceptual solutions for the WEF nexus are needed by designing an integrated conceptual model using advances in Sustainable Supply Chain Management (SSCM). Besides an "end to end" lean strategy (Efficiency Dimension), the strengthening of capacities to absorb disturbances particularly with respect to WEF interdependencies (Resilience Dimension), is considered as a main principle.

Group 3: Reconfiguration of community participation at the local level: A critical analysis of participatory water management approaches Sisira S. Withanachchi, Sören Köpke, Angelika Ploeger

Grassroots-level pro-poor development plans aim to couple rural development and water resource management through participatory approaches. However, these participatory approaches may be in contradiction with socio-economic conditions on the ground. Existing participatory mechanisms do not take into accounts dynamics within social hierarchies, as well as disconnect between governance bodies, hydro-bureaucracies and local people. In order to ensure equity and sustainability in water resource governance, active civic engagement must be integrated into decision-making procedures. Under the SDGs, it is essential to enhance participation of communities, family farmers and smallholders regarding policies on water quality, resource over-exploitation, and the water-energy-food nexus.

Schedule:

- | | |
|--------------------|---|
| 14.45-14:50 | Welcome |
| 14:50-15:05 | Short Introduction into the three groups (each group á 4 min) |
| 15:05-16:20 | Group work (optional: starting with a key note) |
| 16:20-16:45 | Presentation of group results (each group á 5 min) plus discussion |

Topic:**KAN Finance & Economics****Organisers:**

Roger Cremades, Climate Service Center Germany (GERICS), Hamburg; Armin Haas, Institute for Advanced Sustainability Studies (IASS), Potsdam; László Zsolnai, Corvinus University of Budapest, Hungary and European SPES Institute, Leuven, Belgium

Speakers:

Thomas Walker, Concordia University Montreal; Ilona Otto, Potsdam Institute for Climate Impact Research; Michael Jakob, Mercator Research Institute on Global Commons and Climate Change, Berlin; Nils May, German Institute for Economic Research, Berlin

Moderation:

Gerd Leipold, Climate Transparency

Reconnecting economics and finance to Earth

Human impacts show worrying trends for the functioning of the Earth system in the Anthropocene. Many of these impacts are related to the activities of human organizations, e.g. business, which are the main engine of wealth creation but function without considering the scarcity of sinks for human activities on the Earth. We present the novel Biophysical Overshoot Analysis framework, which translates the limits of the safe operating space for humanity on Earth to human organisations, including business, and provides an answer to the question of how to subject growth and the impact of all human activities within the planetary boundaries. Similarly, the financial sector shows signs of an acute disconnection from the real world. By giving scientific evidence and citizens' participation central roles in the policy process concerning finance, we show that it is possible to make the financial sector better serve society. We also analyse the impacts and implications of increased financial risks under climate change. Furthermore, we show how the financial sector can facilitate the long-term investments required by the transition to a more sustainable, more innovative, less unequal and greener EU economy. We explore the meaning of climate policies for countries and individuals, diving into the immediate courses of action to achieve decarbonisation, and what could decarbonisation mean for individuals with different incomes and levels of energy use. Finally, we will address the moral implications of the current disconnection of finance and economics with the Earth system.



Neue Mälzerei
14:45-16:45, Thursday
Room: Kuppelsaal Nord

Schedule:

- 1. 24 minutes keynote speech “Creating Sustainable and Pro-social Enterprise”, László Zsolnai**
- 2. 6 short presentations of 10 minutes:**
 - “The Three Dimensions of the Sustainability of the Financial System”, Armin Haas
 - “Emerging Environmental Risks and Their Effect on Commodity and Stock Prices”, Thomas Walker
 - “Socio-Metabolic Class Theory”, Ilona Otto
 - “A Social Contract for Earth System Management in the Anthropocene”, Roger Cremades
 - “The Role of Financing Costs and De-risking Strategies for Clean Energy Investment”, Michael Jakob
 - “Financing Renewable Energies Under Changing Regulatory Regimes”, Nils May
- 3. 35 minutes roundtable debate**

In all items questions will be allowed according to time availability, e.g. two questions for keynotes and one question for short presentations.

Topic:
KAN Transformations

Session organisers and moderation:

Katharina Schleicher, *Center for Transformation Research and Sustainability - TransZent, Wuppertal; Georg Jochum, TU Munich; Hans Haake, Wuppertal Institute; Ana Cárdenas, ISF Munich*

Speakers:
Katharina Schleicher, *Center for Transformation Research and Sustainability - TransZent, Wuppertal; Georg Jochum, TU Munich; Hans Haake, Wuppertal Institute; Ana Cárdenas, ISF Munich; Beate Littig, IHS Vienna; Ingo Matuschek, University of Duisburg Essen*

Transformative indicators and the transformation of work

In this KAN-related session connected to the KAN “Transformations” there will be room both for a more general discussion on transformations as well as two important aspects of any sustainable transformation.

The term “Transformation” has gained much traction in recent years, and various groups and networks including the Future Earth KAN have made progress in defining and operationalizing it. Yet key issues remain unsolved: The term is often used as a short form of a “sustainable transformation” or a “socio-ecological” transformation, causing confusion to those outside the sustainability community. The theoretical foundation of the transformation-debate is so diverse to sometimes seem weak. There are quite distinct differences between the English-speaking and the German transformation debate, possibly true of other languages as well. Thus at the beginning of an interdisciplinary interactive session, it will be helpful to have a short exchange on what we mean by this “transformation”, what the status quo of the debate is both in science and in society as a whole and where the next steps lie. This first block of the session will give the basis for breaking up into two groups discussing specific roles, strategies or topics of the transformation.

Once it is clear where a transformation is supposed to lead (sustainability, decarbonisation, etc.), there are many ways to get there and many roles to play for different actors. Science has played an important role in all past transformations, knowingly or not at the time. Considering the scope and complexity of current challenges there have been calls for a “transformative science” that takes on a more active role in shaping the transformation. To some disciplines this is nothing new,



**Umweltforum
14:45-16:45, Thursday
Room: Winterkirche**

to others it means leaving behind some fundamental expectations of what it means to be scientific. We will use the example of indicator systems, connecting to the KAN on SDGs and the work of the beyond-GDP community on alternative indicators of well-being. To have any kind of impact, these indicators must not only be created, but also implemented into policy making, political debates and elsewhere. How far do we go as scientist in ensuring such proposals do not stay within the realm of science?

The other aspect to be focussed on in the session will be the role of work in the process of transformation. Referring to the UNDP report “Work for Human Development”, which recommended a “moving to sustainable work”, scenarios for the social-ecological transformation of current working societies are discussed. We assume that the non-sustainability of current modes of production and consumption is to a high degree based on the structures of the sphere of (paid) labour. A transition to sustainability requires a transformation of the global working world towards sustainable supply chains and the relationships between paid employment and non-gainful work (e.g. voluntary work) need to be redefined. Looking at sustainable work will provide a concrete topic to talk about both the direction of the transformation and the leverage points to get there.

Schedule:

- 1. Introduction: definitions of the term transformation(s)**
- 2. Presentation: transformative science & transformative indicators**
- 3. Presentation: transformation of work**
- 4. Group work**
- 3. Summary, report from the working groups**

Topic:

KAN Systems of Sustainable Consumption and Production

Session organisers:

Holger Hoff, Potsdam Institute for Climate Impact Research (PIK) / Stockholm Environment Institute (SEI);
Sarah Malelu & Nora Löhr, Gesellschaft für Internationale Zusammenarbeit (GIZ);
Philip Vergragt, Future Earth SSCP KAN

Moderator:

Holger Hoff, Potsdam Institute for Climate Impact Research (PIK) / Stockholm Environment Institute (SEI)

Speakers:

Knowledge side: Kirsten Wiebe, Norwegian University of Science & Technology (NTNU); Philip Vergragt, Tellus Institute; Leonie Dendler, Federal Institute for Risk Assessment (BfR); Christina Schampel, Systain;

Action side: Stefan Schmitz & Ingolf Dietrich, Federal Ministry for Economic Cooperation and Development (BMZ); Lisa Neumann, Federal Ministry of Food and Agriculture (BMEL); Ambreen Waheed, Stora Enso; N.N., Consumer Organisation; Henning Osmers-Rentzsch, Lebensbaum; NN, Ferrero; NN, GIZ

International spillovers in SDG implementation and sustainable supply chains

The SDGs are universal, their implementation in, by and with Germany must account for spillovers in other regions. However improvements in some national SDG indicators are still achieved by externalizing socio-economic and environmental footprints to other countries.

In order to effectively reduce negative spillovers ("footprints") and to enhance positive spillovers ("handprints"), complex global supply chains and the associated costs and benefits all along these supply chains need to be better understood. This KAN session confronts the rapidly increasing scientific knowledge in this field with the information needs by policy- and decision-makers, including private sector, consumers and development cooperation. The session will help to define the required type, format, scope and resolution of actionable information, for sustainable consumption and production patterns.

Towards that end, GIZ and SDSN have launched a demand-driven and action-oriented Global Responsibility Initiative. Researchers and practitioners collaborate on tracing and quantifying critical spillovers and their impacts on universal SDG achievement, applying scientific tools such as multi-regional input-output (MRIO)



Neue Mälzerei
14:45-16:45, Thursday
Room: Kuppelsaal Süd

analysis, material flow analysis (MFA), life cycle analysis (LCA) and hybrid methods, as well as harmonized global, national and local data. The Global Responsibility Initiative integrates top-down and bottom-up information from the production and consumption side and along the supply chains. It helps to identify Germany's most critical supply chains, and opportunities and solutions for more sustainable sourcing. With that, the initiative supports the co-generation of relevant knowledge in the Future Earth SSCP KAN.

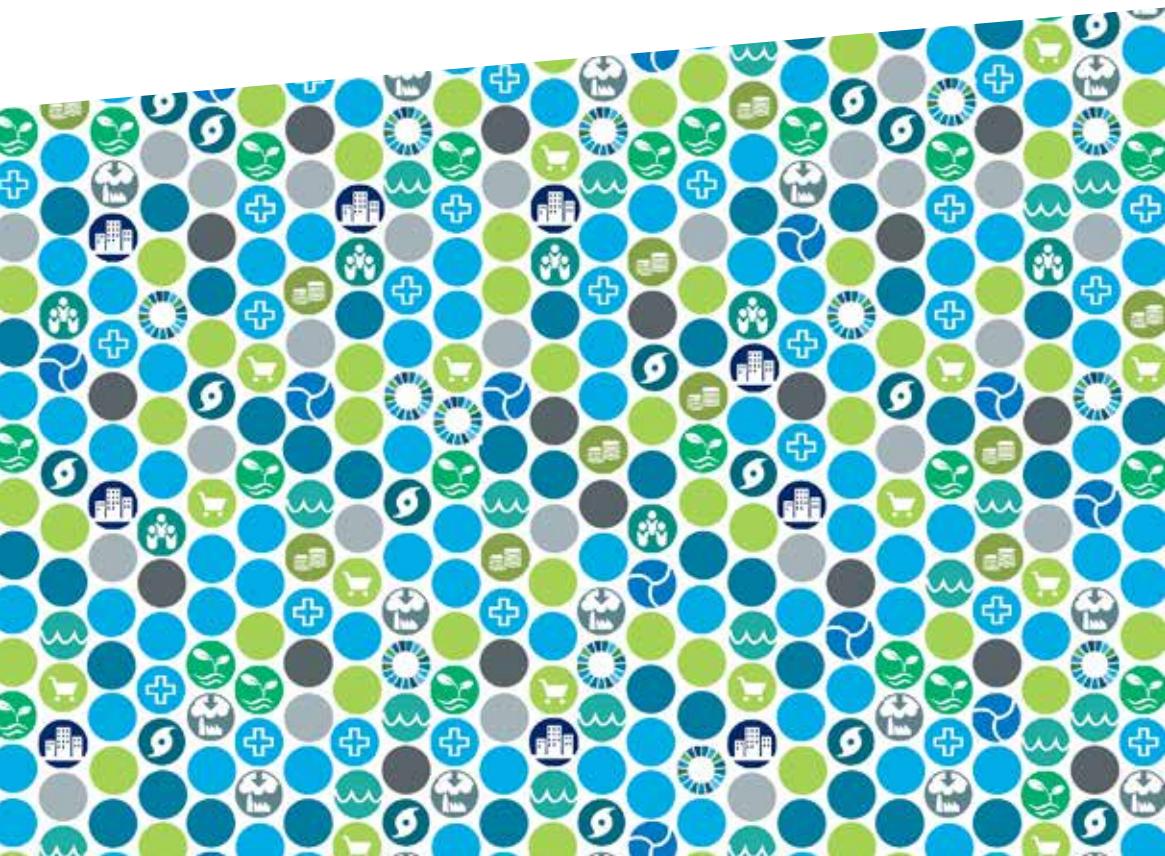
The focus of this session is on agricultural and biomass-based supply chains and land-related footprints. The session presents the state-of-the art in supply chain and footprint analysis, and it spells out critical knowledge gaps for sustainable consumption and production. The session's ambition is to move from knowledge to action. It helps to define and stimulate further activities of the SCP KAN and the Global Responsibility Initiative.

A fishbowl format will enable dynamic discussions and contributions by the audience.

A short input document will be provided upon request ahead of time.

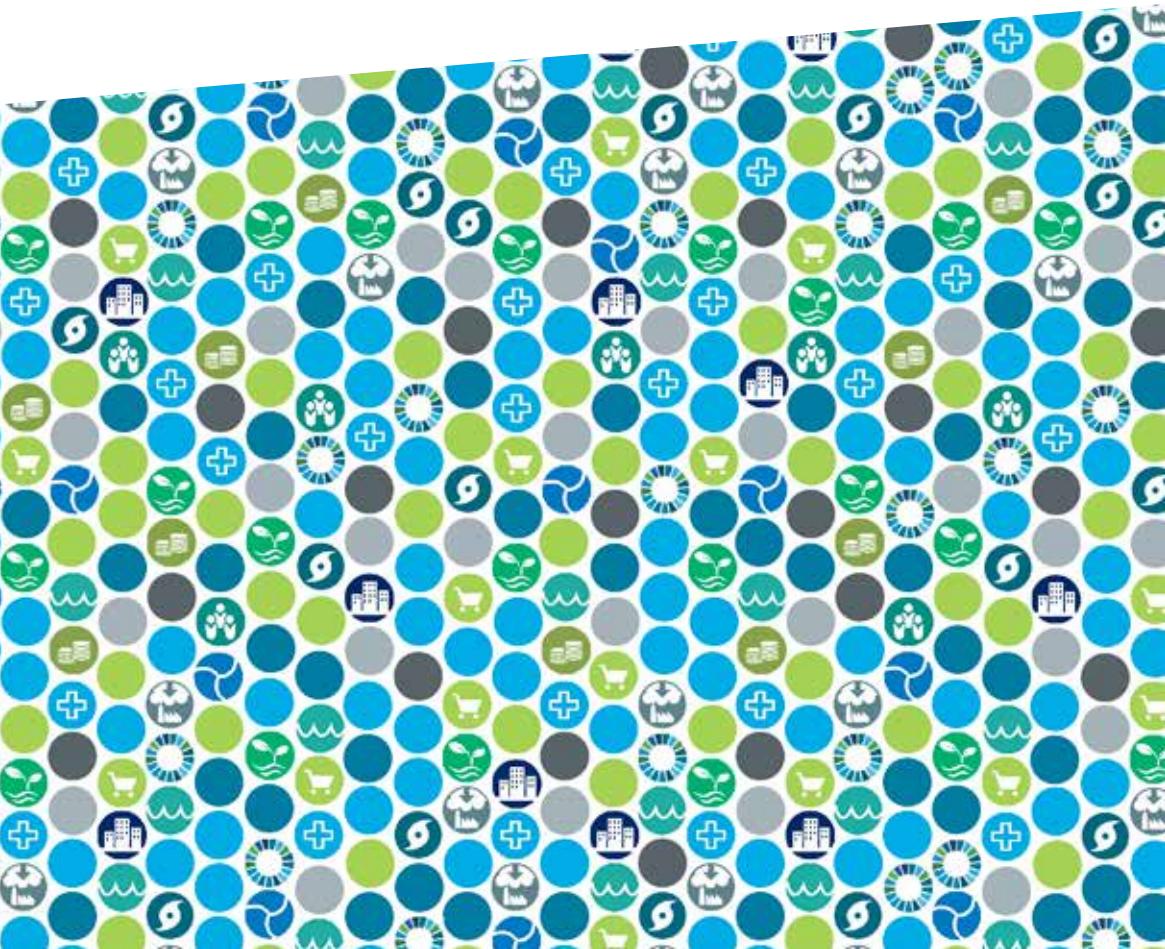
Schedule:

14.45-15:00	Welcome and introduction to the SSCP KAN and Global Responsibility Initiative
15:00-15:30	Short input statements and challenges
15:30-16:30	Fishbowl discussion with participation from the audience
16:30-16:45	The way forward towards co-developing relevant SSCP knowledge



Details

Parallel Roundtables



Topic:

Indicators measuring global responsibility

Organisers:

Adolf Kloke-Lesch and Janina Sturm,
SDSN Germany

Speakers:

Nadine-Lan Hönighaus, econsense;
Hermann Ott, Deutscher Naturschutzbund; Oliver Wieck,
International Chamber of Commerce (ICC)
Germany; Christian Kroll, Bertelsmann
Stiftung

Moderation:

Adolf Kloke-Lesch, SDSN Germany

What do stakeholders expect from science with regard to indicators on global responsibility?

One of the key features of the 2030 Agenda for Sustainable Development is the relevance of domestic policy and performance to the achievement of the SDGs in other countries and at the global level (global responsibility). However there still is limited knowledge about these interlinkages and even more so little data comparable across countries. The recently relaunched German Sustainable Development Strategy claims a stronger focus on the "by Germany" component (action in Germany that has global impact) but fails provide sufficiently elaborated indicators and targets. International indices such as the SDG Index and Dashboards (SDSN and Bertelsmann Stiftung) and other instruments for the measurement of global responsibility have tried to address this issue.

There is significant demand by governments, civil society, and the business sector to have better and comparable data in this field. Some stakeholders have developed measurement instruments of their own that are challenged by academia. Scientists are called upon to come up with proposals and solutions that can be understood by the broader public and can be included into strategy documents e.g. sustainability strategies and then acted upon.



Umweltforum
10:15-12:15, Friday
Room: Winterkirche

Schedule:

In the roundtable stakeholders from civil society, government, and the business sector will discuss with representatives from academia about expectations and possible next steps. The session will be moderated by Adolf Kloke-Lesch, Executive Director of SDSN Germany and will bring together 3-5 panelists from the network of SDSN and beyond.

10:15 -10:30

Introduction

Adolf Kloke-Lesch, *SDSN Germany*

10:30 - 10:50

Keynote

Christian Kroll, *Bertelsmann Stiftung*

10:50 - 11:20

Reactions from invited stakeholders

Nadine-Lan Höninghaus, *econsense*

Hermann Ott, *Deutscher Naturschutzbund*

Oliver Wieck, *International Chamber of Commerce (ICC) Germany*

11:20 - 12:00

Open discussion

12:00 - 12:15

Wrap Up

Topic:
Scientific knowledge for decision making

Organisers:
Mariam Akhtar-Schuster and Christiane Textor, DLR Project Management Agency, Bonn/Berlin

Speakers:
Jens Jetzkowitz, Helmut Schmidt Universität, Hamburg; Josef Settele, Helmholtz-Zentrum für Umweltforschung (UFZ), Halle; Heike Egner, Alpen-Adria-Universität, Klagenfurt; Martin Kowarsch, Mercator Research Institute on Global Commons and Climate Change (MCC), Berlin

The role of the Social Sciences and Humanities at the interface of environmental sciences and international political fora

In recent decades natural sciences have identified changes in the natural environment across scales that are caused by human activities. These changes threaten natural systems, human well-being and future options for development. At the political level, the sustainable development agenda including intergovernmental conventions or institutions related to environmental issues are political responses aiming at preventing or mitigating risks and fostering development. Recently, landmark UN agreements like the Sustainable Development Goals (SDGs), the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction have been adopted. This political success indicates the acknowledgement of results, particularly from science, at prominent decision-making levels.

The implementation of these UN agreements will require profound and differentiated knowledge of prevailing social, economic and cultural circumstances, and their trends thereby also paying attention to other forms of knowledge and different co-existing value framings. These aspects necessitate the further strengthening of information for decision making from the fields of social sciences and humanities as well as other scientific disciplines, beyond the conventional knowledge communities that are already rooted in well organised physical sciences.

The session will be framed by four short keynotes followed by an extensive discussion among participants about the challenges and opportunities arising from the new policy frameworks for social sciences and the humanities. The outcome of the session will be documented in a science-policy relevant format.



