# Conference Summary Report

## 3rd German Future Earth Summit

## *"From Knowledge to Action"*

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## Authors and Co-Authors


Mariam **Akhtar-Schuster**, DLR Project Management Agency
Ariane **de Bermond**, Universität Bern
Ana **Cardenas**, Institut für Sozialwissenschaftliche Forschung München
Ilan **Chabay**, Institute for Advanced Sustainability Studies Potsdam
Roger **Cremades**, Climate Service Center Germany
Leonie **Dendler**, Bundesinstitut für Risikobewertung
Heike **Egner**, Alpen-Adria-Universität Klagenfurt
Ulrike **Eppler**, International Institute for Sustainability Analysis and Strategy
Alexander **Fekete**, Cologne University of Applied Science
Jasmin **Friedrich**, Karlsruhe Institute of Technology
Uwe **Fritsche**, International Institute for Sustainability Analysis and Strategy
Francesca **Grossi**, Collaborating Centre on Sustainable Consumption and Production
Hans **Haake**, Wuppertal Institute
Armin **Haas**, Institute for Advanced Sustainability Studies Potsdam
Jeremias **Herberg**, Institute for Advanced Sustainability Studies Potsdam
Holger **Hoff**, Potsdam Institute for Climate Impact Research & Stockholm Environment Institute
Michael **Jakob**, Mercator Research Institute on Global Commons and Climate Change
Jens **Jetzkowitz**, Helmut Schmidt Universität Hamburg
Georg **Jochum**, Technische Universität Munich
Martin **Kowarsch**, Mercator Research Institute on Global Commons and Climate Change
Sören **Köpke**, Universität Kassel
Kristin **Krewenka**, Universität Hamburg
Cornelia **Krug**, Universität Zürich
Klaus **Krumme**, Universität Duisburg-Essen
Christian **Kuhlicke**, Helmholtz Centre for Environmental Research Leipzig
Larissa **Kwiatkowski**, Deutsche Gesellschaft für Internationale Zusammenarbeit
Helmut **Lehn**, Karlsruhe Institute of Technology
Gerd **Leipold**, Climate Transparency
Beate **Littig**, Institut für Höhere Studien Wien
Nora **Löhr**, Deutsche Gesellschaft für Internationale Zusammenarbeit
Petra **Mahrenholz**, German Environment Agency Dessau
Grit **Martinez**, Ecologic Institute Berlin
Ingo **Matuschek**, Universität Duisburg-Essen
Nils **May**, German Institute for Economic Research
Ani **Melkonyan**, Universität Duisburg-Essen
Ilona **Otto**, Potsdam Institute for Climate Impact Research
Angelika **Ploeger**, Universität Kassel
Joe **Rini**, Institute for Advanced Sustainability Studies Potsdam
Witold-Roger **Poganietz**, Karlsruhe Institute of Technology
Nora Jennifer **Schneevoigt**, University of Bonn
Katharina **Schleicher**, Center for Transformation Research and Sustainability - TransZent
Antonia **Schuster**, Potsdam Institute for Climate Impact Research
Gesine **Schütte**, Universität Hamburg
Josef **Settele**, Helmholtz Centre for Environmental Research – UFZ
Joachim **Spangenberg**, Helmholtz Centre for Environmental Research Leipzig
Rosa **Strube**, Collaborating Centre on Sustainable Consumption and Production
Janina **Sturm**, Sustainable Development Solutions Network Germany
Christiane **Textor**, DLR Project Management Agency
Thomas **Walker**, Concordia University Montreal
Anke **Valentin**, Wissenschaftsladen Bonn
Sisira **Withanachchi**, Universität Kassel
Laszlo **Zsolnai**, Corvinus University of Budapest


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German Committee Future Earth & Secretariat
Heilbronner Str. 150
70191 Stuttgart, Germany
Phone: +49 (0) 711 4900 4240
Email: info@dkn-future-earth.de
https://www.dknsummit18.org
twitter.com/dkn_futureearth