Neue Mälzerei
10:15-12:15, Friday
Room: Elysium

Schedule:

- 10:15-10:25** **Welcome and introduction**
Mariam Akhtar-Schuster and Christiane Textor, *DLR Project Management Agency, Bonn/Berlin*
- 10:25-10:32** **The role of science in a changing landscape of international environmental policy**
Jens Jetzkowitz, *Helmut Schmidt Universität, Hamburg*
- 10:32-10:39** **Challenges and opportunities from multi- or interdisciplinary scientific cooperation: experiences from IPCC and IPBES**
Josef Settele, *Helmholtz-Zentrum für Umweltforschung (UFZ), Halle*
- 10:39-10:46** **Merging different epistemological approaches for interdisciplinary research in the Anthropocene**
Heike Eigner, *Alpen-Adria-Universität, Klagenfurt*
- 10:46-10:53** **Solution-oriented global environmental assessments: Opportunities and challenges**
Martin Kowarsch, *Mercator Research Institute on Global Commons and Climate Change (MCC), Berlin*
- 10:53-11:30** **Discussion about challenges and opportunities arising from the new policy frameworks for social sciences and the humanities**
Facilitators: Mariam Akhtar-Schuster & Christiane Textor
- 11:30-11:45** **Coffee break**
- 11:45-12:15** **Identification of potential options to strengthen information from social sciences and humanities for decision making - what next?**
Facilitators: Mariam Akhtar-Schuster & Christiane Textor

Topic:
Science and policy

Organisers:
Joachim H. Spangenberg, UFZ, Leipzig
Jeremias Herberg, IASS, Potsdam

Beyond “speaking truth to power”? The implications of co-creation for research and policy advice

The idea of neutral, value-free science does no longer hold in Sustainability Science as science becomes an agent co-creating knowledge with policy makers and civil society. This change of basic parameters has profound implications for two interrelated fields: for the self-definition of science and scientists, as well as for policy advisors who rely on science as one of their sources of information and legitimacy. Future Earth may play a key role in shaping expectations towards science and policy advice, while itself building co-creative capacities in both realms.

This roundtable discusses the notion of co-creation – i.e. the collaboration of heterogeneous actors from civil society, academia and policy making – as a challenge to the conventional relationship of scientists and policy advisors. It provides a platform for more intentional management of mutual expectations: If science itself enters in co-creation and information dissemination, what is the role of policy advisors, their added value and conditions for success? In vice versa, how does co-creation shape the role of scientists in policy advice?

For science

Research projects and their coordinators are confronted with new questions: How does their role as an agent influence research processes, agendas and methods? How does the co-creation process change the scientific conduct (for instance in cases of incommensurable views and values), and what does that imply for the credibility of scientific advice? If epistemic certainty is no longer a science monopoly, what gives science the legitimacy as a relevant agent in a world of “post-truth” and “alternative facts”?

The LEGATO project experience in Vietnam and the Philippines shows that projects can define a role for themselves in line with their scientific mandate, while responding to stakeholder expectations and modifying (managing) them through building trust in intensive communication. However, such processes will not only change the stakeholders' expectations, but also modify the research



Neue Mälzerei
10:15-12:15, Friday
Room: Kuppelsaal Süd

plans. That is much easier, according to our experience, if the research funding includes an ex ante scoping phase permitting to establish stakeholder contacts and jointly discuss the research questions to be pursued before the final application is submitted.

For policy advice

As a second cornerstone, the roundtable concentrates on the advisory role of the Future Earth community and its Knowledge-Action Networks. Certainly a co-creative practice that leverages the complex intersection of public and political domains exceeds the task of “speaking truth to power”. And when looking at currently emerging advice practices, co-creation can already be said to complicate the expectations that confront policy advisors. Advisors for instance face contradictory expectations as communicated by heterogeneous stakeholders; or they deal with the increased demand to democratically legitimize cross-boundary collaboration. Which expectations from civic, professional or state actors are conveyed to policy advisors and in vice versa, when co-creative approaches shape their relationship? Altogether the roundtable discusses the added value of co-creation in the eyes of several actors groups. In how far do they find co-creation a desirable, legitimate and feasible shift in scientific and advisory practice?

Schedule:

- 1. Introduction**
- 2. Joint discussion: the changing perception of the role of science**
- 3. Discussion in sub-groups: the implications for research and for policy advice, based on the experience of participants.**

Topic:
**Societal resilience
and climate extremes**

Organisers:
Dorothea Frank, MPI for
Biogeochemistry; Frank Kreienkamp,
DWD; Markus Reichenstein, MPI for
Biogeochemistry

Speakers:
Petra Mahrenholz, UBA; Annegret
Thieken, University of Potsdam; Juergen
Scheffran, Universität Hamburg;
Christian Kulicke, UFZ Leipzig; Alexander
Fekete, TH Köln

Moderation:
Ilan Chabay, IASS

Societal resilience and climate extremes

The topic of extreme events and emergent risks under global environmental change is both scientifically challenging and of high societal relevance. It includes the study of measures of disaster risk reduction and for improving societal resilience. Even if globally averaged surface warming could be limited to "well below 2°C", as demanded by the Paris Agreement, the impacts of extremes as multiple temporal and spatial scales and in different regions will pose serious threats to human societies and ecosystems. Improving the societal resilience to enhance successful responses to extreme events will directly address SDG13 to "combat climate change and its impacts", SDG 14 to "conserve and sustainably use the oceans, seas and marine resources...", the "sustainable use of terrestrial ecosystems" (SDG 15), the transformations towards "resilient infrastructure" (SDG 9) and "sustainable cities and communities" (SDG 11), as well as SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being) and SDG 6 (Clean Water and Sanitation). Given the complexity of the Earth system, one of the key questions is: "Which instabilities, tipping points and risk cascades are most likely to emerge from interactions of future climate extremes with ecological and societal systems, and how can they be avoided?" This is relevant from local (e.g. communal) to supra-national (i.e. UNISDR) scales.



Neue Mälzerei
10:15-12:15, Friday
Room: Plenarsaal

This Roundtable focusses on identifying trans-disciplinary knowledge production and information exchange processes between scientists and stakeholders related to climate extremes and societal resilience, spanning multiple societal sectors and scientific domains, including climate science, aquatic and terrestrial bio-geo-sciences and ecology, agronomy, forestry, engineering, history, archaeology, psychology, political science, ethics, governance, economics, geography, urban planning, and public health.

With its cross-cutting character and relevance in various sectors, the roundtable discussion closely links the working group of the German Committee Future Earth "Societal resilience and climate extremes to international KAN activities. The aim is to identify key actors and questions to mobilize stakeholder attention and scientific interest.

The roundtable is meant to contribute to the emerging Future Earth KAN on “Emergent Risks and Extreme Events” and thus to enhancing the resistance, resilience and adaptive capacity of socio-ecological systems across spatial, temporal and institutional scales. Since extreme climate events are cross-cutting phenomenon, their impacts deeply connect to the topics of other Future Earth KANs such as “Health”, “Urban”, “National Assets” or “Water-Energy-Food Nexus” or “Transformations”.



Neue Mälzerei
10:15-12:15, Friday
Room: Plenarsaal

Schedule:

- 10:15-10:25** **Welcome and introduction**
Ilan Chabay, IASS
- 10:25-10:55** **Short inputs from different perspectives**
Petra Mahrenholz, *Umweltbundesamt Dessau*; Annegret Thieken, *University of Potsdam*; Juergen Scheffran, *Universität Hamburg*; Christian Kulicke, *UFZ Leipzig*; Alexander Fekete, *TH Köln*
- 10:55-11:55** **World café: 6 tables discussing the following questions:**
1. What elements pose the greatest risks for social-ecological systems and what metrics are most useful indicators across time scales?
 2. Which procedures and related institutions are currently in place or envisioned in the future to cope with extreme events and risk cascades? What are missing elements for improving societal resilience under future extreme events?
 3. Which good practice examples or success factors for improving social resilience are known?
- incl. coffee break*
- 11:55-12:05** **Short reports on 2x3 table discussions**
- 12:05- 12:15** **Summary and closing remarks**
Ilan Chabay, *IASS Potsdam*

Topic:
Sustainable lifestyles

Organisers:
Rosa Strube & Francesca Grossi,
*Collaborating Centre on Sustainable
Consumption and Production - CSCP*

Speakers:
Ingrid Stegeman, *EuroHealthNet*;
Francesca Grossi, *Collaborating Centre
on Sustainable Consumption and
Production - CSCP*

Roundtable on policy pathways for healthier, more equitable and more environmental sustainable lifestyles

Throughout the years our society has engaged in production and consumption patterns that have proven to be harmful for our society, economy, environment and ultimately human health and wellbeing. Developing options that promote health and equity, and provide the mechanisms to stimulate and support resilient lifestyles call for integrated approaches. These necessitate that scientific knowledge, “top-down” policies and “bottom up” pressure for change are addressed as a whole and that a broad range of stakeholders is actively engaged. This need of integrated approaches often clashes with the ever-greater dynamic and complex challenges deriving from the interlinkages between environmental, health and wellbeing issues. The key drivers of change in Europe can significantly change over time, increasing uncertainties about possible future trends and policy effectiveness. Even more than before, to make informed strategic decisions, achieve positive changes and increase the understanding of what are the related necessary policy measures to be undertaken requires a ‘fast forwarding into the future thinking’ perspective. We must try to anticipate what lies ahead to best grasp on-going, emerging and latent drivers of change, trends and opportunities.

Against this background, the research project INHERIT (Inter-sectoral Health and Environment Research for Innovation) (<https://www.inherit.eu/>) aims at advancing sustainable lifestyles through the identification of innovative, equitable, and healthier ways of living, moving and consuming and at fostering the development of effective European policies that can address key environmental stressors of health and the underlying causes of health inequity. Also striving to significantly improve cross-sectoral knowledge exchange, the INHERIT project is being implemented from a consortium of 18 European partners, representing environmental, social and health sectors in different countries.

Within the project, different methodological approaches have been developed and



Neue Mälzerei
10:15-12:15, Friday
Room: Seminar I/II

applied to stimulate actions and changes towards healthier and more sustainable lifestyles. In particular, the application of a forward-looking perspective exemplified in a horizon scanning exercise resulted in the development of four different positive future scenarios, describing what European societies could look like in 2040. These four scenario were then used as a basis for a multi-stakeholders back casting workshop to identify the kinds of policy interventions needed in the long-, medium- and short-term both at the European and national/local level to transition towards the envisioned lifestyles and positive futures. Building upon the learnings and experiences stemming from these activities, during the roundtable, we will take a closer look at the complex interactions between a changing European environment, health, health equity and wellbeing of citizens. Through a combination of presentations and interactive group work, we will together explore ways to improve cross-sectoral knowledge exchange processes and successful strategies to develop innovative policy interventions. We will address different questions, such as: what are the most innovative policy interventions which can tackle the full potential of 'triple win' of reducing environmental impacts, improving health, and increasing health equity? Which kind of policy measures can effectively support the transition to a healthier, more equitable and sustainable society in Europe? What is their applicability and feasibility at the local, national and European level? What kind of timeframe they require? What is still missing in the current policy-making processes?

Schedule:

10:15-10:30	A healthier and more sustainable future for all: Introduction to the INHERIT project; Ingrid Stegeman, <i>EuroHealthNet</i>
10:30-10:45	A glimpse of the future: Four scenarios 2040 of healthy, equitable and sustainable societies; Rosa Strube, <i>CSCP</i>
10:45 - 11:10	Planning for the future: presentation of policy interventions enabling more healthy, equitable and sustainable societies; Francesca Grossi, <i>CSCP</i>
11:10 - 11:20	Coffee break
11:20-12:05	Learning from your experiences parallel group discussions around the presented policy interventions
12:05-12:15	Wrap up and outlook; Rosa Strube, <i>CSCP</i>

Topic:
Sustainable climate landscapes

Organiser:
Anke Valentin, WILA Bonn

Speakers:
Pavlos Xanthopoulos, City of Gelsenkirchen; Carsten Oldenburg, University of Bonn; Anna-Maria Bolte, AG Grüne Infrastruktur

Moderation:
Nora Jennifer Schneevoigt, University of Bonn

Town and country in the flow - creating sustainable climate landscapes

The objective of this roundtable is to discuss with representatives of science, municipalities and stakeholders about the different means to cope with urban and climate change. The focus is on straightforward remedies and on the impact of different kinds of land use on climate change.

This discussion is embedded into the project "Town and Country in the Flow – Network for the Creation of a sustainable Climate Landscapes" (KlimNet), in which the bundle project partners identify hot spots of climate change based on satellite and climate data of the last four decades. In order to collect maximum knowledge to develop creative solutions towards resilient towns, both scientists, communal administration and members of the public are encouraged to closely cooperate throughout the project duration. Sometimes small changes suffice to better prepare a city for the challenges of climate change. Therefore, everybody is invited to develop and advance local ideas, and any kind of commitment, albeit limited, is highly appreciated. Various public activities and events such as crowd mapping, photo excursions and science cafes are especially addressing the interested public so as to get them actively involved. The goal is to develop practical action guidelines, which can be implemented and adopted at short notice by citizens, universities, municipalities, companies and other local players.

In the roundtable discussion, first experiences of the two model cities of Bonn and Gelsenkirchen shall be presented and compared to the experiences of the roundtable participants. Are the approaches used transferable to other towns? What are the advantages and disadvantages? Which steps seem promising for the transformation to a resilient city?

Eventually, a visualisation of landscape development in North Rhine-Westphalia over the last 40 years will be accessible online. Thus everybody can identify the expansion and densification of their own settlement, the shift of agricultural



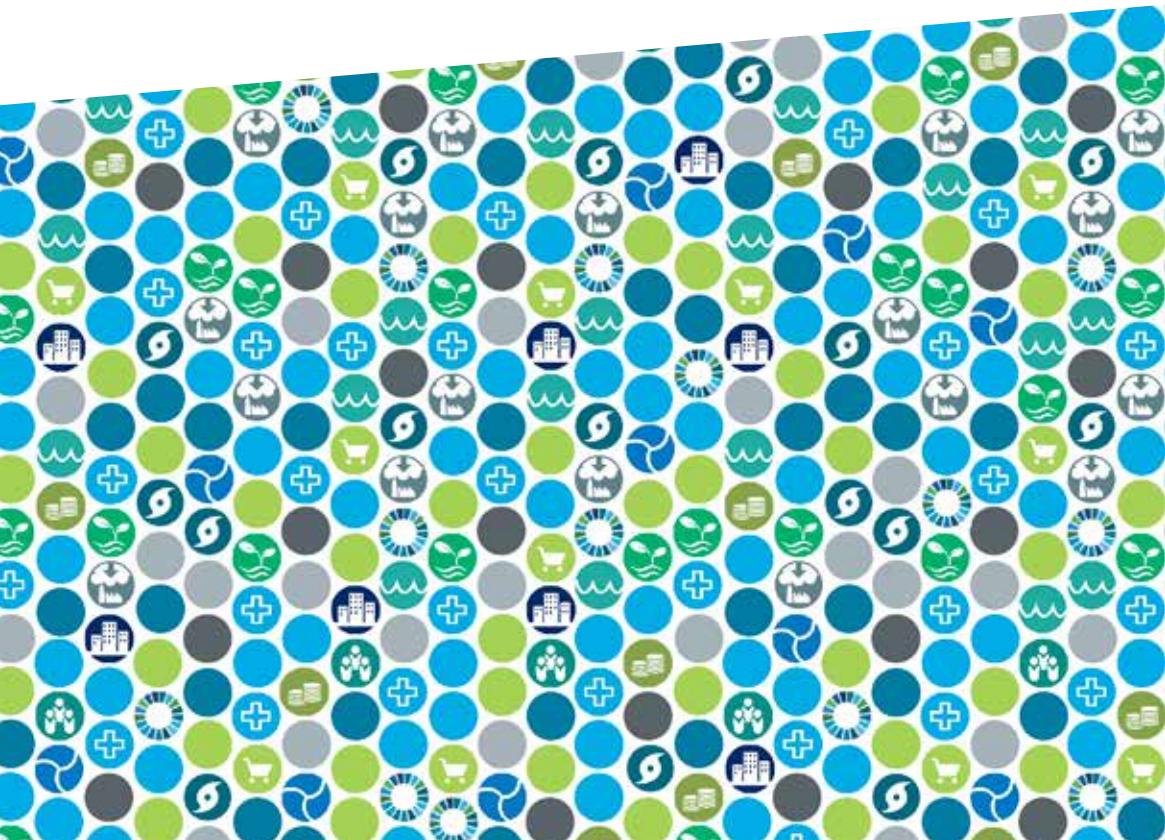
Neue Mälzerei
10:15-12:15, Friday
Room: Kuppelsaal Nord

areas, the change of floodplains and much more. Simultaneously, the impacts of these changes on the climate will be presented. This is going to happen not only through academic computing, but also together with citizens on the street (for example during a campaign at the UN Climate Conference of the Parties in Bonn in November 2017), who will develop solutions for different challenges a city has to face, such as excessive overheating in summer or heavy rainfall. With the project "Town and Country in the Flow", first steps will be taken to put these ideas into practice with the help of stimulating discussions and creative exchange on new approaches to improve the cities' resilience.

The Project KlimNet is funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) following a decision of the German Bundestag (funding code: 03DAS098B); see www.klimalandschaften-nrw.de (online from January 2018 onwards)

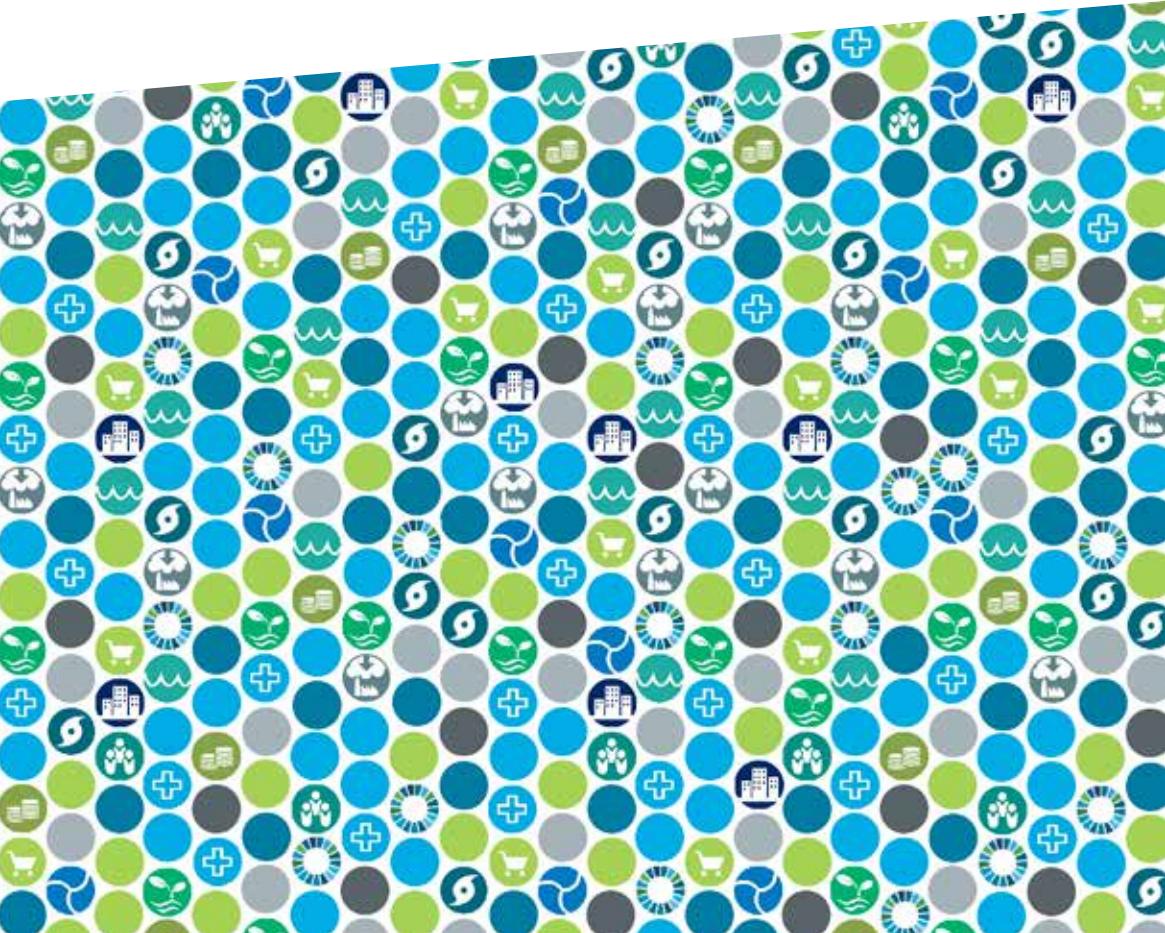
Schedule:

- 1. Welcome address and introduction**
Nora Jennifer Schneivoigt, *University of Bonn*
- 2. Surface cover and climate – what are the linkages between those two?**
Carsten Oldenburg, *University of Bonn*
- 3. Urban green infrastructure in the City of Bonn**
Anna-Maria Bolte, *AG Grüne Infrastruktur*
- 4. Climate adaptation strategies of the City of Gelsenkirchen**
Pavlos Xanthopoulos, *City of Gelsenkirchen*
- 5. Group discussion on experiences gained with climate adaptation strategies – pros and cons**
- 6. Visions for the future: drafting a roadmap towards 2030**
- 7. What are the hindrances and obstacles on the way? Why are practical measures taken lagging so far behind the scientific recognition of climate change?**



Details

Early Career Scientists



Topic:
Early Career Scientists

Organisers/Speakers:
Antje Brock, *FU Berlin*; Katrin Deadlow, *ZALF*; Franziska Schünemann, *IfW Kiel*

Networking meeting: exchange of sustainability-related early career scientist groups

For the benefit of the longer-term advancement of sustainability science, it is important to foster the development and exchange among the next generation of researchers and professionals. Therefore, many organizations involved in sustainability sciences support early career/young scientist-groups or networks.

The aim of this meeting is to bring these groups together. The organization of the networking meeting is led by the Early Career Scientists (ECS) of Future Earth in cooperation with the Young Earth System Science Community (YESS). Further relevant groups and networks (e.g. the “Early Career Researchers Network of Networks”) will be addressed as well. Outcomes of the meeting include the identification of common goals and interests among groups as well as synergies between their activities. All groups welcome Early Career Scientists in sustainability sciences as new members.

The Early Career Scientist Groups will provide short inputs focusing on the organizational background and current activities. Following that, overlapping aims and an exploration of modes and contents of future exchanges and collaborations will be discussed in a world café format. After concluding remarks, the participants of the meeting have the opportunity to informally continue their exchange in a restaurant nearby.



Neue Mälzerei
16:00 - 18:00
Wednesday, 7th February
Room: Kuppelsaal Nord

Schedule

16:00 Welcome and introduction

16:15 Presentation of activities of ECS Networks

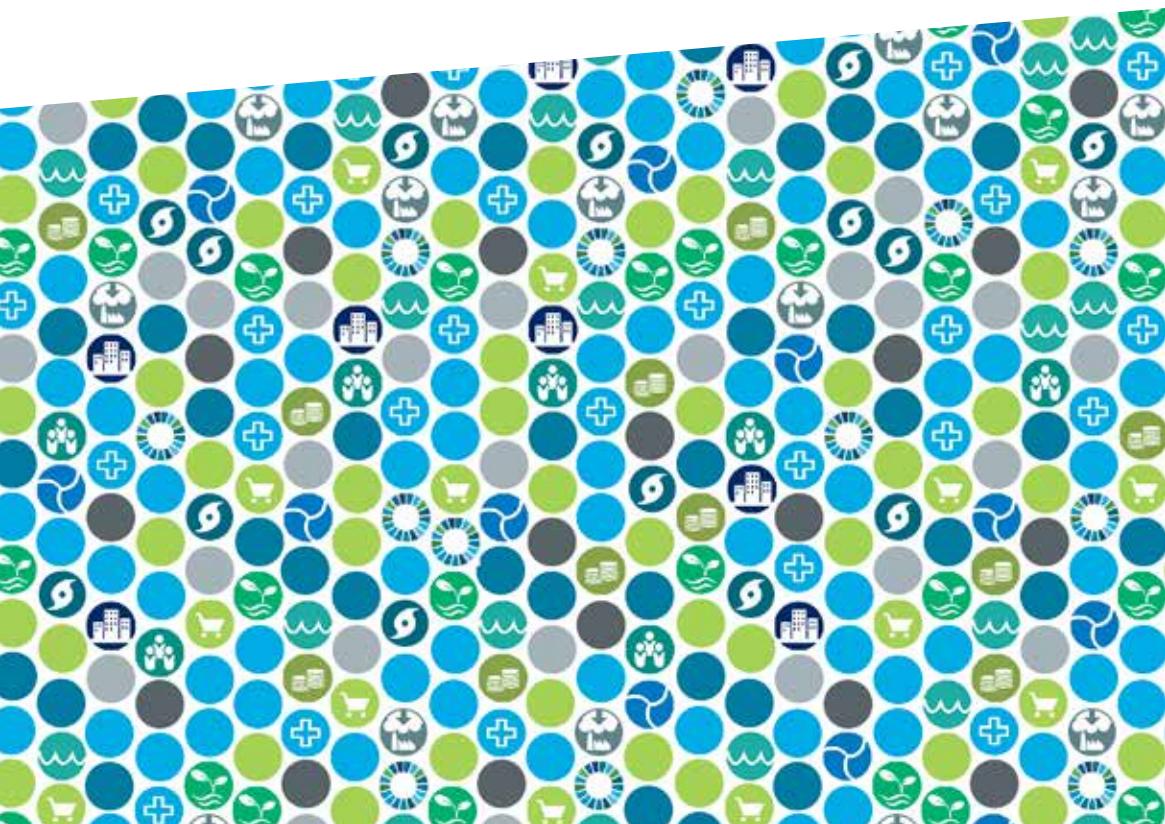
- Future Earth Germany
- YESS
- Network of Networks

16:45 World Café

- How to integrate and synergize activities of the different groups?
- Challenges relevant for sustainability-related early career scientists
- Refinement of ECR presentation at the Future Earth Summit (optional participation)

17:45 Wrap-up and future steps

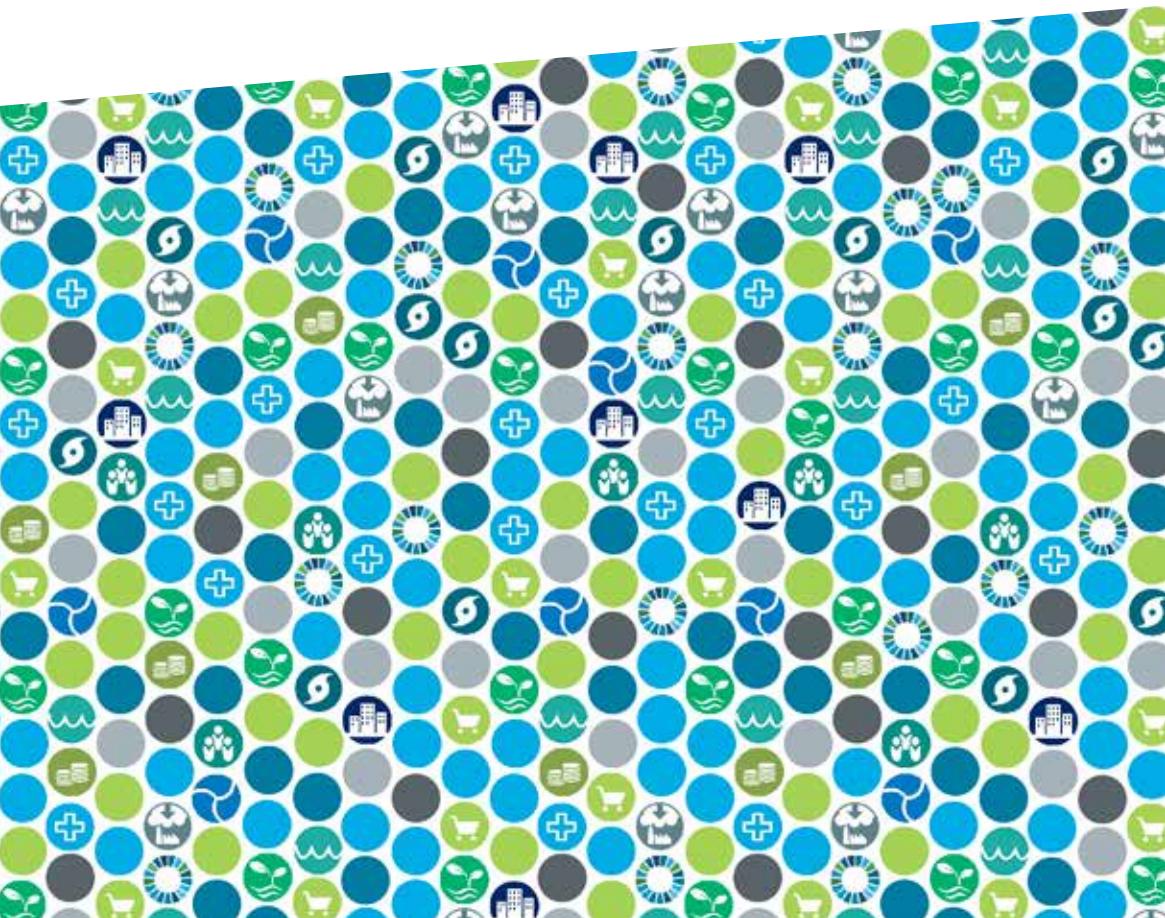
18:00 End of formal meeting (followed by dinner and networking)



Details

Research Blog Posts

online available at conference website



Decarbonising energy sector of Iran, advantages and pitfalls

Due to the ratification of the Paris Agreement, countries face the demanding task of implementing policies to decarbonise their economies. The challenge is daunting, especially for developing countries, like Iran because governments need to shift their development pathways to net zero emissions before the end of the century. At the same time, they need to ensure that this shift does not hamper economic prosperity. This paper analyse the advantages and pitfalls for the oil reach countries like Iran in their way to reach low carbon economy. The right policies and regulations need to be in place to mark the path to achieve these two goals. With clear policies and regulations, stakeholders will have a common ground and clear direction to develop and implement on-the-ground projects that contribute to the achievement of net zero carbon economies and economic prosperity. However, an enabling environment is not enough. While the climate-policy focus up until Paris was mainly on the negotiation process, the focus post-Paris has shifted to implementation of the Agreement. A number of new challenges are tied in with this, coping with which will require the participation of a broad spectrum of actors from politics, business, finance and civil society. Alliances will also have to become more diversified. Iran faces different barriers in implementation of Paris agreement; although Iran committed to reduce GHG emission in different amounts of conditional and conditional, but still the share of each responsible organization is not define, moreover the responsible organizations are not even determined. This is true that Iranian government is responsible for this commitment but beside of government which organizations are responsible and to what extend each of them have responsibility? There are different sectors which produce GHG such as ministry of oil, ministry of industry, ministry of energy.

The lack of awareness and/or knowledge about the Paris Agreement, climate change, and NDCs provides a significant obstacle to successful NDC implementation. Respondents recognized the importance of building political support at the highest level, and requested technical support for education and awareness raising among political leaders, decision-makers, and the general public. Respondents thereby

saw awareness as a key step to securing political approval and commitment. The lack of clarity among policy makers with respect to international support for finance and knowledge of NDC implementation is one of the most fundamental challenges. It was further suggested that questions regarding the mobilization of climate finance could be addressed through roundtables or dialogues with partners. Overall, the need for communication and awareness strategies around INDCs and NDC implementation was emphasized (UNDP 2016). The Paris Agreement's preamble recognises the interrelation between human rights and climate change. Human rights encompass a wide range such as rights to have shelter, and access to clean water, food and environment etc. Global warming is likely to lead to a 2.7 to 3 degree Celsius rise above pre-industrial levels (based on the current growth rates of 2 emissions and in spite of the Paris Agreement's lofty goals). This means crossing the 2 degree Celsius threshold that scientists deem the limit of safety, beyond which impacts of a changing climate – such as droughts, floods, heat waves and sea level rise – are likely to become catastrophic and irreversible. Reflecting the rights of individuals while addressing climate change ensures that planning to address vulnerability accounts for the rights of indigenous people and local communities as well as climate migrants. The inclusion of the rights of the vulnerable people, including climate migrants, in the Agreement ought to facilitate the provision of legal protection to the climate-displaced community. A section in the Agreement solely addresses the loss and damage associated with the adverse effects of climate change; it calls for providing support to vulnerable populations by strengthening early warning systems and emergency preparedness, among other matters.

The emergence of an international carbon market could unleash the full emissions reduction potential of the Paris Agreement, by facilitating the implementation of INDCs and emboldening countries to take on even more ambitious action over time. The opportunities are enormous once countries have access to a broader pool of carbon abatement (<http://www.climatechangenews.com/2016/08/11/cameroun-iran-ukraine-unlikely-climate-leaders/>) Mexico, for example, has pledged to reduce its greenhouse gas emissions by 40% more than its domestic greenhouse gas reduction (22% below business-as-usual levels) if it has access to an international carbon market. If all countries took the same level of effort and joined an international carbon market, the world would be in much better shape to meet the objectives of the Paris Agreement. A critical next step, especially from the perspective of spurring private-sector investment, is to develop 'rules of the road' for cross-border trading. The sooner clear rules emerge, the stronger the business response will be. These rules start with the establishment of domestic emission trading programmes in key countries; the accounting guidance called for in Article 6 of the Paris Agreement; standards and guidelines for environmental integrity of international transfers that could be developed bilaterally or plurilateral through a carbon market club; and finally, operational rules for the mitigation mechanism in Article 6. With the Paris Agreement providing a strong foundation for countries to

move ahead with market-based approaches, and a range of bilateral and plurilateral models for cooperation already beginning to emerge, carbon markets are poised to make a central contribution to implementing the commitments that countries have already made – and unlocking greater ambition in the future.



Fig. Renewable Energies Perspectives © Mona Poorzady

Topic:**Emergent Risks and Extreme Events****By:**David Williams, Helmholtz-Zentrum
Geesthacht

Global action is great, but don't forget about local!

On the 4th of November 2016, the Paris Agreement entered into force. It called into memory the emotional scenes of Laurent Fabius, holding hands with fellow diplomats whilst being applauded by an audience of exuberant political representatives from across the globe. The sense of hope was palpable, and many people felt that now, finally, things were going to change.

The Paris Agreement, famed though it is, is by no means the only piece of global climate legislation in place. In fact, a study by the Grantham Institute on Climate Change and Environment revealed a 20-fold increase in global climate change laws since 1997. This is an indication of a shift in mind-set among the upper echelons of the political establishment. Yet what is actually happening at the local level? On the ground, where river-banks are bursting, sea-level rise is causing coastal erosion, and houses are being swept away by landslides?

While it is the role of national and supranational political bodies to pass legislation, the actual implementation of legislation remains distinctly local.

The construction of wind farms, solar panels or energy-efficient housing for mitigation, as well as the design of flood defences, appropriate drainage systems or erosion protection for adaptation, is largely in the hands of local governments. This highlights the need for strengthening the capacity of local governments for implementing climate change legislation. Before even that, however, an important question needs to be dealt with:

How can the capacity of local governments to implement climate change legislation be evaluated in the first place?

In an attempt at addressing precisely this issue, a group of researchers from the German Institute of Climate Service (GERICS) developed the Capital Approach Framework. With its conceptual roots in a number of different sustainability

approaches, the methodology was developed to assess the ability of communities and governments to respond to natural hazards. In the Capital Approach Framework, various indicators are generated and categorised under a range of factors, with each factor pertaining to one of either social, political, human, financial, or environmental capital. Qualitatively assessing each indicator means every overall capital can also be evaluated.

Assessing the capacity of local government to implement climate change adaptation was also a core aim of the Western Indian Ocean Marina Science Association (WIOMSA) and Marine and Coastal Science for Management (MASMA) project entitled “Emerging knowledge for local adaptation” carried out in Mauritius during August 2017, and thus the Capital Approach Framework was selected as the assessment method. Mauritius is a Small Island Developing State situated in the Western Indian Ocean. It is highly vulnerable to the impacts of climate change, in particular sea-level rise and the increase in frequency and intensity of tropical storms, leading to wide-spread flooding. A rise in coastal impacts, such as erosion, declining reef quality and landslides have also been observed, putting the nation’s economy and well-being at risk.

In close collaboration with the Council for Scientific and Industrial Research (CSIR) from South Africa, the Nova University of Lisbon (NOVA), the German Institute of Climate Service (GERICS), and the Mauritius Oceanography Institute (MOI), the Capital Approach Framework was adjusted to the local context and carried out during the four-week research visit. Representatives from a total of seven District Councils, seven Village Councils, and four Non-Governmental Organizations were consulted for the study. Each participant was asked to respond to the indicators generated for assessing each factor, in turn to evaluate each capital.

For example, participants were asked whether they were aware of any climate change adaptation plans or strategies at local government level. This indicator would then feed into the “Regulatory Framework” factor, in turn making up Political Capital. Another example would be whether local government members have the possibility of taking part in capacity building exercises, feeding into the “Human Resources” factor, in turn making up Human Capital. In total, 70 indicators were generated for the Mauritius case-study, evenly spread out across 20 factors and 5 capitals.

Initial findings indicate that, concerning Financial Capital, local governments feel they do not receive adequate financial support from national government. Though many participants are aware of the possibility to apply for external funding, applications submitted are very rarely granted. With respect to Social Capital, local governments do not collaborate enough, neither with each other, nor with national government or external institutions. Stakeholders on the other hand, such as those

from the private sector or community members, are integrated into the decision-making process well, and have the opportunity voice their opinions or concerns at regular local meetings. Data gathered for Political Capital show that climate change is not considered significantly enough in the regulatory framework. Local governments also lack an internal structure to specifically deal with climate change issues.

Concerning Human Capital, respondents emphasised the lack of staff, compounded by the rate of turnover resulting in a loss of vital expertise. The need for capacity building and technical know-how to be able to adequately assess and implement climate change adaptation options was also discussed. Finally, and most importantly according to several respondents, the key findings for Environmental Capital were that though environmental legislation to protect ecosystem services is in place, the lack of staff and resources means there is no way of effectively monitoring infrastructure developments to make sure environmental regulations are being adhered to. This often results in infrastructure developers not respecting setback lines and building too close to the coast.



Fig. Example of infrastructural development on the Mauritius coastline
© David Williams

The results of the study will be presented to representatives from the National Government of Mauritius during a workshop at the beginning of 2018, highlighting the areas in need of improvement for enhancing their capacity to implement climate change adaptation. It is really important to continue and to increase research of this nature at the local level. What preconditions are necessary for the successful implementation of climate change? And which mechanisms might be developed to support local governments? These questions are essential, as it is at the local level where the battle against the impacts of climate change may be won or lost.

References

- M. Máñez, M. Carmona and B. Gerkensmeier (2014) 'Assessing governance performance'. Report 20, Climate Service Center, Germany
- M. Carmona, M. Máñez Costa, J. Andreu, M. Pulido-Velazquez, D. Haro-Monteagudo, A. Lopez-Nicolas, R. Cremades (2017) 'Assessing the effectiveness of Multi-Sector Partnerships to manage droughts: The case of the Jucar river basin'. *Earth's Future*, Vol. 5 (7), pp. 750-770

Topic:
SDGs

By:
Jeremias Herberg, Institute for
Advanced Sustainability Studies (IASS)
Potsdam

Talanoa As Expectation Management - or Raising the Bar, While Jumping

Both sustainability ambitions and obstacles are growing exponentially. This begs for expectation management as arguably performed by Future Earth: In addressing the advisory role of science in sustainability, Future Earth is building advisory capacities and raising expectations at the same time. These expectations – not least, those directed to itself – rightly challenge the linear models of evidence-based policy making.



Fig. Fijian Minister for Economy Aiyaz Sayed-Khayium during a Talanoa at COP23
© BMUB/ Christian Büchter

As an alternative to “speaking truth to power”, debates at Future Earth often point to the concept of co-creation. In a conventional understanding, co-creation refers to the collaboration of heterogeneous actors from civil society, academia and policy making in shaping sustainability solutions. Formats such as Future Earth’s Knowledge-Action Networks create space for heterogeneous actors to co-produce or even problematize sustainability solutions. Co-creation, I argue, can moreover help to clarify and incorporate the need and the capacities for expectation management. At COP23, an intervention by the Fijian delegation encouraged participants to engage with their expectations in a broad, and surprising way.

Talanoa – pushing ambitions, while managing expectations

Two weeks ago in Bonn, Fiji’s Prime Minister Frank Bainimarama introduced the concept of Talanoa. To find out more, I spoke to Fijians at the Fiji pavilion and to COP participants I encountered in the so-called Talanoa Space (a wooden, arena-like discussion stage amidst the more fair-like booths of NGOs and research institutes).

According to their brief explanations, Talanoa comprises of a patient style of conversation at eye level. Given the dire situation of the pacific islands in the midst of rising sea levels, Fiji has joined the push for more aggressive goals. But, it has also called for new forms of dialogue to do so. Fiji and other proponents of Talanoa, for example Barbara Hendricks, acting German Minister of the Environment, seem to be willing to further complicate expectation management: Future expectations would be discussed in line with mutual expectations amongst a broadened set of actors. Moreover, a Talanoa dialogue would give space for actors to articulate their self-understandings. Fijians and their supporters thus seek to manage social, temporal and self-directed expectations at the same time.