## Design & Layout


German Committee Future Earth Secretariat (Carla Ebert)
James Southwood, Ecovation


## Linguistic Editing


Jutta Bachmann, Bachmann consulting



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# 3RD GERMAN FUTURE EARTH SUMMIT
## CONFERENCE SUMMARY REPORT

## TABLE OF CONTENTS

**OPENING REMARKS**

The German Research Foundation 4

**SUMMARY KEY MESSAGES** 6

**FROM KNOWLEDGE TO ACTION**

Exploring contributions of science to global sustainability 8

Knowledge-Action Networks in Future Earth: from "one-to-one" to "one among many" 11

Stakeholder partnerships and initiatives: lessons learned 12

The way forward: sustainability in science and research 15

**SUMMARIES COMMUNITY FORUM**

6 parallel sessions 18

6 parallel roundtables 27

**THE FUTURE EARTH KNOWLEDGE ACTION NETWORKS**

Overview on the 11 networks 35

**GERMAN COMMITTEE FUTURE EARTH**

Working Groups and Co-Design Project Groups 40

Future Earth, the World Climate Research Programme and the German Committee in brief 48

# OPENING REMARKS
# THE GERMAN RESEARCH FOUNDATION

Prof Visbeck, Dr. Luers, distinguished participants, ladies and gentlemen,

It is an honour to welcome you on behalf of the German Research Foundation. Starting with the first summit in January 2014, it has become a wonderful tradition to meet here every two years and discuss sustainability research.

I would like to thank the German Committee Future Earth for hosting and organising this event. The German Committee Future Earth aims to strengthen the links between the Future Earth network and the German research community. The committee is not just a focal point in the German landscape but also a driving force behind international sustainability science. Likewise, the German Research Foundation has proven its commitment to sustainability research through a range of activities. Although the German Research Foundation is not in a position to prioritise global change as a research topic, it funds numerous sustainability projects and provides financial support to the German Committee Future Earth and its activities.

Two years ago, Future Earth launched the Knowledge-Action Networks (KANs) as a key mechanism for generating solution-focused and societally-relevant research. Since then, the German committee has collaborated with Future Earth to foster the development of these networks, and German scientists have contributed to KANs dealing with topics such as health, cities, oceans and the Sustainable Development Goals, among others. Yesterday, the German committee hosted a workshop in which the scientific leaders of all KANs reflected on the lessons learned and the steps that need to be taken to implement and steer KANs.

There is no doubt that the subject of today's conference is a topic that is both scientifically exciting and politically timely. Last year, Germany hosted two major international events relevant to global change. The first was the G20 summit in Hamburg and the second the COP23 climate change conference in Bonn where the German Research Foundation and the German Committee Future Earth also played an active role. Although both events were considered successes, worldwide carbon dioxide emissions are continuing to increase and Germany is likely to fail to meet its national climate agenda targets. So the questions that need to be asked are: what can science and research contribute to climate protection and sustainable development, and is the science system living up to what is required of it in this process, do we have the suitable channels and communication strategies to deliver research results to society, are politicians taking any notice of sustainability research and are actions being taken based on scientific knowledge. These questions are not new; they have been asked many times before and need to be asked again at this conference.

Together with the German Committee Future Earth, the German Research Foundation arranged several sessions at the UNFCCC COP23 to foster debate on these issues with colleagues in the research and policy communities from Kenya, Canada, Norway, Uruguay and India. Participants stressed the key role that science and innovation play in implementing the Sustainable Development Goals and climate commitments. Scientifically informed implementation requires research that sheds light on the systemic interconnections between various aspects at the global and local level. The event highlighted

the need for a better understanding of interactions between climate action and the SDGs and also the need for building partnerships and strengthening exchange between academia and decision makers as one of the keys to success. The session was aimed at stakeholders, NGO representatives, policymakers interested in identifying and managing synergies and trade-offs and in promoting an integrated approach to SDG implementation.

Coming back to the issues of research, science and innovation, with a specific focus on Germany, one conclusion is quite obvious: the German research landscape is thriving, it is unique in some respects and offers great opportunities - which by the way does not necessarily mean that there are no improvements to be made. However, in general, annual science budgets have been growing over the past few years in a stable and predictable way. It must be borne in mind, however, that bold research initiatives are both extremely important and welcomed: they can lead to the intellectual property and technologies that Germany so needs.
Germany's Excellence Strategy, for example, incites competition among universities and improves collaboration between universities and non-university research institutions. The Initiative for Excellence was launched in 2005 with 5 billion euros in funding and the aim of creating new research consortia and elite universities. Almost 200 groups of scientists submitted proposals to form clusters of excellence last year, and up to 50 clusters will receive funding from 2019 onwards for a period of around seven years. Project proposals are chosen strictly on the basis of scientific quality, with no other considerations such as discipline, political leaning or regional distribution. Against this backdrop, Germany should be able to maintain its position as one of the world leaders in some climate- and SDG-related disciplines such as renewable energy or climate research.

The programme for the next two days promises stimulating discussions on a whole range of these issues. I would like to end by recalling a concept that frequently arose at COP23: the Talanoa principle – which refers to storytelling and dialogue – should be established not only in the negotiations and consultations among policymakers, but perhaps also in the discussions over the next two days.

On behalf of the German Research Foundation, I hope you will have a great exchange of ideas and will gain new insights into global change and sustainability research. Perhaps you will identify new cooperation partners and expand your networks. On that note, I wish us all a successful and inspiring conference.

Thank you very much.

CHRISTIANE JOERK
*On behalf of the German Research Foundation (DFG), Head Office*

# SUMMARY AND **KEY MESSAGES**

Over the past five years, the German Committee Future Earth and many scientists and non-academic experts have been exploring how science can productively interact with decision-makers to address global sustainability. Our 2016 report entitled "The contribution of science in implementing the sustainable development goals" suggests that scientific knowledge is essential to support and guide decision-makers to successfully implement political frameworks such as the 2030 Agenda for Sustainable Development and the Paris Agreement. This report is aimed at better understanding complexity and relationships, as well as the impacts over the short and long term. The move towards decarbonisation and a more sustainable way of living, for example, requires a better understanding of how countries can design and implement long-term pathways towards sustainable development in cities, on land and in the ocean to support planetary health and human well-being. From the scientific perspective, a systematic and context-specific approach would be beneficial. For example, putting climate change (SDG 13) in the context of the 2030 Agenda means that desirable actions and solutions should be beneficiary to humans and their economic, societal and environmental systems both in a specific country and beyond its borders. Science can contribute to enhancing knowledge about these challenges in order to improve decision-making and give guidance. However, in light of the urgent need to achieve these Sustainable Development Goals (SDGs) by 2030, the scientific community is confronted more than ever with the need to organise, collaborate and share knowledge and activities in order to provide solution-oriented insights.

Many fields ranging from the natural sciences, social sciences and humanities to engineering, the life sciences and economics are therefore facing three substantial challenges: (1) assessing and communicating science that can provide a knowledge base for sustainability, (2) identifying and closing existing knowledge gaps, and (3) working with relevant societal players to generate (new) solution-oriented knowledge.

Working across academic disciplines and together with relevant societal leaders gives rise to huge potential for new, promising and societally relevant pathways to global sustainability.

Collaboration across knowledge domains, sectors and countries increases not only innovation potential but also the possible impact of knowledge in decision-making processes. The emerging Future Earth Knowledge-Action Networks can offer the space for building alliances and partnerships to support highly integrative global sustainability science and provide the platform for mutual learning through science in major topics. Future Earth Knowledge-Action Networks can be seen as a network of professional networks that encompasses a community of practice (e.g. action projects) and project teams (e.g. research projects) and generates the multi-perspective knowledge required to inform solutions for complex societal issues. As one example, the Knowledge-Action Networks on Ocean provides the space for a broad sponsor group with partners from WCRP, SCOR and IOC.