Really making broad expectation management happen is complicated. Be it Future Earth or the Talanoa Dialogue – platforms that strengthen future ambitions while gathering heterogeneous actors play a double role: they seek to build the capacities for co-creative forms of policy advice, and they push the boundaries of what can be expected from co-creation. They raise the bar while jumping.

But, are they falling over? I argue that, especially in sustainability, dialogical expectation management is direly needed. When expectations among actors are increasingly in conflict, only reflexive understanding and collective practice can help to push sustainability ambitions. Especially when dialogue is at odds with pushing for higher ambitions, it is high time for a combined form of expectation management. One would have to articulate future expectations, communicate mutual expectations, and raise one’s own self-efficacy all at the same time. How to do that?

Co-Creating expectations

Co-creation is currently discussed as a stepping stone towards new styles of policy advice. Certainly, a co-creative practice transcends the notion of “speaking truth to power”. More interestingly, co-creation is a viable and encouraging route, when future ambitions and pragmatic constraints are rising concurrently.

Socially, co-creation entails the notion of seeking out helpful skills and expertise, while expanding what can be deemed as necessary, or what counts as expertise. Politically, seeking ‘innovative solutions’ in mutual exchange will raise the bar of what can legitimately be called ‘innovative’ or ‘a solution’. Finally, even the underlying problem definition or the wider problematic that motivates interaction between heterogeneous concerns is subjected to expectation management: what is the temporal horizon, the normative stepping stones, or the logical basis for defining the problem? In short: How does the problematic of a given project channel our thinking about solutions? (cf. a recent workshop at Leuphana University Lüneburg)

While co-creation promises a methodological response, it is also intrinsically linked to the expression of mutual expectations. Eliciting social needs and desires, as is the current focus of most co-creative endeavors, may not always compliment future-driven or self-oriented expectations; when overwhelmed with what others expect from them, actors may lose sight of future expectations; and when confronted with challenges to their own ambitions, actors may be paralyzed by the need to reflect or re-orient their expectation.

To give an example, policy advisers face multiple expectations that may rather discourage a co-creative involvement. While policy makers look for guidance or grounding, post-truth populists challenge the legitimacy of any evidence base, and reformers challenge the legitimacy of scientific and political authority. As a result, when their professional methodology is thwarted by paradoxical demands, a policy advisor may refrain from co-creative approaches. Although a viable approach, the co-creation concept may itself need some expectation management. (cf. a prevalent project at IASS)

Expectation management of and through co-creation

Current sustainability conversations revolve around a key question: How to remain ambitious and persistent, while settling for the means at hand? Co-creation, one of the means currently at hand, is a plausible way to do so - the introduction by the Fijian delegation of Talanoa into the COP- conversation indicates that. Yet, co-creation can only be encouraging if there are solid answers to two questions: Why to engage? And how to create an arena where

heterogeneous actors feel able to collaborate in creating mutual expectations and expected futures?

Raising the bar, while jumping, is a risky exercise. Yet, it also represents an opportunity for playful and broad expectation management. At the 3rd German Summit, Future Earth, actors are convened to increase future ambitions. That is raising the bar. Not to fall over implies that co-creation also explores mutual expectations, and actors' capacities to meet them.

Many thanks to Katherine Farrell, Humboldt-Universität zu Berlin, for reviewing this post.

The Future Earth Natural Assets KAN - towards fair and equitable stewardship of natural resources

Future Earth Knowledge-Action Networks (KANs) are conceived as networks for mobilising scientists, stakeholders and policy-makers and provide a collaborative framework to facilitate highly integrative and action-oriented sustainability research. KANs are envisaged to act as mechanisms for exchange, and to bring communities together to share knowledge; their aim being to generate the multifaceted knowledge needed to inform solutions for complex societal issues. This is achieved by centring the KANs around activities that are driven bottom-up, and take place the science-society-policy interface. KANs also play an important role in community building; pointing to the importance of the various research communities assembled under Global Research Projects and national committees under the Future Earth umbrella participating in the development of the KANs.

The Future Earth Natural Assets KAN intends to facilitate and enable co-designed, integrated, action-oriented research and synthesis towards the sustainable and fair stewardship of terrestrial, freshwater, and marine ecosystems that underpin human well-being. Although still in their planning phases, initial activities of this KAN are geared towards increasing the understanding the relationships between biodiversity, ecosystems and their benefits to societies, and to developing more effective management and governance approaches. Knowledge to inform action, and tools needed to support management decisions are drawn from various perspectives and epistemologies, and combined to offer a more holistic approach.

Humans are dependent on nature for their well-being, for example by harvesting of natural resources for food or medicine, or through access to natural areas for cultural and spiritual well-being. At the same time, mainly due to human-induced land use and climate change, ecosystems are degrading, and are less and less able to provide benefits for humans. Furthermore, the benefits derived from nature are often distributed unfairly, and unequally. To reduce and prevent further degradation of nature, and to maintain the benefits humans derive from these,

there is a need to not only ensure the sustainable use of natural assets, but also a need for responsible action and accountability.

Transdisciplinary science is required to support management and decision-making to achieve sustainable use of nature in a world with a growing population, and under pressure from changing climate and land use. To address these challenges, research activities need to span multiple scales and levels of governance, and regard larger time scales and longer temporal scales. An emphasis should be placed on the question “natural assets for whom” – who gains from which services, who loses, whose assets are we using up? – in order to develop and select the necessary tools to guide management decisions.

Research activities also need to be conscious of the ongoing societal and economic developments that shape human attitudes and use of natural assets, and be geared towards the insertion of science into decision-making. Activities should contribute to the integration of different communities at their intersections and interfaces, and address the exponential increases in human impacts on the environment and the natural system feedbacks.

Scientific activities within the Natural Assets KAN should focus on the development of tools for a specific context, including the development of the underlying concepts, as well as insights and understanding of causal relationships required for correct application of tools and interpretation of outcomes. Furthermore, a clear understanding of the dynamics of a system is needed, which requires the inclusion and integration of social sciences to cover different perspectives and open avenues for actions. The development of new tools, or the advancement of already existing tools, for data collection will also form part of the activities conducted within the framework of the KAN.



Fig. Participants in a workshop to develop a concept of natural assets to frame the Natural Assets KAN © Lorène Mesot and Raphaël Taylor Ponte

As a first activity, and to provide a conceptual framing for the activities within the KAN, the Swiss Future Earth Global Research Projects (GLP, GMBA, bioDISCOVERY, and PAGES), the Swiss Academy of Sciences and the Future Earth Secretariat co-organized a workshop in September 2017 bringing together respected scholars from across the sciences to develop a shared understanding of the Natural Assets conceptual framework. In a follow-up, participants at the PECSII conference in Oaxaca were invited to join the process of co-designing an innovative, integrated and inclusive conceptual framework for the Natural Assets Knowledge-Action Network, thereby further contributing to on-going efforts by Future Earth and the KAN development team to lay the foundation for future activities and for tackling pressing societal challenges.

More information on the Natural Assets KAN
<http://futureearth.org/future-earth-natural-assets>

Watch a video on the first workshop here: <https://youtu.be/AI8-ryUxYSg>

Tasting insects - To eat or not to eat?

Central Message

For a successful utilization of edible insects as food and feed, consumer acceptance is a central aspect and needs to be enhanced. Information is one potential promising tool for increasing the consumers' willingness to try insects.

Background

Insects are rich in protein, lipids, vitamins and minerals¹ and can be produced sustainably and resource-efficiently². As an alternative high-quality protein source, they can contribute to world nutrition. However, up to now insects are a mostly unexploited food and feed source in Germany, Europe and even on a global level. One major hurdle for a successful utilization is consumer acceptance. In countries such as Germany, where entomophagy, i.e. the consumption of insects, has little to no tradition, consumer acceptance is low.

Strategies to increase consumer acceptance of novel foods such as insects includes the creation of positive taste experiences, the use of familiar dishes (e.g. insect burger) or familiar carrier products (flavour-flavour-conditioning, e.g. chocolate-covered or barbecue-flavoured insects) or information³.

Objective of our study was to investigate the impact of information on consumers' willingness to taste insects. 149 people were interviewed and afterwards offered to try dried mealworms (*Tenebrio molitor*) and locusts (*Locusta migratoria*). The interview before the tasting included questions regarding

- Previous experiences with entomophagy,
- Perception of open-mindedness towards new things in general,
- Personal opinion on insects as food of the future and as sustainable alternative to meat and
- Willingness to eat and buy insects in different forms (whole, ground as an ingredient e.g. in a bar).

If the interviewee was not willing to taste, additional information was given and insects were offered again. Information included for example: "Insects are nutritious and rich in protein". The consumers' willingness to taste initially and after information was recorded. Finally, the socio-demographic and educational background (age, gender, cultural background, educational level) as well as the eating habits (vegetarian, vegan, omnivorous) of the participants were inquired.

Results

A 149 people have been interviewed at a science night in Berlin (Lange Nacht der Wissenschaften Berlin, June 24, 2017) of which 45 % were male and 55 % female. Their age ranged from 10-69 years (84 % were above 18 years). A 46 % of the interviewees had a tertiary education (bachelor or higher).

Only 26 % of the interviewees had previously eaten insects. Notwithstanding, 69 % tasted insects right after the interview, while 31 % initially declined the tasting. 20 % of the people who declined (9 out of 46) could be persuaded to taste insects via information so that 75 % of all people interviewed (112 out 149) tasted insects (Fig. 1). 53 % of vegetarians and vegans (n=19) tasted insects whereas 78 % of the omnivorous (n=130), i.e. people who also eat meat, tasted insects. A gap between imagination to taste and actual tasting was observed.

Conclusions

The setting chosen did not result in a representative test group. The interviewees were assumedly more highly educated than average and were interested in science.

In view of similar European studies in recent years, it was unexpected that 75 % of the participants tasted insects. This could be an indication that the initial threshold to try insects in general is decreasing. This could be due to the increasing amount of media coverage of the topic. Information appears to be a promising tool for the persuasion to try insects. 20 % of the people who declined and were given information could be persuaded by information to taste insects. The more difficult step will be to insert insect-based products in the regular meal plan of the consumer.

Recommendation for decision makers and next steps

In order to successfully market sustainable insect-based products in Germany and Europe on a large scale, more consumer and market research is necessary. In addition, expedient and ecologically worthwhile insect-based products need to be developed. In order to preserve global and European competitive ability more research funding on insect-related food research is required.

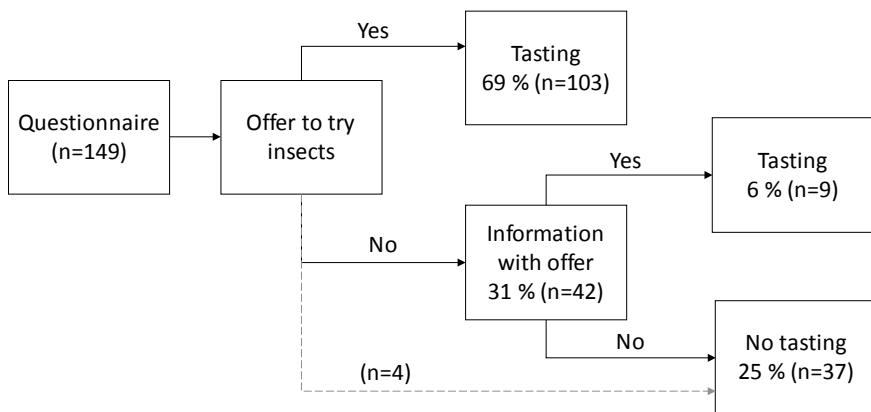


Fig. Amount of interviewees tasting insects along the methodological approach ©
Nina Langen & Birgit A. Rumpold

References

- Rumpold, B.A.; Schlüter, O. (2013): Nutritional composition and safety aspects of edible insects. In: Molecular Nutrition & Food Research. 57 (5): 802-823. (<http://dx.doi.org/10.1002/mnfr.201200735>).
- Rumpold, B.A.; Schlüter, O. (2013): Potential and challenges of insects as an innovative source for food and feed production. In: Innovative Food Science and Emerging Technologies. 17 (1): 1-11. (<http://dx.doi.org/10.1016/j.ifset.2012.11.005>).
- Macfarlane, T., Pliner, P. (1997): Increasing Willingness to Taste Novel Foods: Effects of Nutrition and Taste Information. In: Appetite 28, 227-238.

Topic**Sustainable Consumption & Production****By**Amelie Michalke and Tobias Gaugler,
Universität Augsburg

Nitrogen loss and follow-up costs of Germany's agriculture - An approach for closing the gap between market prices and the true value of foods

Recognizing the necessity of transforming the world the United Nations agreed on 17 Sustainable Development Goals which should be achieved by the international community in the upcoming 15 years.

Due to their direct links to a variety of SDGs (no. 1, 2, 3, 6, 12, 13, 14 and 15 in particular) production and consumption of groceries play a significant role in meeting these ambitious goals. But maybe Germany is headed in the opposite direction: The country is facing infringement procedures by the European commission as it violates agreements on reactive nitrogen levels in ground- and surface water. Whilst it is hard to trace hydrospherical or atmospherical nitrogen back to its original source, one of the biggest polluters is definite: The German agricultural sector is responsible for over 50 percent of the country's total nitrogen fluxes to the environment also due to excessive fertilizer usage.

Moreover, unbound reactive nitrogen not only causes eutrophication in waterways; threats to human health, biodiversity and climate are further consequences of disproportionate fertilizer handling nonetheless and cause external costs not yet completely comprehensible.

So, who is to pay the price after all? Without obligation of publishing a nitrogen balance, neither farmers nor final consumers are held accountable for their damaging surplus of nutrients. Consequences are insufficiently internalized follow-up costs which are to be paid by the public in unaffiliated ways.

Nitrogen fluxes – Costs for the society resulting from different food categories

In an interdisciplinary approach we not only want to look at the matter from an ecological but also an economical point of view. Therefore, we work ambitiously for finding ways to quantify the German agricultural nitrogen loss and internalize occurring follow-up costs into the foods' market price. Furthermore, we distinguish between four food categories as our research has shown great differences between the damaging effects of plant based produce and animal produce, as well as differences between organically and conventionally produced foods.

Based on Van Grinsven et al. (2012) the public must bear the costs of 11.53 billion Euros per year for the German agriculture's nitrogen loss. Even increasing yields due to the ground's higher nutrient content cannot quite compensate all damaging effects of which the highest share is held by human health costs closely followed by the damage to various ecosystems.

As mentioned before, it is essential for us to distinguish food categories by their environmental impacts and correctly assign arising costs accordingly. Organically produced foods only cause about one third of the arising conventional nitrogen surplus. After taking the yield gap into account – which makes up about 25 percent with lower organically farmed yields (Seufert et al. 2012) – and standardizing both parameters we estimated a damage factor of approximately 30 percent for organic agriculture and 70 percent for conventional agriculture. Using similar considerations for the two other food categories we determine the damage factor for plant based produce to be approximately 11 percent and for animal produce to be 89 percent.

As we combine all four categories following damage factors are found: 3.12 percent for organic plant based produce, 7.39 percent for conventional plant based produce, 26.55 percent for organic animal produce and the biggest share of 62.95 percent for conventional animal produce.

Polluter Pays Principle – Including damage costs in the market price

To eventually hold the nitrogen polluter responsible for causing external agricultural effects the previously calculated damage factors must be put into perspective of the categories' production sizes or rather the general publics' average expenditure for said categories.

When standardizing the four categories again, following factors are found: 0.19 percent for organic plant based produce, 12.79 percent for conventional plant based produce, 1.27 for organic animal produce and again the biggest share of 85.75 percent for conventional animal produce.

Earlier mentioned follow-up costs of 11.53 billion Euros can now be divided onto all four food categories. By including the polluter oriented follow-up costs into the current market price rather extreme differences can be seen between the rivalling categories shown in the picture below.

This goes to show that not only market prices mislead the consumer in general

with their gap to the true value of foods. Furthermore, the currently observable price gap between different food categories leads the consumer to buying ecologically problematic foods rather than making unbiased and educated decisions for their consuming behaviour. With that in mind it appears only reasonable to add resulting follow-up costs to the causing food categories accordingly. Removing such market failures should be one aim of various economic measures.

An even greater gap – Further external effects should be equally considered

Not only do nitrogen losses from agriculture cause follow-up costs and therefore price gaps on the market. We are only at the beginning of a great field of research and want to take further effects into account in the future, such as pesticide use, energy use, greenhouse gas emissions or phosphorus surplus. Our research strives to correctly estimate the overall follow-up costs while always being distinctive between different food categories.

All further research in this topic is highly relevant to the current discussion, not only for Germany but also other developed and industrialized countries. Based on the Sustainable Development Goals and especially thanks to the engagement of the Paris Agreement we simply must not carry on with present agricultural high-performance practices and thereto relating forms of consume.

We believe that spreading the word about arising market failure and the present agriculture will in the long run be beneficial towards a more sustainable foodstuff future. Further scientific exchange, which we accelerate through our working group “Markets for Mankind”, and interest in our compiled study is much appreciated.

If you want to get involved, support the organization that helped us fund our research on the matter and change the food system of Munich's public facilities and events, visit: <http://www.artgerechtes-muenchen.de/>

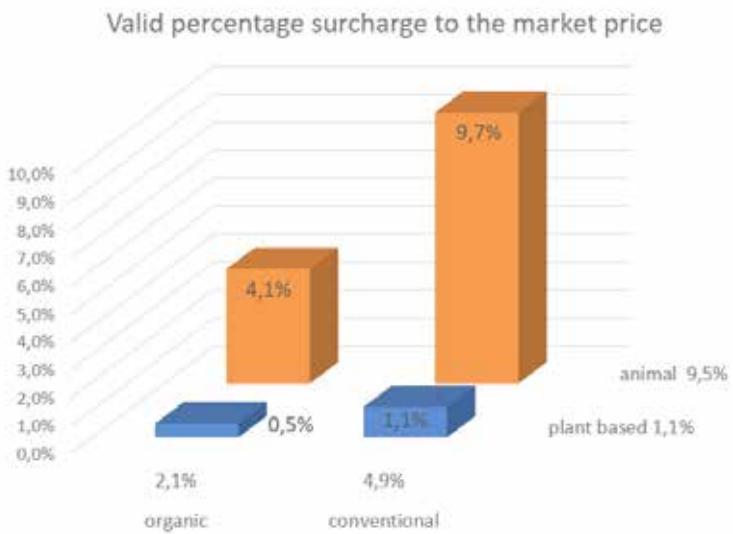


Fig. Valid Percentages Surcharge to the market price © Amelie Michalke & Tobias Gaugler

References

- Van Grinsven et al. (2013): Costs and Benefits of Nitrogen for Europe and Implications for Mitigation. In: Environmental Science and Technology, 47 (8), pp 3571–3579.
- Seufert et al. (2012): Comparing the yields of organic and conventional agriculture. In: Nature, 485 (7397), pp 229–232.
- Gaugler et al. (2017): Was kosten uns Lebensmittel wirklich? Ansätze zur Internalisierung externer Effekte der Landwirtschaft am Beispiel Stickstoff. In: GAIA – Ecological Perspectives for Science and Society, 26 (2), pp 156–157.

NGO's contribution to reduced animal product consumption in Germany – An assessment of congruency between aims, knowledge and action

Central message: NGOs as potential interface between society, politics and economy are one promising player for reducing animal product consumption. However, the contribution of German NGOs in this field is mainly restricted to animal welfare and environmental organization; whereas NGOs working in the field of food security and health are restrained in this topic due to i.e. the dependence on financial means from the government, donors and members.

The high and further increasing consumption level of animal products worldwide has various environmental, social and health consequences. One of the most problematic aspects of animal products is the enormous energy loss during processing feed to meat and milk. As a result large intensively used agricultural areas are necessary to feed animals (Fig. 1) which leads to biodiversity loss, greenhouse gas emissions, land grabbing and health problems due to pesticide usage. Furthermore, high water usage, competition between food and fodder, as well as inhumane treatment of animals, and threats to human health by e.g. coronary heart diseases and antibiotic resistance are consequences of a meat-rich diet (i.e. FAO 2006 und Link 1).

Reasons for this high and increasing animal product consumption include personal, social, economic and political as well as structural factors (see Stoll-Kleemann and Schmidt 2017). Non-governmental organizations (NGOs) as part of the so called Third Sector, besides politics and economy, and representatives of the society are a vital player in national, international as well as earth system governance. They are mostly supported by the society or at least by parts of it and can put pressure on political and economical protagonists through public relations activities and other means. Thus, NGOs as potential interface between society, politics and economy are one promising player for reducing animal product consumption. In detail, NGOs being potentially interested in reducing animal product consumption in industrialized countries include those targeting to

protect the environment, improve the world nutrition situation, care for animal ethics and enhance the health status. This is because of its above named multidimensional consequences.

However, according to previous studies, there is a limited degree of engagement in encouraging reduced meat consumption of NGOs in Europe and more specifically of environmental NGOs in Sweden, Canada and the U.S. in light of climate change (i.e. Laestadius et al. 2013). Analysing the engagement of NGOs which should have an interest in reducing animal product consumption (see above) is an attempt to foster one important pathway for sustainable nutrition patterns.