Germany has ambitions to support the 2030 Agenda on Sustainable Development and the Paris Agreement. For example, the "Deutsche Nachhaltigkeitsstrategie", the German Sustainability Strategy, was updated in 2017 to align it with the 2030 Agenda and its 17 goals. Now, government ministries, business, civil society and also science are being asked to identify possible pathways for a more sustainable future on a global scale. To support this goal, the German Committee Future Earth along with SDSN Germany (Sustainable Development Solutions Network) and the research institute IASS (Institute for Advanced Sustainability Studies Potsdam) are seeking to support scientifically informed decision-making via the newly launched "Science Platform Sustainability 2030" in Germany. Furthermore, the German Committee Future Earth provides a platform for German researchers to initiate and support the development of new and innovative research approaches and networks in the field of global sustainability. So far, the German committee has financially supported, for a period of two years each, ten Working Groups put forward by the German community to explore new themes. And two Co-Design Project Groups have recently been launched to work towards a better understanding of science-stakeholder interactions in the development of research agendas. The German Committee Future Earth has also organised international strategic workshops together with leaders from the United Nations, Future Earth, WCRP, as well as science

policy events at UNFCCC's COP23 with leaders of the climate and development cooperation field to highlight the importance of integrated knowledge generation in finding possible pathways towards global sustainability. With the "German Future Earth Summit", a conference series mainly designed for networking between global sustainability scientists in Germany, we are pleased to have found a format that has attracted a steady number of around 270 participants and opened up a broad range of scientific fields. The conference themes ranged from research into the "Dynamic Planet", "Global Development" and "Transformations" (in 2014) to cross-cutting issues in support of research such as modelling, observing, metrics and evaluation, theory and methods, communication and science-society interfaces (in 2016). In 2018, we will be focusing on "From Knowledge to Action" and we are especially pleased to welcome to this summit representatives from business and government, as well as international participants from many corners of the globe.

The German Committee Future Earth thanks all colleagues involved in this conference, the session and roundtable organisers, panellists, moderators, speakers as well as all the participants. With your commitment we can make this conference a success once again. We also thank the German Research Foundation for its support in our numerous activities and we are looking forward to many exciting years together!

*Martin Visbeck*
*Chairman*

*Bettina Schmalzbauer*
*Executive Director*

German Committee
Future Earth

# FROM KNOWLEDGE TO ACTION:
# SCIENCE, RESEARCH AND ACTION NETWORKS IN THE FIELD OF GLOBAL SUSTAINABILITY

The German Future Earth Summit organised by the German Committee Future Earth is an ongoing conference series and a national platform on sustainability research. The conference series was launched in 2014 to create a space for exchange between peers from various disciplines who are facing similar challenges in their work in the field of global sustainability.
Exploring sustainable pathways for complex socio-ecological systems requires horizontal (across and beyond academic disciplines) and vertical (across nations, regions, the globe) interconnectedness between knowledge domains. Reducing complexity is one strategy for generating issue-specific knowledge in response to an increasing number of connected issues and variables – and this also holds true for science. However, another strategy could be actually confronting the complexity and combining knowledge from areas such as ecology, sociology and economics as well as from stakeholders in order to find more sustainable development pathways.
This co-created knowledge offers great potential for innovation. However, crossing academic disciplines in order to generate this kind of knowledge, including different non-academic fields (such as policy, business, civil society) and taking into account different cultures to develop joint ideas of how to tackle global challenges, demands functioning networks that are built on trust. The German Future Earth Summits provide an opportunity for participants to build networks between participants and learn about different approaches to global sustainability.

## I. Exploring contributions of science to global sustainability

The German Future Earth Summits are linked to the international Future Earth and WCRP programmes and have contributed to different fields by: a) providing the opportunity to introduce new research topics relevant for researchers from Germany (in 2014), b) exploring cross-cutting issues and networking with research funders from fundamental and solution-oriented science, the private sector as well as on the European level (in 2016), and c) increasingly opening up to stakeholders from politics and business to explore opportunities of turning knowledge into action (in 2018).

### Networking on a national level

Held biennially, the conference series has attracted around 270 participants per event, from the natural sciences, social sciences, life sciences, engineering sciences, humanities as well as development cooperation, and included many early career participants. As introduced by *Martin Visbeck (German Committee Future Earth / GEOMAR Helmholtz Centre for Ocean Research Kiel)* the summits have provided ideas and seeds for new community-driven activities at the German Committee Future Earth. For example, the first summit led to the establishment of the “German Early Career Scientists in Future Earth” and “Transdisciplinary Research” networks as well as the German committee “Working Group” format. The latter, which featured a regular call for proposals, aims to support the dialogue on problem definitions, knowledge gaps and research priorities in global sustainability. From 2014 to 2018, the German Committee Future Earth supported 10 inter- and/or transdisciplinary working group topics such as “Sustainable Agriculture”, “Urban Transformations”, “Sustainable Work” and “Societal Resilience and Climate Extremes”. Moreover, two “Co-Design Project Groups” have been founded to explore the processes of co-designing research agendas in order to answer the question as to how to produce scientific knowledge that is valuable both to researchers and stakeholders (*see also overview, page 40*).

## Science, policy & global sustainability

The three last summits were highly appreciated by the participants and created a unique opportunity for researchers to connect on the issue of global challenges (such as water, biodiversity, governance, climate, transformation), academic disciplines, and nations. In 2016, the adoption of the Paris Agreement and the 2030 Agenda for Sustainable Development provided additional stimulus for global sustainability research. Germany contributed to these goals for example by revising its sustainability strategy ("Deutsche Nachhaltigkeitsstrategie"). These developments and the international call for more evidence-based policymaking, was picked up in the "Science, policy & global sustainability" panel discussion at the 3rd German Future Earth Summit.


*Armin Grunwald (professor of philosophy of technology at the Karlsruhe Institute of Technology, director of the ITAS institute at the KIT and director of the Office of Technology Assessment at the German Bundestag)* opened the discussion by stating:

> ***It is time for science not only to solve the problems that it has identified; but also to tackle real-world problems. It must be appreciated that although sustainability science runs counter to the mainstream, as does the concept of the SDGs, it has achieved considerable success. However, scientists in the field of global sustainability still need to find a way to navigate between scientific autonomy and being instrumentalised by stakeholders. But to give one example, engineering science tackled the same challenges 150 years ago and found its own way to set agendas as well as a new balance between contract research that contributes to solving societal problems and also supports fundamental research.***

Together with panellists *Imme Scholz (vice director at the German Development Institute and member of the German Council for Sustainable Development)*, *Reinhold Leinfelder (professor of palaeontology and geobiology at the Freie Universität Berlin and founding director of the House of the Future in Berlin)* and guest panellists from the audience, moderator *Jan Wiarda* explored the role played by science in political decision-making. One of the observations that came out of this was that even in conferences like the German Future Earth Summits, where the scientific community meets across many societal relevant fields, there is scant participation by decision-makers. This led to participants discussing the following items:

**How do scientists see themselves when it comes to policy interactions?**
Although communication is considered an important part of science, the context in which scientists want to communicate (e.g. conferences like the summits) is not necessarily the appropriate platform for decision-makers, for whom time and motivation are the biggest constraints. Experience shows that local politicians for example see greater need for interaction with science (to formulate concrete options of change) than politicians at the national level, where discussions are often made along sectoral divisions and focus on issues involving ministerial competence.

**Have politicians simply learned to speak the language of sustainability without feeling the need to implement it?**
The German government 2018 coalition agreement proclaims that "sustainability is the benchmark of our actions". The fact that sustainability has become a guiding principle can be seen as a success. At the same time, the extent to which policymakers and other elements of society participate in global sustainability science remains unclear.