Research is conducted in the framework of a doctoral thesis and included the material analysis of 34 NGOs, 22 expert interviews with NGO staff and a focus group discussion testing the preliminary results of the interviews. Spatially the research was limited to German NGOs. The whole research process is embedded into the Grounded Theory approach aiming to develop a new model or theory to explain the extent of how NGOs thematise animal product consumption in their campaigns.

Results indicate that animal welfare organizations are most active in encouraging a reduced consumption of meat and dairy products and most environmental NGOs also plead for more sustainable nutrition habits. However, NGOs working in the field of food security and health are restrained in this topic. The main reason can be detected in the dependence on financial means from the government, donors and members. But there are also factors like the division of responsibility and the competition between NGOs which impede an engagement in reducing animal product consumption.

The strategies NGOs apply to advocate a reduced animal product consumption mainly include public relations work through information on their websites as well as petitions and demonstrations; but also lobbying to change political and societal frameworks. More cooperation and coordination between NGOs of different disciplines is demanded to be able to compete with the economic and political sector.

Thus, next steps for decision makers of the Third Sector include creating networks between NGOs aiming to reduce the consumption of animal food products as well as between NGOs and research partners (see Link 2 for an example), politics and economy. Additionally, NGOs working in the field of food security and human health should be encouraged to include the topic of animal products in their portfolio of measures. As NGOs depend on financial means of their members, donors and sponsors, each sector of the society (individuals, economy, politics, third sector) has to play a role in fostering a more sustainable diet regarding animal products.

The research fulfills the criteria of sustainability science, i.e. normativity, cooperation of natural and social scientists, inclusion of nonscientists, and urgency, which are recognized as inherent to a new scientific approach, appropriate to the current environmental and social challenges. Research about the sustainability work of NGOs is predestined for the possibility of getting from knowledge to action.



Fig. Satellite image of deforestation of rainforest in Bolivia. Large areas are converted to agriculture, primarily to grow soybeans © NASA/Goddard Space Flight Center Scientific Visualization Studio

References

- FAO (2006) Livestock's long shadow. Environmental issues and options. Food and Agriculture Organization of the United Nations, Rome.
- Laestadius LI, Neff RA, Barry CL, Frattaroli S (2013) Meat consumption and climate change: the role of non-governmental organizations. *Climatic Change* 120: 25-38. doi: 10.1007/s10584-013-0807-3.
- Stoll-Kleemann S, Schmidt UJ (2017) Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors. *Regional Environmental Change* 17: 1261-77. doi: 10.1007/s10113-016-1057-5.

Take urgent action to combat heat-stress impacts! But where?

They are invisible and often unrecognized. Nevertheless, heat waves pose a serious threat to human health, especially for children and the elderly. While heat waves gain relatively little public attention, they are one of the most severe natural disasters worldwide and cause casualties and illnesses. Heat waves affect particularly regions where high temperatures occur infrequently, so the population is consequently not well prepared for the heat. For example, the heat wave in 2003 in Europe is statistically related to about 40,000 deaths (García-Herrera et al. 2010). (For comparison: Around 54,000 people died in traffic accidents in the same year in Europe.) Heat waves, however, only seldom cause deaths directly (e.g. through heatstroke), but they worsen already existing health issues, such as illnesses of the respiratory or the cardiovascular system. With the global climate change, grave heat waves will occur more frequently and intensely. Hence, both the Intergovernmental Panel on Climate Change and the Sustainable Developments Goals (SDGs) point out the need for public authorities to target the ongoing global climate change and for the population to adapt to the changing situation.

How to combat heat stress in Seoul? Identify sites with high heat-stress risk, vulnerability or hazard, and implement site-specific measures.

But how can we adapt to heat stress? To answer this question, decision-makers need not only to know about effective adaptation measures, but also where exactly heat stress occurs. Particularly cities are affected by heat waves, because they are home for the majority of all people – more than half of the world population is living in cities. In many countries, such as Germany or Korea, the fraction of the urban population is even more than 80%. Moreover, in cities an urban heat island establishes, thereby additionally increasing the air temperature. Cities such as Berlin and Seoul are, during cloudless nights with low wind speed, up to 7 to 10 °C warmer than their rural surroundings. The lower fraction of vegetation and the higher area of sealed surfaces in cities cause the urban heat island effect. Thus, the cooling evapotranspiration decreases and the

heat of the day is stored in the buildings and released during the night. This can have serious implications during heat waves. When the temperature is up to 10°C higher than average, the cities remain too hot to find the needed recovery during the night-time, while in the rural surroundings a good sleep is possible. Moreover, also poor sleep quality has been associated with the worsening of several illnesses.

I already identified cities as particularly heat-prone areas. But even within cities urban planners need to know where exactly, e.g. in which districts or neighborhoods, the heat-stress risk is high (see Ren et al. 2011). Identifying those areas is not an easy task since cities are a complex mosaic of different pieces. Within a small distance, we can find different urban structures such as vegetation, buildings, and parking lots. Moreover, the population is spatially differentiated in cities. In some areas there are more families with vulnerable children, in other districts more elderly people. Consequently, the heat-stress risk is spatially varying, such as the number of emergency interventions and hospitalization as well as heat-related mortality. All of these pieces form a mosaic showing the heat stress risk in a city.

In a recent study (preview: Jänicke et al. 2017), I considered all these components and their spatial variability for the city of Seoul. For describing the spatial patterns of buildings and green spaces, I used air temperature simulated by urban climate models. The heat-stress risk is represented by heat-related mortality. And for describing the spatial pattern of heat-stress vulnerability, I used an index called the heat vulnerability index, which summarizes different factors like age and socioeconomic status. With these data, I can now identify the areas in the city that are particularly affected by heat stress. I can also detect the cause of the heat-stress risk and find out if it is either the extremely air temperature or the vulnerable population.

At the Korean Weather Service my colleagues and I already implemented a high-resolution heat-wave forecasting system for the city of Seoul. The system provides high-resolution maps of expected air temperature and heat-stress risk at 25 m resolution, and provides guidance for forecasters when issuing heat-stress warnings. Moreover, the maps highlight the districts with the highest air temperature due to the urban heat island. In these districts countermeasures to reduce the urban heat island would be beneficial. These countermeasures include increasing the vegetation amount with parks, façade, or roof greening. Also, reflective roofs which decrease the heat storage and therefore the heat stress in buildings are helpful. Water pounds have also been found to reduce the urban heat island. In districts with high heat-stress vulnerability measures can focus on the vulnerable population by providing cool shelters, increasing awareness of the topic and special care for the elderly. Institutions such as retirement homes or

daycare centers with particularly vulnerable inhabitants can be provided with heat-stress warnings.

This new knowledge about the location of heat stress within the urban mosaic is important to protect cities better against heat waves in the future. Given the ongoing urbanization and climate change, such knowledge is needed to foster the implementation of adaptation measures and thus to contribute to achieving the SDGs.



Fig. How to combat heat stress in Seoul? Identify sites with high heat-stress risk, vulnerability or hazard, and implement site-specific measures.

References

García-Herrera R, Díaz J, Trigo RM, Luterbacher J, Fischer EM (2010) A review of the European summer heat wave of 2003. *Crit Rev Environ Sci Technol* 40:267–306.

Jänicke B, Holtmann A, Kang M, Kim KR, Scherer D (2017) Towards high-resolution heat-stress maps for Seoul, Korea: Hazard, risk, and vulnerability. 21st Int Congr Biometeorol Ext Abstr S1.3:29–33.

Ren C, Ng EY, Katschner L (2011) Urban climatic map studies: a review. *Int J Climatol* 31:2213–2233.

Topic:
Urban

By:
Nora Jennifer Schneivoigt, University of Bonn; Holger Wolpensinger, WILA Bonn; Carsten Oldenburg, University of Bonn; Andreas Rienow, Ruhr-University Bochum; Frank Thonfeld, University of Bonn, Anke Valentin, WILA Bonn

Town and Country in the Flow - Network for the Creation of a sustainable Climate Landscape (KlimNet)

How can a city defy climate change? That is the central issue which the project "Town and Country in the Flow - Network for the Creation of a sustainable Climate Landscape (KlimNet)" wants to work out. In this project, a close cooperation between different players is used to collect ideas on how to deal with a noticeably changing climate. The ideas shall come both from citizens, universities, municipalities, companies and other interested parties on a local level. Everyone is faced with the effects of climate change; hot spells and droughts, heavy precipitation and the increase of pollen are only some examples.

The participation of scientists, municipalities and members of the public will bundle a lot of information and knowledge so that new approaches can be developed. Everyone who is interested in taking an active part in the project is welcome and can join or leave at any time. The goal is to develop new ideas, to advance already existing local initiatives and to spread all of them. Therefore, formats like crowd-mapping, seminars, excursions and local information-points are used.

Permanent project partners are the WILA Bonn, the Departments of Geography of the Universities of Bonn and Bochum and the Cities of Bonn and Gelsenkirchen which serve as model towns. The project is funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) following a decision of the German Bundestag (funding code 03DAS098B). Detailed information and a German project description can be found on the WILA Bonn website. For more information, please also see the English research summary on the website of the Geography Department at the University of Bonn.

What are climate landscapes? To answer this question and to find the hot spots of landscape development, remote sensing technologies are used. Satellite images from the last 40 years show the change of forests, rivers, cities and settlements. Cities are expanding their sealed surfaces, rivers and other streams lose their inundation areas and agricultural areas turn into new housing estates. This makes towns more vulnerable to climate change. After creating a database, the value, mutual reactions and interplay of the planned actions have to be evaluated as well as their transferability to other cities. During the project duration of three years, it is not possible to implement all planned measures. Nevertheless, another aim is to develop an action guideline, which will outlast the project and may be useful for other cities as well (see www.Klimalandschaften-NRW.de, online from January 2018 onwards).

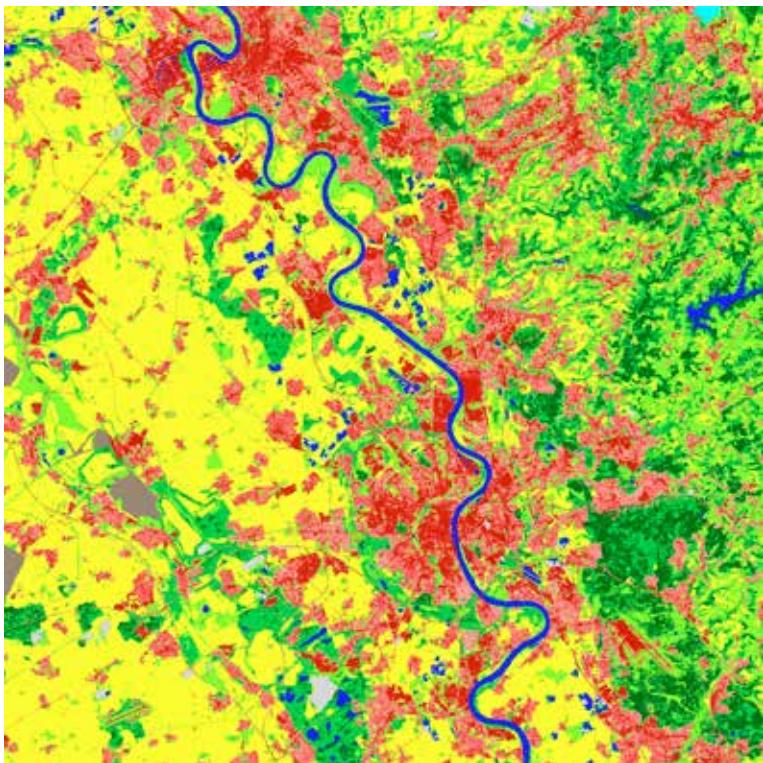


Fig. Land cover classification of Cologne and Düsseldorf © Universität Bonn, RSRG 2016

Topic:
Education/ Others

By:
Antje Brock, Theresa Grapentin, Mandy Singer-Brodowski, Nadine Etzkorn,
Julius Grund, *all Institut Futur, TU Berlin*

Education for Sustainable Development - A Ponderous Leverage Point for the Great Transformation? – Insights from a National Monitoring Process

Central message

Education for Sustainable Development (ESD) offers a still underused potential to contribute to the transformation away from un-sustainability. The encompassing national monitoring process of ESD in Germany offers insights into effective ways of reaching the international goal of mainstreaming ESD.

Background and Relevance

Education is seen as decisive in supporting current and future generations in tackling the enormous sustainability-related challenges of the current times. Therefore, the relevance of ESD has been emphasized by various top-down and bottom-up-processes: A UN-Decade (2005-2014) was devoted to it, followed by a UNESCO-Global Action Programme (GAP) on ESD (2015-2019) while the aims are the implementation of ESD at all educational levels and in all nations. The GAP roadmap states that "ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. [...] It achieves its purpose by transforming society" (UNESCO 2014: 12). Also, SDG 4.7 aims at ESD as one critical part of quality education for all while many other SDGs are fostered by increased levels of good education (Nilsson et al. 2016). In summer 2016, a National Action Plan on ESD in Germany resulted from a participatory process led by the Ministry of Education and Research while the German Bundestag supported this plan in September 2017. At the same time, young adults request more sustainability-topics from educational systems (e.g. netzwerk n e.V. et al. 2017).

Research Design

While the societal need for ESD as well as an interest in it from the learner's perspective are given, there are clear signs that a critical mass necessary for mainstreaming ESD is not reached yet - many experts still conceive it as a niche educational concept. Against this background, a national monitoring on ESD in Germany was developed. The multi-method-design tries to better capture the complexity of what is needed to more deeply integrate ESD at the level of educational practice and policy. The monitoring analyzes 6 different fields of Education: Early Childhood Education, School, Vocational Education and Training (VET), Higher Education, Non-formal and Informal learning and Education in the context of Local Authorities. The design and conduct of the research process is stakeholder-informed just as the dissemination of the findings is stakeholder-oriented and thereby in close exchange with the members of the different bodies of the national implementation structure of the UNESCO-GAP in Germany (see fig.1). The monitoring is guided by the following aims (see fig.2):

- Providing information on the extent of ESD in key documents within the educational systems, such as curricula, exam regulations, educational standards, relevant laws etc. (desk research, 2.317 documents, lexical analysis, will be repeated for updated documents after 1,5 years)
- Identifying leverage points as well as barriers for mainstreaming ESD specific for each educational sector (expert interviews, n=70)
- To survey the extent of ESD-implementation, knowledge, attitudes and self-reported behavior regarding ESD and SD for 15-24 year olds and for teachers (representative online survey study, 25 minutes each, n=3.000)

Education for Sustainable Development (ESD) offers a still underused potential to contribute to the transformation away from un-sustainability. The encompassing national monitoring process of ESD in Germany offers insights into effective ways of reaching the international goal of mainstreaming ESD.

National ESD-Monitoring – Research Design

Phase I:

Desk Research (2016/17):
To what extent has ESD become part of central documents in Germany's education system?



Phase II:

Expert Interviews (2017):
How does ESD diffuse into the educational system? What and where are leverage points for ESD?



Phase III:

Quantitative (2017/2018):
What kinds of ESD-related knowledge, attitudes and behaviors do ...
1) young people (15-24 y.) and 2) teachers report on?



Phase IV:

Desk Research (2018):
Replication of Phase I



Figure © Antje Brock & Freya Kettner

Results

The results of the desk research show clearly that, at the level of key documents within the German educational system, ESD has been taken up to some extent, but varies highly with regard to fields of education, subjects, federal states, and how recent the documents are (more ESD in more recent documents).

Taking the example of schools, the integration of ESD within the formal structures of the German educational system shows, that the more the documents are of obligatory nature (e.g. curricula, common national educational standards), the less ESD is implemented. Furthermore, an expected challenge for an ESD-mainstreaming is an integration beyond the subjects with the highest overlaps with ESD-topics (such as Geography, Biology or Social Studies) into the obligatory subjects with more teaching time.

The first results of the expert interviews on identifying leverage points for mainstreaming ESD in the different educational sectors show that the complexity of ESD is a hindrance for effectively catalyzing the diffusion of ESD as an overarching and cross-cutting 'social innovation' within the educational system. Also, there lies a potential for ESD-mainstreaming in turning a view on other cross-curricular topics such as inclusion, digitalization or gender mainstreaming as competing with ESD into a more constructive and synergistic relation.

Many experts also emphasize the importance for quality ESD-related training for multipliers such as teachers, lecturers, educators, which is one priority area of the UNESCO GAP on ESD and the National Action Programme on ESD. Here, new

capacities and structures would need to be created to leverage the training of the trainers for ESD.

Conclusion

The first results of the monitoring point to the still great potential of further integrating ESD in broad (cross-curricula and following a whole-institution-approach) as well as deep (high quality-ESD including innovative methods, conveying heuristic instead of epistemic knowledge participative, problem-centered learning etc.) ways into the educational systems.

A deep, cross-sectoral and ambitious implementation of ESD has a huge potential for contributing to a successful societal transformation and overcoming the current un-sustainability because ESD equips people with the capability for shaping the world in a responsible and informed way. Here, ESD also functions as a driver for and vehicle of the variety of sustainability topics discussed in future earth contexts.

Given the inertia of structural innovations within the educational system, however, implementing ESD has the tendency to be a crucial, but a rather ponderous leverage point for a great transformation.

Next Steps

The upcoming analyses will complement the findings so far and include insights from the representative survey concerning the extent and quality of ESD in educational settings and a replication of the document analysis to observe trends of the ESD-Implementation.

References

- Netzwerk n e.V. et al. (2017): Positions- und Forderungspapier Nachhaltigkeit und Ethik an Hochschulen. Siehe: <http://www.nachhaltige-hochschulen.de/wp-content/uploads/2017/11/Positionspapier-ausfuehrliche-Version.pdf>
- Nilsson, M., Grigg, D., Visbeck, M. (2016) Map the Interactions between Sustainable Development Goals. *Nature*, no. 534, pp. 320-322.
- UNESCO (2014) Global Monitoring and Evaluation Report, Shaping the Future We Want-UN Decade of Education for Sustainable Development (2005-2014). Paris
- Máñez, M. Carmona and B. Gerkensmeier (2014) 'Assessing governance performance'. Report 20, Climate Service Center, Germany
- M. Carmona, M. Máñez Costa, J. Andreu, M. Pulido-Velazquez, D. Haro-Monteagudo, A. Lopez-Nicolas, R. Cremades (2017) 'Assessing the effectiveness of Multi-Sector Partnerships to manage droughts: The case of the Jucar river basin'. *Earth's Future*, Vol. 5 (7), pp. 750-770

How to unlock a sustainable future

Background

In 1997 during an education panel in Berlin, then Federal President Roman Herzog stated: "It's all over town. Knowledge is the most important resource in our resource-poor country today. But we can only gain knowledge through education." Two decades later, an issue we are frequently confronted with is the phenomena of false news and "alternative facts" spread and established widely among the population. The contents reach from conspiracy theories to anti-immigrant propaganda and are discussed to having influenced even political decisions such as the withdrawal of the UK from the EU or the 2016 US-presidential elections. Also the successful implementation of the 2030 agenda could be affected if it comes to climate change. Even though there is mostly agreement in the scientific community regarding the anthropogenic impact on climate change, in Germany only one in four people is aware of this scientific consensus (Steentjes, K. et al. 2017), indicating that the lack of comprehension regarding scientific terminology is not the only reason preventing scientific outcomes from reaching and eventually benefitting the society as a whole: Its missing transfer converts science into unused knowledge. Scientific results are often insufficiently communicated to the public or located behind pay-walls, inaccessible for the populace. While misbeliefs spread freely and in the digital era even more exponentially the proof of the truth remains a hidden treasure. The difficulty of this transfer gap becomes more and more apparent in internal societal structures e.g. as climate change denial, and also in international dimensions depending on a country's development and its structural and financial means to access and transform science into applicable measures.

Since 40 years, the UNEP/UNESCO/BMUB course program seeks to break through these obstacles by enabling policy and decision-makers from emerging and developing countries to gain insights in environment-related state-of-the-art methods and technologies. The program is implemented by the Center for

International Postgraduate Studies of Environmental Management (CIPSEM), an institution at TU Dresden and was initiated in 1977 as the GDR's contribution to the United Nations Environment Programme (UNEP). Since then, over 2200 environmental experts from 139 countries have deepened as well as broadened their knowledge during lectures given by facilitators from TU Dresden and other universities, research institutions, enterprises, or municipal-, state-, and federal administrations. A range of excursions is enriching the program with valuable hands-on experiences imparted by specialists from all kinds of environmentally relevant institutions and offering the opportunity for mutual exchange between representatives of science, research, economy, industry and governmental institutions. Finally, the course program is rounded out by interactive items on the agenda such as role plays, work-shops, and action plans and by the preparation and presentation of a final paper supervised by the specialists affiliated to the course program.