Over the past few years, many leading scientists and science managers have been heavily involved, for instance, in the debate on science's contribution to global challenges, possible changes needed in the research system and the importance for research and research organisations in Germany. This academic discussion has included a lively exchange between Peter Strohschneider (DFG), Armin Grunwald (KIT ITAS / TAB), Uwe Schneidewind (Wuppertal Institute / WBGU) and leaders from other science organisations – and it is a success story in so far as it shone a light on underlying premises and prejudices, that can be taken up by the sustainability community.

It is important to add that the "German Committee for Sustainability Research in Future Earth", which is the direct translation of the committee's German name, is supported by the German Research Foundation (DFG) which mainly funds fundamental research but has also been supporting the scientific community in addressing global challenges for the past 20 years. This support is an excellent example of an overarching perspective that includes fundamental as well as solution-driven research.

Experience from many fields shows that science has to become clearer about whom it seeks to address in society: is it civil society or policymakers? Public administration? At a local, national or regional level? The United Nations? Once that is established, the way that it should be done can then be defined. Should it be via e.g. platforms, real-world labs, social innovation labs, conferences, or any other possible suitable format where science can speak up and also listen to other elements of society?

> ***Reinhold Leinfelder (Freie Universität Berlin): "Is science simply government's puppet theatre? Is the Brundlandt definition of sustainability still relevant today, and to what extent? We behave as if we were just visitors to the world around us. We should refer to it as 'us world' ('Unswelt'), because we depend on it."***

There is no one-size-fits-all approach. Communicating complexity without simplification remains challenging. A high level of flexibility is needed as well as scientists who are intrinsically motivated to want to engage with society in co-design and co-production processes. For the future, monitoring the implementation of co-created results could be a source of power and courage to researchers working in the field of global sustainability.

"Exploring the role of science in achieving the Sustainable Development Goals" (SDGs) was a key event organised by the German Committee Future Earth in 2016 in collaboration with SDSN, UNU and Future Earth. The following fields of action were identified:

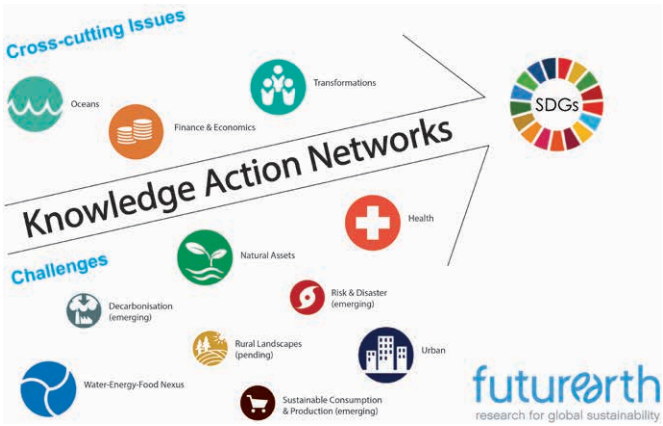
- To encourage interdisciplinary science that produces knowledge about the most efficient and coherent sustainable development pathways.
- To prepare problem- and solution-oriented synopses in order to better understand, analyse and cope with different types of conflicts concerning the SDG implementation process.
- To establish platforms for free and open data sharing with transparent metadata that is available to all stakeholders and can be used for creating flexible indicator frameworks.
- To foster increased international collaboration and exchange of knowledge and scientific capacity on the global level by intensifying projects such as Future Earth.
- To reinforce the science-policy process by building on good examples such as the UN-SAB (United Nation Secretary-General's Scientific Advisory Board) national science advisors and the committees that have been set up to ensure that the best scientific knowledge is available to decision-makers.
- To develop more partnerships between academia, business, civil society and governments in order to find innovative sustainable development solutions through networks such as SDSN.
- To understand the implementation of the SDGs as a continuous learning process that needs close and regular scientifically based revision.