Fig. International post-graduate students of Environmental Management © Tamara Karp

In doing so, the course program takes not only its allocated role of a teacher in environmental matters but also the role of a mediator between various players in the game of environmental management. As mentioned, these can be representatives of diverging work fields like ministries, universities or NGOs, but it goes far beyond: in each course 21 participants quite often from 21 different

countries join up, and study not only together, but also discover their new and initially unfamiliar environment in Germany together; they share not only their professional experiences with each other, but also their individual cultural heritages, their cooking recipes and their traditional dances. They improve not only their expertise but also their capability to comprehend opposite opinions and to empathize with people with partially entirely different views of the world. Comprehension and empathy, two highly needed key competencies for effective communication, also and especially for the communication of science.

Results

To assess the effectiveness of the program's knowledge transfer, CIPSEM is annually conducting a quantitative and qualitative online survey addressing the alumni of past courses. The quantitative part of the study inquires after the alumni's evaluation regarding the contents and the beneficial impacts on their careers. Excerpts of the results are available on the official homepage <https://tu-dresden.de/bu/umwelt/cipsem/alumni/alumni-survey>. In the qualitative part, alumni are asked to depict their achievements by means of concrete examples. The answers comprise career advancements, the application of newly gained knowledge, active networking, the development and implementation of innovations, and the taking over of roles as multipliers in terms of capacity building. More specifically, the participants design resource management plans, develop green city-programs, and formulate policy guidelines; they pass their knowledge on to colleagues by means of in-house trainings, teach students at universities, publish articles in scientific journals, periodicals, local newspapers, and at conferences, and provide trainings and technical support for rural communities on sustainable farming and livelihood development; they ensure the implementation of eco-labels and of environmental management standards, improve urban planning concepts, and develop financial instruments for eco-sustainable construction of houses for low-income families; they initiate the reduction of plastic bags and cutlery, raise environmental awareness among their colleagues and the population, and eventually let the knowledge leak drop by drop to sites where it is most needed.

Conclusion

Even though the alumni also report obstacles in the implementation process - with lack of funding, resources, and political will named most frequently - the enthusiasm in their success stories presages the positive impact of the program and substantiates the relevance of environmental education for a sustainable future.

Next steps

Though the program is constantly adjusted and updated, there is also untapped potential to further increase its range and impact. With the use of current media such as social networks (facebook.com/CIPSEM) or blogs (cipsem.wordpress.com), the leveling up to knowledge 2.0 has been initiated and opens up new possibilities such as e.g. an online expert database which could provide the opportunity to offer and search for online-specialist consultation and cooperation among former participants. Furthermore additional online courses could contribute to an increased dissemination of knowledge and expertise.

References

Steenjes, K., et al. (2017). European Perceptions of Climate Change: Topline findings of a survey conducted in four European countries in 2016. Cardiff: Cardiff University.

Space2Place – Earth Observation to Empower UNESCO Site Managers

Space2Place – an online training environment, developed at the Department of Geography – Research Group for Earth Observation at Heidelberg University of Education, will empower UNESCO sites managers and planning authorities to incorporate Sentinel data from the European Copernicus programme to improve documentation, monitoring, planning, and management of respective sites.

Earth observation tools have been identified as useful means for various issues such as documentation, monitoring, planning, management, and evaluation of UNESCO sites and their surroundings. Main benefits are time and cost savings, provision of near-real time information, quality improvements by increased accuracy of information, better informed decision-making and planning as well as enhanced control of processes and measures. Furthermore, Earth observation techniques are evolving on a fast track and there has never been a better time for using these datasets. Implemented by the European Commission, the Copernicus programme is producing vast amounts of global data in order to support service providers, public authorities and international organizations with valuable information. This information come free and open accessible to its users. The core of the Copernicus programme is a fleet of Sentinel satellites. This fleet consists of already started radar satellites (Sentinel 1) and high-resolution optical satellites (Sentinel 2) up to planned missions for atmospheric composition monitoring (Sentinel 5) and global sea surface height measurements (Sentinel 6).

These Earth observation techniques offer a wide range of possibilities, but are rarely used by UNESCO sites managers or related planning authorities. The deficient implementation is often justified with the complexity of satellite image analysis as well as high costs in terms of time and organization efforts. The increasing number of UNESCO World Heritage sites, Biosphere Reserves and other UNESCO related sites show high potentials to use remote sensing data for monitoring, evaluating, and visualizing environmental changes. Some of these sites are assessed by UNESCO to be in danger, showing that an improved management is of urgent need. Regardless of the underlying causes, ranging from

environmental processes, climate change or manmade destruction, considerable degradation can be monitored on a number of different Cultural and Natural Heritage sites, Biosphere Reserves etc. (UNESCO, 2009). Many of these affected sites can be found in the global south, suffering from conflicts, poor economic, social or political conditions. However, they play a decisive role within the UNESCO sites network.

The adaptive e-learning environment Space2Place, developed by rgeo and the UNESCO Chair on World Heritage and Biosphere Reserve Observation and Education, won the "Space Oscar" in the category University Challenge at the Copernicus Master 2016 . (<http://www.copernicus-masters.com/winner/spacetoplace-eo-empower-unesco-site-managers/>) The aim of Space2Place is to empower UNESCO sites managers to access and use Copernicus datasets as well as to spread the benefits of modern Earth observation techniques. Participants of the modules will understand the benefits of modern Earth observation techniques and get an overview of the various applications. Thereby, site managers are enabled to formulate their needs and demands for their UNESCO sites. The e-learning module consists of 20 learning units, focusing on the introduction to Earth observation, image enhancements, classification and change detection methods. It has several connection points to the online remote sensing software BLIF. Furthermore, in various units different examples of applications are given. Small and simple quizzes within the module will evaluate the learning progress of participants. At the end of the module if the quizzes were successfully answered, a certificate is given to participants. The course is open, free to access and will be launched at the beginning of 2018.

Background

The basis for the e-learning environment was set with the former rgeo research project Space4Geography (www.geospektiv.de), funded by the German Space Administration (DLR). National educational standards in Germany include already remote sensing methods, which can be found e.g. in state curricula and school books. However, at the same time a considerable lack of implementation was detected in a nationwide curricula analysis. Space4Geography aims to improve the implementation of modern satellite technologies for Earth observation by addressing various environmental and geographical issues with the help of remote sensing, instead of talking solely about remote sensing methods itself. Project results consist of ten different learning modules. Every module addresses a different geographical aspect, ranging from urbanization and megacities up to water conflicts on Tenerife and deforestation in the rainforest of Brazil. By using real satellite images such as Landsat, RapidEye and TerraSAR-X, the competencies in analyzing satellite images are directly improved. The adaptive system of the e-learning platform allows students their own individual learning path by adjusting the content and difficulties to their individual abilities and needs. With nearly 2.000 attended students, Geospektiv is already widely used by addressed

primary and secondary school classes. All modules are interlinked with the web-based remote sensing software tool BLIF (Remote Sensing in Focus), also developed by rgeo, Department of Geography. The web application is enabling students to work and analyze real remote sensing data independently on a problem-oriented geographical question. Included technical features range from basic tools, editing and typical image processing features up to tools for manual and automatic classification.

Prospects

Currently only a single learning module is available in English, specifically designed for site managers and other stakeholders. On the basis of cooperation's with the UNESCO and other institutions, it is planned to offer more diverse courses in future. This includes an e-learning module for the documentation and monitoring of cultural heritage sites by 3D data acquisition. Another will focus on the interrelation between Earth observation techniques and health, e.g. for malaria control programs

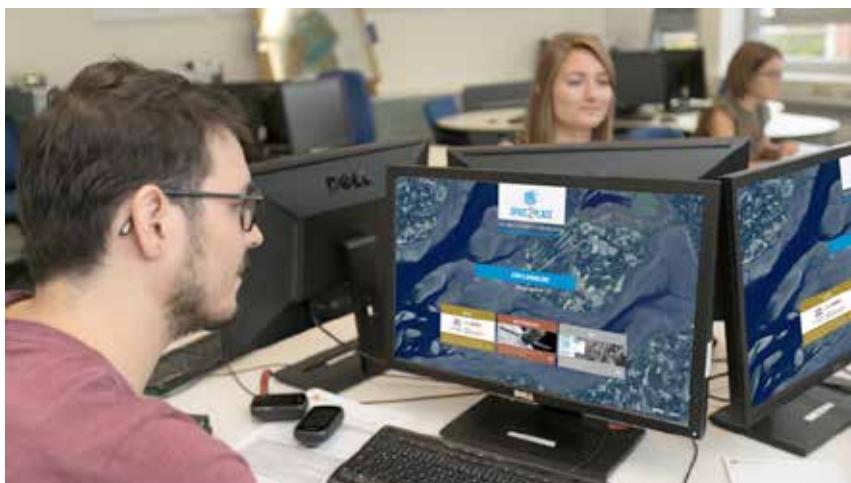
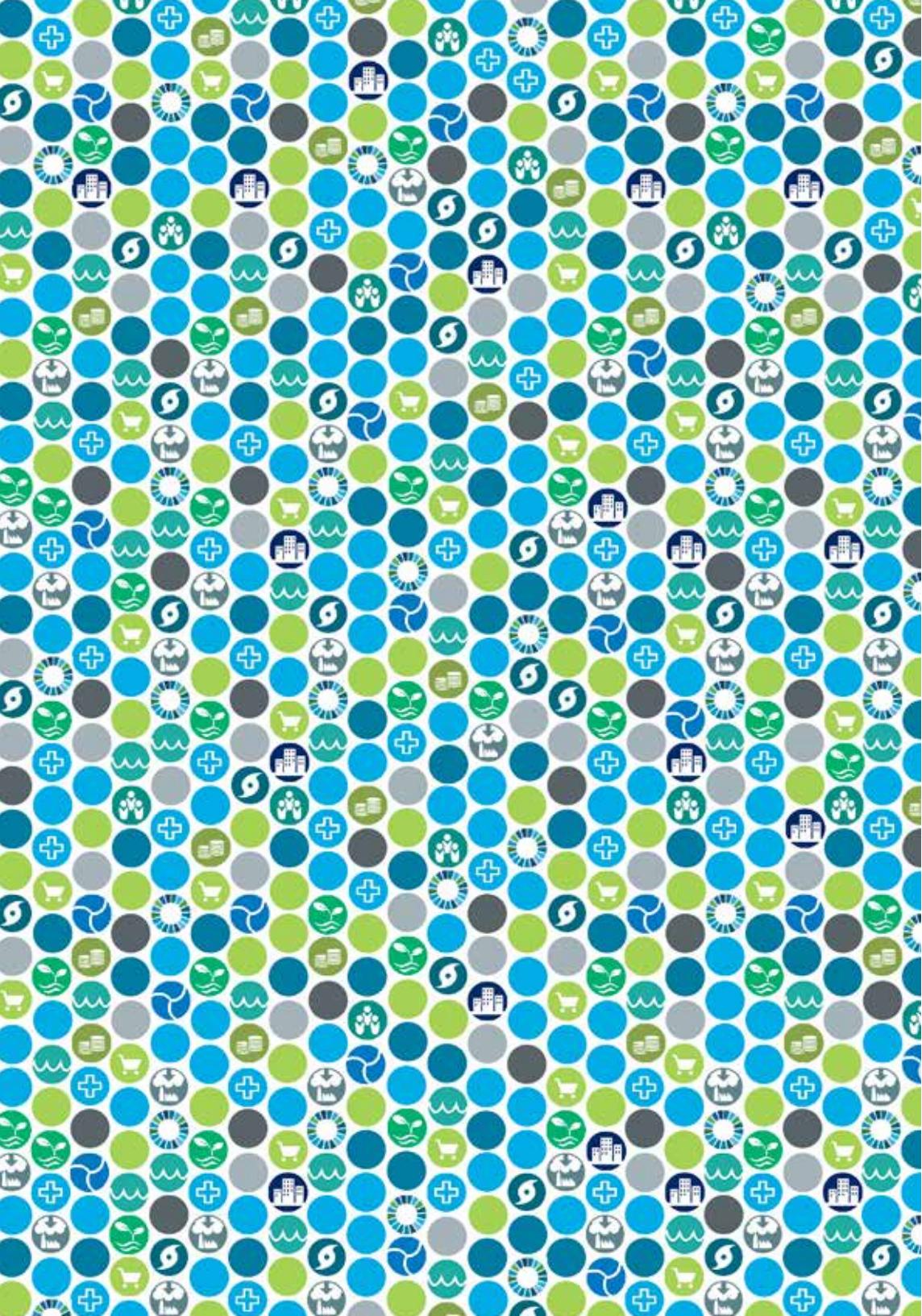


Fig. Students using the Space2Place module of rgeo to learn basic aspects of Earth observation (© PHHD, rgeo)

References

UNESCO (2009). ICOMOS - World Heritage in Danger; Compendium II - A compendium of key decisions on the conservation of cultural heritage properties on the UNESCO List of World Heritage in Danger; Convention concerning the protection of the world cultural and natural heritage; World Heritage Committee, April 2009



Extras

Short Biographies

Working Groups

**Co-Design Project
Groups**

**Science Platform
Sustainability 2030**

**Future Earth
Knowledge Action
Networks**

Venue

Short Biographies

Matthias Bergmann

Dr. Matthias Bergmann is researcher at the Institute for Social-Ecological Research (ISOE) focusing on the transdisciplinary methods and concepts. In addition, he has been guest professor at Leuphana University of Lüneburg. His main research interests are in quality criteria and the evaluation of transdisciplinary research as well as methods for knowledge integration issues and transdisciplinarity in higher education.

Birgit Blättel-Mink

Prof. Dr. Birgit Blättel-Mink is professor for sociology at the Department of Social Sciences at Goethe University Frankfurt am Main. She is a member of the coordination gremium of the German network on consumer research of the Federal Ministry of Justice and Consumer Protection, and member of the advisory board of artec - Sustainability Research Center, Bremen University. Her main research interests include concepts of work, production and consumption in the context of sustainability, post-growth societies, energy transition and electro mobility, and gender in higher education.

Antje Brock

Ms. Antje Brock is a research assistant at the Institute Futur, Freie Universität Berlin. She is working at the department of the Scientific Advisor of the UNESCO Global Action Programme “Education for Sustainable Development” (ESD) and engaged in the development and implementation of a national monitoring system for the implementation of ESD in Germany while taking into account the National Action Plan of Education for Sustainable Development of Germany. She is a board member of the German Network of Early Career Scientists in Future Earth. Her main research interests are in the field of Education for sustainable development, environmental justice and theories of justice.

François Buscot

Prof. Dr. François Buscot is Head of the Department of Soil Ecology at the Helmholtz Centre for Environmental Research (UFZ) in Halle and Co-Director of the German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig. He holds a chair in Soil Ecology at the University of Leipzig. Since 2016 he is a member of the German Committee Future Earth. He is Director of the Selection Committee “International Climate Protection Fellowship” of the Alexander von

Humboldt Foundation. His research interests include soil ecology, microbiology, and mycology.

Ilan Chabay

Dr. Ilan Chabay is senior advisor for Global Sustainability Research at the Institute for Advanced Sustainability Studies (IASS), Potsdam. Ilan was Hasselblad Professor in the sociology and applied IT departments in Gothenburg and Chalmers Universities in Sweden and consulting professor of chemistry at Stanford, as well as the associate director of the Exploratorium Science Museum in San Francisco and founder and president of the New Curiosity Shop in Silicon Valley in 1983 until 2001. He chairs and has led the development of the Knowledge, Learning, and Societal Change international research alliance (KLASICA). His particular interest is on understanding decision making and behavioral change through the lenses of modeling and narratives.

Roger Cremades

Dr. Roger Cremades is a research associate at Climate Service Center Germany (GERICS). He is member of the Earth Doc network of the Earth League and he participates in different European research projects on human interactions with global environmental change. He is particularly interested in issues of transdisciplinarity, cutting across economics, climate, resources, information and stakeholders. He is part of the Future Earth Knowledge Action Network on Finance and Economics.

Anita Engels

Prof. Dr. Anita Engels is professor of Sociology at the University of Hamburg and co-speaker of the Cluster of Excellence on Integrated Climate System Analysis and Prediction (CliSAP). She is Executive Director of the Center of Globalization and Governance, board member of the Center for Earth System Research and Sustainability (CEN), and a member of the German Committee Future Earth. Her main research interests are at the intersection of social science and climate research.

Andreas Ernst

Prof. Dr. Andreas Ernst is professor of Environment System Analysis at University of Kassel, Co-Director of the Center for Environmental Systems Research (CESR) and speaker of the Graduate Center for Environmental Research and Education (gradZ) at University of Kassel. He is a member of the project Energy Systems of the Future by acatec, Leopoldina, and the Union of the German Academies of Sciences and Humanities, and an advisor to the journal GAIA. His main research interests are in computer modelling of social action and learning regarding the environment as well as questions of acceptance and social innovations with focus on water, land use, and energy.

Ioan Fazey

Prof. Dr. Ioan Fazey is director of the Centre for Environmental Change and Human Resilience at the University of Dundee and holds a professorship in the Social Dimensions of Environmental Change. He is an interdisciplinary researcher with current research focusing on resilience, adaptation, what it means to achieve equitable and sustainable societal transformations and the practices that can help to facilitate such changes. His work has included international projects on diverse issues relating to ecosystem services, biodiversity, agricultural systems, social change, vulnerability and climate change. He is part of the Future Earth Knowledge Action Network on Transformations.

Daniel Fischer

Prof. Dr. Daniel Fischer is junior professor of Sustainability Science at the Institute for Environmental and Sustainability Communication (INFU) at Leuphana University of Lüneburg, where he is heading the working group Sustainable Consumption & Sustainability Communication (SuCo²). He is also involved as a working group co-chair in the Future Earth Knowledge Action Network on Systems of Sustainable Consumption and Production. His main research interests are on sustainable consumption and sustainability communication, especially education for sustainable development.

Christine Fürst

Prof. Dr. Christine Fürst is professor of Sustainable Landscape Development at Martin-Luther University Halle-Wittenberg. She is engaged as lead author in the Intergovernmental Panel for Biodiversity and Ecosystem Services, is President of the International Association for Landscape Ecology and contributes to the steering committee of the Ecosystem Service Partnership. Her work focuses on integrated modeling approaches for social-ecological systems, methods for environmental assessments and evaluation of ecosystem services as well as software-tools for facilitating public participation in spatial planning processes. She is member of the development team of the Future Earth Knowledge Action Network on Food-Energy-Water Nexus.

David Griggs

Prof. Dr. David Griggs is director of the Institute for Global Sustainable Development at Warwick University, UK and adjunct professor of Sustainable Development at Monash University, Australia. Until Feb 2015 he was director of the Monash Sustainability Institute and CEO of ClimateWorks Australia. Previously he was director of the UK Hadley Centre for Climate Change, and head of the IPCC scientific assessment unit. He is co-chair of the Future Earth Sustainable Development Goals (SDGs) Knowledge Action Network.

Armin Grunwald

Prof. Dr. Armin Grunwald is head of the Institute for Technology Assessment and Systems Analysis (ITAS) and holds the chair of Philosophy and Ethics of Technology at the Karlsruhe Institute of Technology (KIT). Furthermore, he is head of the Office of Technology Assessment at the German Bundestag. He is member of the German Committee Future Earth, the Deutsche Akademie der Technikwissenschaften (acatech), and was a member of the Science Committee of Future Earth and the Baden-Württemberg Council on Sustainable Development. His main research interests are in theory of technological impact assessment, ethics of technology, concepts of sustainability and nanotechnology and society.

Christoph Hansert

Mr. Christoph Hansert is head of the Division Development Cooperation at the Strategy Department at German Academic Exchange Service (DAAD) in Bonn. For more than 10 years he has worked in the field of strategic development and human capacity building with a strong focus in higher education.

Katharina Helming

Prof. Dr. Katharina Helming is co-head of the research area 'landscape research synthesis' and head of the working group impact assessment at the Leibniz Centre for Agricultural Landscape Research (ZALF). She is professor for sustainability assessment at the University for Sustainable Development Eberswalde (University of Applied Sciences). Her research interests include sustainability assessment of land use and soil management, resource efficiency and ecosystem services, research impact assessment and research synthesis methods for sustainable development.

Jana Holz

Ms. Jana Holz is a member of the board of "netzwerk n e.V.", an open network of initiatives, students, PhD candidates and young professionals who share and collaborate to advance sustainability in higher education across Germany, Austria and the Netherlands. She is also a team member of the project "Zukunftsfähige Hochschulen gestalten" of „netzwerk n e.V.“, and an active member of the board of "Förderverein Wachstumswende e.V.", which is providing a platform for the exchange of individuals, ideas and projects striving for a society independent from economic growth.

Patrick Hostert

Prof. Dr. Patrick Hostert is director of the Integrative Research Institute on Transformations of Human-Environment Systems (IRI THESys) at Humboldt-University of Berlin and Chair of Geomatics Lab of the Geography Department.

He is a member of the Landsat Science Team, the Environmental Monitoring and Analysis Program's Science Team and the German Committee Future Earth. From 2011 to 2017, he was a member of the Scientific Steering Committee of Future Earth's Global Land Program. His main interests are in interdisciplinary research and modeling of human-environment systems, and global environmental change and remote sensing.

John Ingram

Prof. Dr. John Ingram is associate professor and a senior research fellow at Somerville College, and leads the Food Systems Program at the Environmental Change Institute of University of Oxford. He was executive director of the international research project on 'Global Environmental Change and Food Systems' (GECAFS), and then Food Security Leader for the UK Natural Environment Research Council. He has had substantial interaction with FAO, UNEP and CGIAR and many other international organisations, with national departments and agencies, and with NGOs and businesses in the food sector, helping to establish research on the links between food security and environment through the analysis of food systems.

Daniela Jacob

Prof. Dr. Daniela Jacob is director of Climate Service Center Germany (GERICS) in Hamburg and visiting professor at the Faculty of Sustainability at Leuphana University Lüneburg. Climate scientist Daniela Jacob, who holds a PhD in meteorology, is main author of the 5th progress report of the Intergovernmental Panel on Climate Change (IPCC) and Coordinating Lead Author for the IPCC Special Report SR1.5. Since 2017, she is a member of the German Committee Future Earth. Furthermore, she is a member of the German Meteorological Society and the CORDEX Scientific Advisory Board of the World Climate Research Programme (WCRP). Her research focuses on regional climate modelling and adaption to climate change.

Melanie Jaeger-Erben

Dr. Melanie Jaeger-Erben, sociologist and psychologist, is a member of the board and a freelancer scientist at the Institute of Social Innovation (ISInova) in Berlin and since 2014 she has been a member of the Institute of Social Innovation Consulting UG (ISIconsort). Moreover, she leads the BMBF Junior Research Group „Obsolescence as a challenge for sustainability“ at TU Berlin. Her research interests include environmental sociology and psychology, qualitative research and mixed-methods, sustainable consumption, social innovation, and practice theories.

Georg Jochum

Dr. Georg Jochum is a researcher at the Friedrich Schiedel Endowed Chair of Sociology of Science at the Technical University of Munich. He is a member of German Sociological Association (GSA) and European Sociological Association (ESA). His main research interests are in sociology of work and occupations, sociology of technology, environmental sociology, analysis of social structure, and sustainable work.

Christiane Joerk

Dr. Christiane Joerk is program director of Humanities and Social Sciences at the German Research Foundation (DFG). She is responsible for the Humanities Centre for Advanced Studies on the Modern Orient and research funding in Economics, Business Administration, Statistics, and Economic History. She also is responsible for and ex-officio member of the German Committee Future Earth.

Hermann Jungkunst

Prof. Dr. Hermann Jungkunst is professor and head of Geoecology and Physical Geography at the University of Koblenz-Landau. He is Editor-in-Chief for the Journal of Plant Nutrition and Soil Science. His research group is committed to problem-oriented approaches always considering the human dimension and with focus on land use and land use change.

Claudia Kemfert

Prof. Dr. Claudia Kemfert is head of the division Energy, Transportation, Environment at the German Institute for Economic Research (DIW Berlin) and professor of Energy Economics and Sustainability at the Hertie School of Governance (HSOG). She is a member of the board of experts for questions on the environment (SRU) of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and a member of the Steering Committee of German Association for the Club of Rome. Her research focuses on climate and energy policy.

Adolf Kloke-Lesch

Mr. Adolf Kloke-Lesch is executive director of the Sustainable Development Solutions Network Germany (SDSN Germany) and member of the Leadership Council of SDSN. In the past, he was managing director at Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and director general at the German Federal Ministry for Economic Cooperation and Development (BMZ). He serves on the Advisory Council of the Institut du développement durable et des relations internationales (IDDR), the Criteria Committee of the Fair World Fonds (Chair), and is ex-officio member of the steering committee of the German 'Science Platform Sustainability 2030'.

Florian Koch

Dr. Florian Koch is researcher at the Department of Urban and Environmental Sociology, Helmholtz Centre for Environmental Research – UFZ in Leipzig. He is coordinator of the integrated project 'Urban Transformations' and Sustainability Visiting Expert of UNILAK, Kigali, Rwanda, supported by Elsevier Foundation and TWAS (The World Academy of Science). His main research interests include urban politics, urban transformations, climate adaption, and planning theory.

Kerstin Krellenberg

Dr. Kerstin Krellenberg is lecturer at Leipzig University and guest scientist at the Helmholtz Centre for Environmental Research – UFZ in Leipzig, Department of Urban and Environmental Sociology. Her main research interests are in the areas of urban transformations, climate change adaptation and urban vulnerabilities as well as participative processes in different cultural contexts.

Reinhold Leinfelder

Prof. Dr. Reinhold Leinfelder is a professor of Invertebrate Palaeontology and Geobiology at the Institute of Geological Sciences at Freie Universität Berlin. In addition, he is the principal investigator of excellency cluster "Image - Knowledge - Gestaltung", a joint cluster project at the Humboldt-University Berlin. He was also the project co-leader and steering board member of "The Anthropocene Project" at the Haus der Kulturen in Berlin. His research interests include reef evolution, biodiversity and environmental control, research and education for the Anthropocene as well as the growth of marine microbes.

Amy Luers

Dr. Amy Luers has been the executive director of Future Earth since 2017. Previously, she was director of Climate at Skoll Global Threats Fund and advised the Californian state government, the White House, and the United Nations. She is a member of the Council on Foreign Relations and has served on committees of the National Academies of Sciences. She has published in both academic and the popular media on issues related to vulnerability to global environmental change, data, sustainability, climate policy, and science communication.

Karen Pittel

Prof. Dr. Karen Pittel is head of the Energy, Environment and Exhaustible Resources section at the Ifo Institute for Economic Research and professor of economics at the University of Munich. She is a member of the Scientific Advisory Council on Global Change (WBGU), and the German Committee Future Earth. Until the end of last year, she was vice president of the European Association of Environmental and Resource Economists (EAERE). Her main research interests are in energy, resource and climate economics as well as long-run economic development and sustainability.

Jakob Rhyner

Prof. Dr. Jakob Rhyner holds a PhD in theoretical physics from ETH Zurich. He is vice-rector for the United Nations University in Europe and director of the United Nations Institute for Environment and Human Security (UNU- EHS) in Bonn. He also is a professor at the Agricultural Faculty of the University of Bonn. Rhyner is a member of numerous professional organizations and boards, including Co-Chair of the Governing Council of Future Earth. His main research interests are in environmental risks and sustainable development.

Wilfried Rickels

Dr. Wilfried Rickels is researcher and co-head of the research area Environment and Natural Resources at the Kiel Institute for the World Economy (IfW). He was a visiting scholar at UC San Diego at the School of International Relations and Pacific Studies as well as at UC Berkeley at the Department of Agricultural and Resource Economics. His main research interests are in climate engineering, ocean sustainability, and renewable energies.

Bettina Schmalzbauer

Dr. Bettina Schmalzbauer is executive director at German Committee Future Earth. Before she was head of the Secretariat of German National Committee on Global Change Research and supported the setup of the European Alliance of Global Change Research Committees. For ten years she has been involved in strategic development and cooperation of science and research. She served as member of the GEWISS advisory board for citizen science, and is ex-officio member of the steering committee of the German 'Science Platform Sustainability 2030'.

Claudia Schmitt

Dr. Claudia T. Schmitt is managing director and scientific coordinator of the Center for a Sustainable University at Universität Hamburg and initiated the German HOCH-N-project: "Sustainability at Higher Education Institutions: develop – network – report". She is involved in research on organizational psychology, value-based behavior, and innovation processes. Claudia Schmitt is board member of the Hamburg Climate Week, deputy manager of the EU-funded project CHAMPP and in the team lead for implementing education for sustainable development at higher education institutions in Hamburg.

Imme Scholz

Dr. Imme Scholz is a sociologist and the deputy director of the German Development Institute (DIE). She is a member of the German Council for Sustainable Development (RNE), deputy chairwoman of the Committee for Development Service and Humanitarian Aid of Bread for the World, and a member of the advisory council of the German Corporation for International Cooperation (GIZ). Her main research interests focus on global environmental governance, climate policy and climate change, and forest policy in Amazonia.

Asun St. Clair

Dr. Asun St. Clair is senior principal scientist at the Climate Action Program of DNVGL Strategic Research and Innovation in Oslo. She was a Lead Author for IPCC AR5 and has contributed to the ISSC's social science agenda for global change and ICSU's science review of the Sustainable Development Goals. Her current work focuses on mobilizing business for climate resilient pathways and sustainable development solutions. This includes exploring hybrid forms of climate governance such as guidelines and standards to support the implementation of the Paris Agreement and business climate action. She was a member of the Future Earth Engagement Committee and is involved in the Future Earth Knowledge Action Network on Decarbonisation.

Josh Tewksbury

Prof. Dr. Josh Tewksbury is director of the Colorado Global Hub at Future Earth, professor at Colorado University, and executive editor of the Anthropocene magazine. He is an ecologist, conservation biologist, and planetary health scientist with experience both in academia and in civil society. Before joining Future Earth, Josh was the Maggie and Doug Walker endowed professor of Natural History at the University of Washington, with appointments both in the department of Biology and the College of the Environment.

Barbara Unmüßig

Barbara Unmüßig is the president of the Heinrich-Böll-Foundation. She is responsible for its strategy and programme development in Latin America, Africa, Asia, the Middle East, and for the Gunda Werner Institute for Feminism and Gender Democracy. Her work focuses on issues of globalisation and international climate policy, national and international gender policy, and the promotion of democracy and conflict prevention. Her numerous contributions to periodicals and books have covered global governance, international environmental issues, gender policy and the issue of shrinking and closing spaces for civil society.

Philip Vergragt

Prof. Dr. Philip Vergragt is research fellow at Tellus Institute, Boston and a research professor at Marsh Institute, Clark University, Worcester, MA. He is founding member of the Advisory Board of the Greening of Industry network; a founding member of the Executive Committee of the Sustainable Consumption Research and Action Initiative; and a cofounder of the Global Research Forum on Sustainable Consumption and Production. His research interests include technological innovation for sustainability; sustainable consumption; housing and community development; back casting; and technology assessment of emerging technologies. He is a member of the Development Team of Future Earth Knowledge Action Network on Systems of Sustainable Consumption and Production.

Martin Visbeck

Prof. Dr. Martin Visbeck is head of the Research Unit Physical Oceanography of the GEOMAR Helmholtz Centre for Ocean Research Kiel and Professor at University of Kiel. He is chairman of the German Committee Future Earth, co-chair of the steering committee of German 'Science Platform Sustainability 2030' and speaker of the Kiel Excellence Cluster "The Future Ocean". He is a member of the Scientific Committee of WCRP (World Climate Research Programme), of the ICSU Committee on Programme and Review, the Leadership Council of SDSN, and the Development Team of Future Earth Knowledge Action Network on Ocean. His research interests focus on integrated ocean observation, ocean dynamic and climate variability, and sustainable development of the ocean.

Chadia Wannous

Dr. Chadia Wannous is coordinator of Toward a Safer World Network, a professional multisectoral network advancing pandemic preparedness and risk reduction of health emergencies. She recently worked for the UN Office for Disaster Risk Reduction coordinating the implementation of the health components of the Sendai Framework for Disaster Risk Reduction and managing the Science and Technology Partnership and Advisory Group. She also served as a Senior Policy Advisor to the UN Special Envoy on Ebola and the UN System Influenza Coordination. Dr Wannous is a member of the Development Team and Advisory Group of Future Earth Knowledge Action Network on Health.

Anna Zivian

Dr. Anna Zivian is senior research fellow on Ocean Conservancy's Science team. Previously, she was Associate Director of Ocean Conservancy's Knowledge Management Program, where she worked with Ocean Conservancy's programs to develop solutions to complex ocean issues through effective use of knowledge and networks and, before that, Senior Manager of the Ocean Planning program at Ocean Conservancy, working on successful implementation of the United States National Ocean Policy through regional coastal and marine spatial planning. In addition to her work on ocean policy, Anna's past research looks at the intersection of environmental policy, science, and society, and, in particular, issues of democracy and public participation in science. She is a member of the Development Team of Future Earth Knowledge Action Network on Ocean.

Working Groups German Committee Future Earth

Sustainable work – the social-ecological transformation of labour society frame and technical standards

The UNDP report on “Work for Human Development” emphasizes the need for a “moving to sustainable work” with regard to the Sustainable Development Goals (SDGs) (Goal 8 “Decent work and economic growth”). Sustainable work refers to work that promotes global human development while ensuring sustainability, and suggests a comprehensive societal transformation of labour society.

Thus the working group objectives are to intensify the dialogue on work and sustainability, to identify thematic priorities and to enhance cross-linkages. Apart from solely focusing on the topic of green jobs the working group will address the dynamic relationship between ecological and social sustainability, and aims of economic development. This goes in line with the extended definition of sustainable work in the UNDP report and the heterogeneity of the SDGs. In this context the following questions will be discussed and further examined:

- What opportunities and risks for workers are linked to the social-ecological transformation in Germany (taking into account gender-specific, regional and sector-specific differences)?
- What interactions arise between the social-ecological transformation and the transformation process currently discussed under the term “Industry 4.0”?
- How will be the relation between wage labour and other forms of labour (e.g. care and educational work, housework, honorary positions)?
- What relationships are given between sustainability or unsustainability of the world of work and everyday life?

Working group members

Thomas Barth, Ludwig-Maximilians-Universität München

Sebastian Brandl, Hochschule der Bundesagentur für Arbeit (HdBA) am Campus Schwerin

Ana Cárdenas Tomazic, Institut für Sozialwissenschaftliche Forschung e.V. München

Sabine Hofmeister, Leuphana Universität Lüneburg

Georg Jochum, Technische Universität München

Beate Littig, Institut für Höhere Studien (IHS) in Wien

Ingo Matuschek, Universität Duisburg Essen

Stephan Ulrich, International Labour Organisation Genf

Günter Warsewa, Universität Bremen

Social innovations in energy policy making - Integrative social-science concepts of analyzing social innovations in energy policy making

Raising awareness of the unsustainable path on which societies and economies develop also triggers the emergence of alternative lifestyle concepts. At the core of this development is social innovation. Both the individual as well as the societal innovation processes might prove to be important factors in people's willingness to adopt climate policies and to support international efforts in mitigation and assistance to adaptation. Yet, a pressing question is how fast and how broadly these new concepts are adopted. In order to make a difference to current societal and economic development, they have to reach the mainstream in a relatively short period of time.

In order to do so, this working group aims at fostering societal transformations in the energy domain through smart combinations of social and technical innovations after establishing a inter- and transdisciplinary network of relevant scientists and stakeholders and developing a sound transdisciplinary research perspective for future activities of the network. The working group makes two specifications for the use of the social innovation concept. One concerns the domain of innovation, in this case focusing on energy use. The second one

regards the methodological challenges to capture and model innovation and diffusion.

Among others, the following questions are to be discussed:

- How is social innovation conceptualized in different disciplines and how can different angles of research on innovation be brought together, e.g. with a transdisciplinary approach?
- How are social innovations triggered? What societal constellations foster innovative ideas? Are societal innovations initiated by bottom up processes, by top-down processes or by a combination of both?
- How can transdisciplinary research help in scaling up social innovative behavior?
- What can be learned from the field of energy use for other fields of consumption?

Working group members

Andreas Ernst, University of Kassel,
Psychology

Jochen Hinkel, Potsdam Institute for
Climate Impact Research, Economics

Birgit Blättel-Mink, Goethe-University
Frankfurt, Sociology

Katrin Rehdanz, Kiel Institute for the
World Economy, Economics

Antje Brock, Freie Universität Berlin,
Educational Science and Future Studies

Jens-Peter Schneider, University of
Freiburg, Public Law

Ilan Chabay, IASS Potsdam,
Transdisciplinary Sustainability
Research

Mattijs Smits, Wageningen University
and Research, Environmental Policy

Bert Droste-Franke, European Academy
of Technology and Innovation
Assessment, Engineering science

Urban sustainability transformations - integrated urban research

Cities are at the same time contributing to and affected by global environmental change. Therefore cities play a crucial role to achieve the globally adopted UN Sustainable Development Goals (SDGs). Moreover it is stated that the majority of the SDGs can only be reached if transformative action is taken at the local level. The complexity associated with urban sustainability transformations requires a systemic, holistic and integrated research approach.

The working group aims to support implementation of the SDGs by a new coalition of urban research expertise of different institutions in the context of integrated urban research. At this, the working group will bring together the German research community and existing research approaches as well as discuss possible connections to accompanying communities.

The working group will focus on the following questions, structured by the three transformation fields of reconstruction of infrastructure, climate adaptation and CO2 compensation:

- How can the SDGs be implemented in German and European cities and thus contribute to successful transformations of greater sustainability? What obstacles have to be overcome on that way?
- What is so far the role of science in this process, and what are possible constraints, but also the potential of transformative urban research?

Working group members

Claudia Binder, École Polytechnique Fédérale de Lausanne

Kristine Kern, Leibniz-Institut für Raumbezogene Sozialforschung (IRS) und Åbo Akademi University (Finnland)

Florian Koch, Helmholtz-Zentrum für Umweltforschung – UFZ Leipzig

Kerstin Krellenberg, Helmholtz-Zentrum für Umweltforschung – UFZ Leipzig

Klaus Krumme, Universität Duisburg-Essen

Jens Libbe, Deutsches Institut für Urbanistik

Klaus Reuter, Landesarbeitsgemeinschaft Agenda 21 NRW e.V.

Katharina Schleicher, Zentrum für Transformationsforschung

Susanne Schubert, Umweltbundesamt

Societal resilience and climate extremes

Climate extremes are one of the major future threats to society, as recognized by several international bodies. Yet, it is difficult to conceive the question: "Which instabilities, tipping points and risk cascades are most likely emerging from the interaction of future climate extremes with ecological and societal systems?" There is lack of systematic assessment which modelling approaches and data from various disciplines can be used to better constrain this question. In addition, climate extremes are usually defined with extreme weather events in mind, while risks to society emerge as well from longer-term (e.g. decadal) extreme climatic conditions, including slow onset events.

Thus, the key goal of this working group is to envision how far the German and international scientific community may come in the next 5-10 years to answer the above question, addressing the following specific goals:

- Enter into a dialogue with relevant stakeholders on existing and desired models for an optimized decision making in this context. Clarify the missing key elements.
- Analyze appropriate and achievable approaches and methods of coupling socio-economic and behavioral models with climate and ecological models for being capable of indicating the risk of extreme impacts on social-ecological systems.
- Elaborate how to leverage existing data for model improvement (from plausibility check to hypothesis testing to data assimilation), and how to acquire new data.
- Identify what climate extremes are most threatening to social-ecological system and what metrics are most useful risk indicators across time-scales?
- Envision high-level strategies of how societal resilience can be enhanced in light of the identified risk cascades.

Working group members

Jörn Birkmann, Universität Stuttgart

Ilan Chabay, Institute for Advanced Sustainability Studies Potsdam

Frank Kreienkamp, Deutscher Wetterdienst

Mojib Latif, GEOMAR Helmholtz Centre for Ocean Research Kiel

Petra Mahrenholz, KomPass – Kompetenzzentrum Klimafolgen und Anpassung, Umweltbundesamt

Markus Reichstein, Max-Planck-Institute for Biogeochemistry

Jürgen Scheffran, University of Hamburg

Gerrit Jasper Schenk, TU Darmstadt

Kirsten Thonicke, Potsdam Institute for Climate Impact Research Potsdam

Shipping emissions in the German Baltic and North Sea Region – impacts, incentives, and regulation

Ships contribute not only to the global carbon emissions problem, but they also emit sulphur oxides, nitrogen oxides, and particulate matter, thus affecting local air quality in big harbours or canals. While these emissions are strictly regulated, many ships use exhaust gas cleaning systems to meet current regulations. However, altered effluent in turn affects marine ecosystems and contributes to ocean acidification, in particular in ports, estuaries, and coastal waters. Consequently, shipping emission are increasingly gaining public and political relevance.

The working group aims to establish a transdisciplinary network of scientists and stakeholders from Northern Germany (and beyond) that can function as a forum for initiating research projects on shipping emissions that responds to societal needs and political priorities. In order to do so, this network will include different types of knowledges on shipping emissions such as i) scientific knowledge on the magnitude of impacts, ii) engineering knowledge on technological potentials, iii) best-practice knowledge based on personal experience and validated by the business sector, and iv) legal and regulatory knowledge at the national and international level.