*In: Schmalzbauer B., Visbeck. (Eds.) 2016. The contribution of science in implementing the Sustainable Development Goals. German Committee Future Earth, Stuttgart/Kiel.*

## II. Knowledge-Action Networks in Future Earth: from "one-to-one" to "one among many"

What have we learned from the past? (1) Fundamental research and solution-oriented research can contribute to global sustainability by providing relevant knowledge for decision-making aimed at achieving the SDGs. (2) Science alone cannot change policy (or even society), no matter how ground-breaking the research results are. The policy cycle is a complex, non-linear process and it depends on more than just facts. Collaborating with people (and organisations) who share objectives, building trust and developing joint activities can increase the impact of knowledge. Networks are essential to create and disseminatemultifaceted knowledge. This is most efficiently done by supporting a co-creation process (that includes co-design of research agendas, co-production of knowledge and co-dissemination of knowledge). Challenges in the context of global sustainability can best be addressed in teams within a highly interconnected environment.

Future Earth Knowledge-Action Networks (KANs), currently being developed by academic and societal actors worldwide, have the ambition to become thematic networks for international, highly integrative global sustainability knowledge generation that can guide decision-making. Introduced by *Amy Luers (Future Earth)*, KANs may be understood as a network of professional networks that includes communities of practice (e.g. action projects) and scientific project teams which aim to generate the multi-perspective knowledge required to inform solutions for a transformation to more sustainability in the context of the 2030 Agenda for Sustainable Development.




**What is the current state of KAN implementation?**

The Secretariat of the German Committee Future Earth organised the first cross-cutting KAN workshop in the lead-up to the third German Future Earth Summit to facilitate the exchange of experiences between KAN leaders on the development and implementation of KANs.
The KAN leaders also shared their experiences with conference participants during the dialogue forum at the third German Future Earth Summit through the examples of KANs on "Health", "Systems of Sustainable Consumption and Production", and "Ocean". These discussions were introduced by the relevant KAN Development Team members, *Chadia Wannous (Towards A Safer World), Leonie Dendler (German Federal Institute for Risk Assessment) and Anna Zivian (Ocean Conservancy), and moderated by Daniela Jacob (Climate Service Center Germany).* To setup a KAN a multistage approach exploring priorities, possible relevant partners and finances is needed. All KANs are still engaged in an internal development process, to which the global community is invited to contribute by discussing the science and engagement plans in workshops or webinars. The first KANs will become fully operational and open to the global community in 2018/2019.

## III. Stakeholder partnerships and initiatives: lessons learned

With more than two decades of experience in both applied and fundamental research, Germany has a leading role in sustainability research. Accompanying these efforts involving mainly technically driven innovations, networks such as Future Earth have shaped research priorities and put societal transformation on the agenda. Science is now increasingly challenged not only to cross disciplines but also to reach out beyond academic disciplines.

The involvement of stakeholders in research is nothing new; what is new are the different ways of doing so, such as co-designing research agendas, co-producing and co-disseminating knowledge, in other words the idea of "co-creating knowledge". Researchers are now not only observers and analysts of systems, they become part of the (societal) systems through learning processes developed and undertaken with stakeholders. This collaboration creates a new opportunity for learning about and understanding societal challenges, and can increase impact through e.g. trust building. Participation, particularly mutual learning, is a key element in this context because the complexity of contemporary phenomena means that science has to deal with more uncertainty while attaining normative goals such as sustainable development and the SDGs. Mutual learning can help to address this uncertainty. It can be understood as an informal exchange of knowledge and experiences based on reciprocity and reflexivity, which produces legitimate and socially accountable knowledge. As researchers become part of the system that they are investigating, however, they face new challenges. Understanding the different motivations of stakeholders in government, business and civil society is crucial to successfully learn and collaborate. One of the biggest challenges is bridging the prevailing gap between science and societal groups by bringing together multiple problem definitions and developing sustainable development pathways. It is important to understand that participating in the co-creation of knowledge is a continuing learning process for everyone involved. Creating socially robust knowledge and supporting decision-making in society is an innovation action. This is what the Future Earth KANs are based on and what we must continue working on.