Working group members

Wilfried Rickels, Kiel Institute for the World Economy, Co-Speaker

Christa A. Marandino, GEOMAR, Helmholtz Center for Ocean Research Kiel, Co-Speaker

Nele Matz-Lück, Walther Schücking, Institute for International Law, Kiel University

Volker Matthias, Helmholtz-Zentrum Geesthacht

Ralf Zimmermann, Helmholtz-Zentrum München / Universität Rostock

Michael Thiemke, Flensburg University of Applied Sciences

Silke Beck, Helmholtz-Centre for Environmental Research UFZ

Ulrike Bernitt, Kiel Earth Institute

Transformation corridors for sustainable consumption

Consumption is regarded as a significant driver of global sustainability problems. The 2030 agenda of the United Nations takes account of this perspective by formulating the sustainable development goal 12 (SDG 12). Moreover, various direct and indirect effects of consumption are relevant for other SDGs. Transformation approaches of societal consumption patterns should combine minimum consumption standards on one hand with maximum tolerable impacts of consumption on the other hand.

The working group wants to analyze and define transformation corridors for sustainable consumption focusing on resource intensive everyday consumption. Taking into account the current standard of knowledge the working group will reflect on structural and social conditions for sustainable consumption in the context of resource intensive life styles and how these can be transformed in alignment with national and global goals such as the SDGs and the National Program of Sustainable Consumption (NPNK) in Germany.

The following questions shall be answered:

- How can the corridors be defined, which are marked by minimum consumption standards and maximum tolerable impacts of consumption?

- How do these transformation corridors relate to resource intensive everyday consumption?
- What role can national and global sustainability goals play in enforcing a transformation of resource intensive everyday consumption?

Working group members

Birgit Blättel-Mink, Goethe-Universität Frankfurt a.M., Institut für Soziologie

Daniel Fischer, Leuphana Universität Lüneburg, Institut für Umweltkommunikation

Doris Fuchs, Westfälische Wilhelms Universität Münster, Zentrum für Interdisziplinäre Nachhaltigkeitsforschung,

Melanie Jaeger-Erben, Institut für Sozialinnovation e.V. sowie Zentrum Technik und Gesellschaft/ Technische Universität Berlin

Nina Langen, Technische Universität Berlin, Institut für Berufliche Bildung und Arbeitslehre

Sylvia Lorek, Sustainable Europe Research Institute Deutschland e.V.

Henrike Rau, Ludwig-Maximilians-Universität München, Institut für Geographie

Martina Schäfer, Zentrum Technik und Gesellschaft/ Technische Universität Berlin

**For more information on our working groups please visit
www.dkn-future-earth.org/en/community/working-groups/**

Co-Design Project Groups

More land use diversity – regionalize it!

The current well-established land use and nature conservation practices in Germany lead to the following hypotheses: 1. there are emerging integrated landscapes, that are similar to one another, so that on larger scale biodiversity losses are increasing. 2. the land use may not be sustainable, because land use decisions of one country affect land use decisions in other countries: for example set-aside in Germany can lead to deforestation in Romania.

The prevention of similar landscapes and biodiversity losses as well as the prevention of the externalization of negative effects require transdisciplinary solutions, because different knowledge and practical experiences are needed to understand the mechanisms of land use changes. Together with stakeholders from different thematic fields (nature conservation, agriculture, forestry, landscape planning, climate protection etc.) as well as different spatial and planning levels the co-design project aims at developing perspectives and strategies for a sustainable land use (Sustainable Development Goal (15)). Extreme solutions like deforestation should not be excluded in these strategies.

The project group will develop different land use scenarios for the model region of Baden-Württemberg and will discuss them with relevant stakeholders. The new insights of the project shall be concluded with result in a research agenda, with open research questions.

Co-design project group members:

Heiko Faust, University of Göttingen, Human Geography

Oliver Frör, University of Koblenz-Landau, Environment Economy

Hermann Jungkunst, University of Koblenz-Landau, Physical Geography

SDGs and cities

Cities provide solutions to mitigate and adapt to Global Climate Change and also play an important role in implementing the UN Sustainable Development Goals (SDGs). The implementation of the SDGs poses great challenges to all actors involved. It is not yet clear, how the necessary transformations towards more sustainable cities should be organized. Aims, concepts, content and processes of urban sustainability transformations therefore are important research topics.

Within the co-design project, scientists and stakeholders, especially representatives of urban politics and practice, are exchanging experiences and knowledge. In order to learn from the past and to unravel current needs concerning the implementation of the SDGs, the project aims at analyzing challenges, experiences, success factors and obstacles of previous sustainable urban development efforts in German cities. This helps to reveal open research questions regarding the implementation of the SDGs at the urban level. The results of the exchange with stakeholders feed back into the DKN Future Earth working group "Urban Sustainability Transformations". This will at the best pave the way to develop a national research agenda, that describes the open research questions and first hypotheses on answers to the questions identified.

Co-Design project group members:

Florian Koch, Helmholtz Centre for Environmental Research (UFZ) Leipzig

Kerstin Krellenberg, Helmholtz Centre for Environmental Research (UFZ) Leipzig

***For more information on our co-design project groups please visit
www.dkn-future-earth.org/en/community/co-design-project-groups/***

Science Platform Sustainability 2030

In the fall of 2015, the leaders of all 193 UN member states adopted the 2030 Agenda for Sustainable Development, including 17 Sustainable Development Goals (SDGs). These goals shall promote a global transformation towards sustainability by 2030 and cover environmental, economic, social as well as institutional aspects. The German Sustainable Development Strategy was fully revised in 2016 to be aligned with the 2030 Agenda. Both strategies explicitly stress the role of science to provide the scientific basis for evidence-based implementation. In response to this, the "Science Platform Sustainability 2030" was launched in May 2017 to contribute to the implementation of the SDGs.

The German Committee Future Earth supports the science platform as one of three organizing units, together with the "Sustainable Development Solutions Network Germany (SDSN Germany)" and the "Institute for Advanced Sustainability Studies (IASS)", which hosts the platform's secretariat. A steering committee consisting of 26 members from science, politics, economics and civil society is responsible for the platform's working program and operative management. The link to further actors from different backgrounds shall strengthen an effective, representative and internationally anchored platform. The committee itself is co-chaired by Martin Visbeck (chair of the German Committee Future Earth), Dirk Messner (co-chair of SDSN Germany) and Patrizia Nanz (IASS Scientific Director). Additional support is provided by a circle of government agencies (currently including the ministries of Education and Research (BMBF), Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Economic Cooperation and Development (BMZ), Food and Agriculture (BMEL) and Labour and Social Affairs (BMAS) as well as the Federal Chancellery).

The successful implementation of the 2030 Agenda will depend on a continuous learning process based on knowledge exchange among academics, decision-makers, practitioners, business leaders and civil society. Core issues in this regard are likely to be: measurability, implementability and consistency with other political processes. Science can make a contribution to all of these aspects

by providing a sound knowledge base for decision-making and implementation. For instance, upstream fundamental and solution-oriented research is needed to support the development of indicators, assessment mechanisms and foresight schemes. Moreover, science plays a decisive role for holistically exploring positive and negative interlinkages embedded within the SDGs (e.g. reinforcing or counteracting goals). Synergies and trade-offs among the goals must be identified in order to promote policy coherence. In so doing, the best pathways for making progress towards all goals can be found to secure a sustainable future for the global community.

The science platform seeks to support sustainable policy-making by developing and transferring integrated knowledge as well as offering new innovative impetus. As a space for dialogue and a potential for nudging, it aims to generate added value both for science and practice. In so doing, its goal is to develop a scientific perspective on the progress and shortcomings in the implementation of the SDGs. This includes measures in Germany, measures with Germany (in cooperation with the international community) as well as measures by Germany (with a global impact). One important working format of the platform are working groups formed by the steering committee. Priority working fields at the moment are: sustainable consumption, the future of work, mobility and the global commons.

Steering committee members

Günther Bachmann, *Rat für Nachhaltige Entwicklung (RNE)* | Marianne Beisheim, *Stiftung Wissenschaft und Politik* | Jetta Frost, *Universität Hamburg* | Jörg Hacker, *Nationale Akademie der Wissenschaften Leopoldina* | Reiner Hengstmann, *go4more* | Thomas Holtmann, *BDI* | Adolf Kloke-Lesch (ex-officio), *SDSN Germany* | Stephan Lessenich, *LMU München* | Kai Lindemann, *DGB* | Karsten Löffler, *UNEP Zentrum für Klima und Finanzierung nachhaltiger Energie an der Frankfurt School of Finance & Management* | Ursula Mathar, *BMW Group* | Dirk Messner (co-chair), *SDSN Germany* | Klaus Milke, *Germanwatch* | Alexander Müller, *TMG Think Tank for Sustainability* | Patrizia Nanz (co-chair), *IASS Potsdam* | Jürgen Renn, *MPI für Wissenschaftsgeschichte* | Ulrike Schell, *Verbraucherzentrale NRW* | Hans Joachim Schellnhuber, *Potsdam-Institut für Klimafolgenforschung* | Ina Schieferdecker, *Fraunhofer FOKUS* | Bettina Schmalzbauer (ex-officio), *German Committee Future Earth* | Falk Schmidt (ex-officio), *IASS, Potsdam* | Dennis Snower, *Institut für Weltwirtschaft* | Olaf Tschimpke, *Naturschutzbund Deutschland (NABU)* | Martin Visbeck (co-chair), *German Committee Future Earth* | Markus Vogt, *LMU München* | Joachim von Braun, *Bioökonomierat* | Hilmar von Lojewski, *Deutscher Städtetag* | Ulrich Walter, *Lebensbaum* | Marion Weissenberger-Eibl, *Fraunhofer ISI*

Future Earth Knowledge Action Networks

Our 3rd German Future Earth Summit will focus on topics related to Future Earth Knowledge Action Networks. The Future Earth Knowledge Action Networks (KANs) are collaborative frameworks that facilitate the production and dissemination of highly integrative sustainability research co-designed with stakeholders. The aim of a KAN is to generate the integrated knowledge products needed to inform solutions to complex societal challenges and to stimulate change. Knowledge Action Networks build on the broad range and diversity of specialist expertise represented in the large community of researchers and practitioners associated with Future Earth, e.g. networks, projects, organisation or individuals that are part of the Future Earth Open Network.

The following KANs are underway:



The Future Earth Health Knowledge Action Network responds to the planetary health concept. It will bring health researchers together with natural and social scientists, health and environmental policy experts and leaders in government, the private sector and civil society to promote research for better, integrated understanding of the complex interactions between a changing global environment (such as pollution, disease pathogens and vectors, ecosystem services) and the health of human beings (including livelihoods, nutrition and well-being).



The Future Earth Natural Assets Knowledge Action Network will focus on questions such as "How will changes to ecosystems and their biota alter the benefits that human societies need to have a fulfilling life?" The challenge lies in achieving a scientifically-based, sustainable and fair stewardship of terrestrial, freshwater and marine natural assets underpinning human well-being. The following five potential working fields have been identified: (1) Biodiversity, ecosystem functions and ecosystem services, (2) Governance and fair stewardship of natural assets, (3) Socio-economical transformations for sustainable consumption and production of resources, (4) Development of scenarios and models to support multilateral agreements, (5) Concept of Natural Assets.



The Ocean Knowledge Action Network seeks to address the challenge of climate change, overfishing, acidification, de-oxygenation and pollution through solutions-oriented research and by engaging with stakeholders from diverse sectors and regions and by drawing on the strong fundamental research and innovative agendas of the international marine projects and communities in Future Earth and beyond. Together with ICSU, WCRP, CLIVAR and IOC a scoping workshop has been organised that shaped the KAN in the following direction: (1) Ocean in 2050,(2) Ocean health, (3) Ocean governance, (4) Integrative data and open information, (5) societal transformation & interactive learning and knowledge exchange.



The Future Earth Systems of Sustainable Consumption and Production (SSCP) Knowledge-Action Network emphasises the need to address whole provisioning systems, including consumption practices and production conditions, as well as life-cycle impacts and the economic, political, social and cultural imperatives that impel consumerist lifestyles. To promote a more systemic approach to SCP and to enable a transformation in theory and practice, the Knowledge-Action Network aims to strengthen collaboration between communities of researchers and practitioners that are currently focused on either production or consumption, including actors, decision makers and other stakeholders. Knowledge-Action Network focus on co-designed studies and co-generated knowledge in the field of (1) Ecological macroeconomics and political economy of transition to sustainable lifestyles, (2) Urban provisioning systems and well-being, (3) Social change beyond consumerism and (4) Communicating for Sustainable Consumption and Production.



The aim of the Knowledge Action Network on Sustainable Development Goals (SDG KAN) is to bring the scientific knowledge and processes of the Future Earth community into the efforts to implement and achieve the SDGs. The methodological thinking underpinning this KAN is that of integrated, system-based, solution-oriented and multi-scale (local to global) approaches. Future Earth aims to enhance the contribution of research in helping to achieve the SDGs through (1) Connecting the international research community to the SDG policy interface, (2) Identifying and solving cross-cutting and cross-scale SDG delivery challenges, addressing institutional problems and systemic constraints, (3) Synthesizing and proposing pathways based on existing research, (4) Mobilizing an interdisciplinary scientific group to derive data and information to support the SDGs, (5) Identifying critical research and funding streams for the SDGs and stimulate projects in these fields.



The Future Earth Transformations Knowledge Action Network is connecting researchers and practitioners all over the world in a concerted effort to identify and fill the knowledge gaps pertaining to societal transformations to sustainability. The Network is based on a conception of “transformation” as a profound and complex socio-ecological process with both short- and long-term implications for the sustainability of natural and social systems. Engaging with a wide range of research communities and non-academic actors, this Knowledge Action Network will explore and integrate diverse perspectives on critical questions and issues relating to sustainability, such as what type of alternative futures are considered desirable and possible, whose visions count and the politics and social conflicts surrounding decisions and actions concerning transformations to sustainability.



The Future Earth Urban Knowledge Action Network is going to 1) build a global research platform and engagement network on urbanization and sustainable cities, 2) become a key source of knowledge from integrative, interdisciplinary and trans-disciplinary research across natural and social sciences, engineering and humanities, for practitioners, policy and decision-makers, and 3) contribute to the transition and transformation towards sustainable urban futures where cities are more livable, equitable and resilient through co-developed and solutions-oriented research.



The Future Earth Finance and Economics Knowledge Action Network will focus on improving the understanding of sustainability through the lens of business, economic and financial systems, and their inter-dependencies – and to do this, as much as possible, together with practitioners. The aim of this work is to contribute to the urgently needed emergence of sustainable development pathways that link economic prosperity with social justice and a healthy biosphere.



Delivering water, energy and food for all in a sustainable and equitable way is one of the major challenges faced by our societies. The Future Earth Knowledge Action Network on the Water-Energy-Food Nexus will support this goal by providing the knowledge needed to understand how interactions between water, energy and food are shaped by environmental, economic, social and political changes and how the synergies and trade-offs among them can be better planned and managed. The KAN is a collaborative initiative of the Core Projects of Future Earth, the Future Earth Cluster Activity on Sustainability for water, energy and food through integrated water information and improved governance and CCAFS (the CGIAR Research Program on Climate Change, Agriculture and Food Security).



The Future Earth Decarbonisation KAN explores the possible pathways for a rapid decarbonisation of the world economy. The default pathway is described by the Carbon Law (Rockström et al, *Science* issue 6331) which requires emissions peaking at 2020 and thereafter halving every decade. The key objective of the KAN is to understand the implications of decarbonisation pathways and promote positive effects on, as well as preventing harm to, human development and biosphere integrity, using an SDGs perspective. This includes issues such as social equity and preserving biodiversity.

The KAN fundamentally draws on the existing Future Earth community expertise in climate modeling and carbon budgets but is expanded to include a wide disciplinary breadth, encompassing natural and social sciences, engineering and humanities, as well as societal stakeholders. A first 2-day workshop was held in London in March 2017 on the topic of Disruptive Low-Carbon Innovation. The workshop initiated a dialogue on one of the key topics of the KAN and showcased researcher-stakeholder interaction. It was set up in a way that the first day was mainly for stakeholders to frame issues while the second day was for researchers to pick up these issues and define research questions. Follow-up workshops are planned, likely focusing on rapid decarbonisation coupled with ICT and/or urban development.



The Future Earth KAN on Emergent Risks and Extreme Events aims to define an interaction network between its partners and wider stakeholders to allow a structured integration and synthesis of expertise, professional and local knowledge to accelerate action on multi-hazard and compound events and so to support a transformation of development towards an equitable, sustainable and resilient future. The goal of reducing in an integrated manner the systemic, complex and cascading risks against the background of climatic, environmental and socioeconomic change requires scientific collaboration among multiple existing expert communities and with the stakeholders in the society. In this context, three ICSU programmes, World Climate Research Programme (WCRP), Integrated Research on Disaster Risk (IRDR) and Future Earth, are establishing a new KAN on Emergent Risks and Extreme Events.

More information at

www.dknsummit18.org/topics-kan

www.futureearth.org/knowledge-action-networks

Venue

Umweltforum & Neue Mälzerei

The venue „BESONDERE ORTE Umweltforum and Neue Mälzerei“ in Berlin offers a fitting location for the 3. German Future Earth Summit as it is specialised on sustainable events.

In 2000, BESONDERE ORTE began with the extensive renovation of the historical buildings according to ecological standards. They were not only equipped with environmental technology such as a photovoltaic system, a combined heat and power unit (CHP) and loam rendered walls, the green roof at the Umweltforum is also home to 10 beehives. Through these measures, the 3. German Future Earth Summit saves on energy costs and reduces CO₂ emissions.

Moreover, all the beverages served at the events at BESONDERE ORTE venues are organically produced and tea and coffee are additionally fair-trade. BESONDERE ORTE can also ensure that all of the snacks they serve during breaks such as fruit, biscuits, cakes and pastries are made from 100% organically-grown ingredients.

To reduce travel costs and protect the environment, participants of an event of BESONDERE ORTE can purchase event-tickets from Deutsche Bahn. This means that you can save money and, at the same time, influence the total emissions of the Summit since travel accounts for up to 80% of the CO₂ emissions of such events.





Umweltforum Berlin
Pufendorfstr. 11
10249 Berlin

Directions

The Umweltforum and the Neue Mälzerei are located directly adjacent to each other (10 minutes walking distance). Both locations are just a few minutes from Alexanderplatz in Berlin.

Subway: U5 to Strausberger Platz, exit Lebuser Str., 3 min. by foot

Tram: M5, M6 and M8 to Platz der Vereinten Nationen, 3 min. by foot

Bus: 142 from Hauptbahnhof or Ostbahnhof to Friedrichsberger Straße, 2 min. by foot

Room for thoughts

THANK YOU!

We would like to thank all people involved in the preparation of the conference as well as the conference participants. Your inputs and ideas contributed to making this event unique in Germany with knowledge exchange across disciplines, knowledge domains as well as nations. Global sustainability is a multilevel approach and you are a part of it!

Bettina Schmalzbauer & team of German Committee Future Earth Secretariat:

Philipp Lange, *Science officer 'Science Platform Sustainability 2030'*, Johannes Lunderhausen, *Science officer*, Barbara Malburg-Graf, *Community coordination*, Anna Rozwadowska, *Assistant*, and our student helpers Saskia Blümle, Judith Dudenhöfer, Maike Dieterich, Carla Ebert.

Organiser

German Committee Future Earth

Members

Prof. Dr. FRANÇOIS **BUSCOT** (2016-2018), Helmholtz Centre for Environmental Research - UFZ | Prof. Dr. ANITA **ENGELS** (2016-2018), Universität Hamburg | Prof. Dr. ARMIN **GRUNWALD** (2013- 2018), KIT – Institute for Technology Assessment and Systems Analysis | Prof. Dr. PATRICK **HOSTERT** (2016-2018), Humboldt-Universität zu Berlin | Prof. Dr. DANIELA **JACOB** (2017-2018), Climate Service Center | Dr. CHRISTIANE **JOERK** (ex-officio), German Research Foundation | Prof. Dr. WOLFGANG **LUCHT** (2013-2016), Potsdam Institute for Climate Impact Research | Prof. Dr. KAREN **PITTEL** (2013-2018), Ifo Institute – Leibniz Institute for Economic Research at the University of Munich e.V. | Dr. BETTINA **SCHMALZBAUER** (ex-officio), German Committee Future Earth Secretariat | Prof. Dr. CHRISTIANE **SCHMULLIUS** (2013-2015), Friedrich Schiller University Jena | Prof. Dr. MARTIN **VISBECK** - Chairman - (2013-2018), GEOMAR Helmholtz Centre for Ocean Research Kiel | Prof. Dr. VOLKMAR **WOLTERS** (2013-2015), Justus Liebig University Giessen

Design & concept

Secretariat German Committee Future Earth
Dr. Bettina Schmalzbauer & team
Heilbronnerstr. 150
70191 Stuttgart

info@dkn-future-earth.de
www.dkn-future-earth.org
www.dknsummit18.org
twitter.com/dkn_futureearth
#dknsummit18