> ***John Ingram (Oxford University): "I am very interested in the Future Earth agenda as it is highly relevant to much of my food systems work at Oxford University. We are here to learn from each other's experience to help tackle the food system challenges that affects us all."***

Based on the experience of many scientists in numerous projects worldwide, panellists in the dialogue on "stakeholder partnerships and initiatives: lessons learned" reflected on the issues of "Whom to engage? When to engage? How to engage?". The panellists were *John Ingram (University of Oxford), Matthias Bergmann (ISOE – Institute for Social-Ecological Research), Asun St. Clair (DNV GL), Anita Engels (University of Hamburg) and Florian Koch (Helmholtz Centre for Environmental Research - UFZ)* and the panel was moderated by *Patrick Hostert (Humboldt-Universität zu Berlin).*

The panellists emphasised that stakeholder involvement in research does not mean that researchers have to constantly work with stakeholders. Before starting activities with stakeholders, researchers need to clarify their own motivation: is it to drive action, to inform or to learn? If the aim is to learn, the following questions arise: what are the roles of researchers in these processes and how does this influence research products, educational systems and/or actions taken? What does research (investigating) to action (change) mean for people involved in these processes? And how can success be measured? For example, stakeholder involvement might be understood as a reflective element in research. In approaches such as Real World Labs or City Labs, for example, the aim is to develop transformation strategies, which requires a transdisciplinary research mode that includes learning processes with stakeholders.

As soon as scientists have clarified their own individual roles and identified why stakeholders would be motivated to participate in projects, cooperation rules need to be negotiated and expectations clarified. Typically this includes questions on:

- Stakeholders' "landscape": What are the operational modes and constraints (of a company)? What are the time frames and windows of opportunities and how do scientists deal with different timescales? What agreements can be made at the start of a collaboration process and what rules have to be defined to make sure that any interaction is successful? What communication strategy and exit strategy are needed to minimise conflicts and handle possibly "sensitive" new research results?

- "Language": What language(s) suit(s) my stakeholders? For example, business people listen carefully if scientists use the language of risk and opportunity.

- "Sustainability": For whom and for what? How is a sustainable world defined in the private sector and in society as a whole? Can we recognise the SDGs as a joint societal vision for sustainability? For example, many companies were involved in the development of the SDGs. It is an interesting boundary object that connects many thematic fields and the private sector with issues involving society and nature.

• “Institutional logics”: What is the business case for sustainability in the institution? Is there a way to enable companies to do business as usual while also investing in and mobilising for disruptive processes to achieve a more sustainable development? How to deal with multiperspectivity in stakeholder groups? How to deal with scientists’ institutional logic (the requirement to publish research results makes them more than just honest brokers in transdisciplinary research projects)?

Finally, performing transdisciplinary research entails negotiating some procedural rules before research can start. Facilitating the different perspectives and stakeholders with their different internal logic is an accompanying element throughout any project. Building trust is one essential element for successful partnerships that often goes hand in hand with a constant process of negotiation of perspectives and positions. Besides hard facts, soft skills are important to be able to take partners’ perspectives and (institutional) logic seriously during the co-creation processes. language of risk and opportunity.

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## Research Blog Post Award
## Global Sustainability
Winner 2018

The award for the best research blog post at
the 3rd German Future Earth Summit is presented to

**Antje Brock; Theresa Grapentin; Mandy Singer-Brodowski; Nadine Etzkorn; Julius Grund**
**Institut Futur, FU Berlin**

Title

**Education for Sustainable Development - A Ponderous Leverage Point for the Great Transformation? – Insights from a national monitoring process**

Berlin, 8/2/2018

As contribution to

futureearth WCRP German Committee Future Earth

3rd German
**Future Earth**
Summit

## Research Blog Post Award
## Global Sustainability
Winner 2018

The award for the best research blog post at
the 3rd German Future Earth Summit is presented to

**David Williams**
**Climate Service Center Germany (GERICS)**

Title

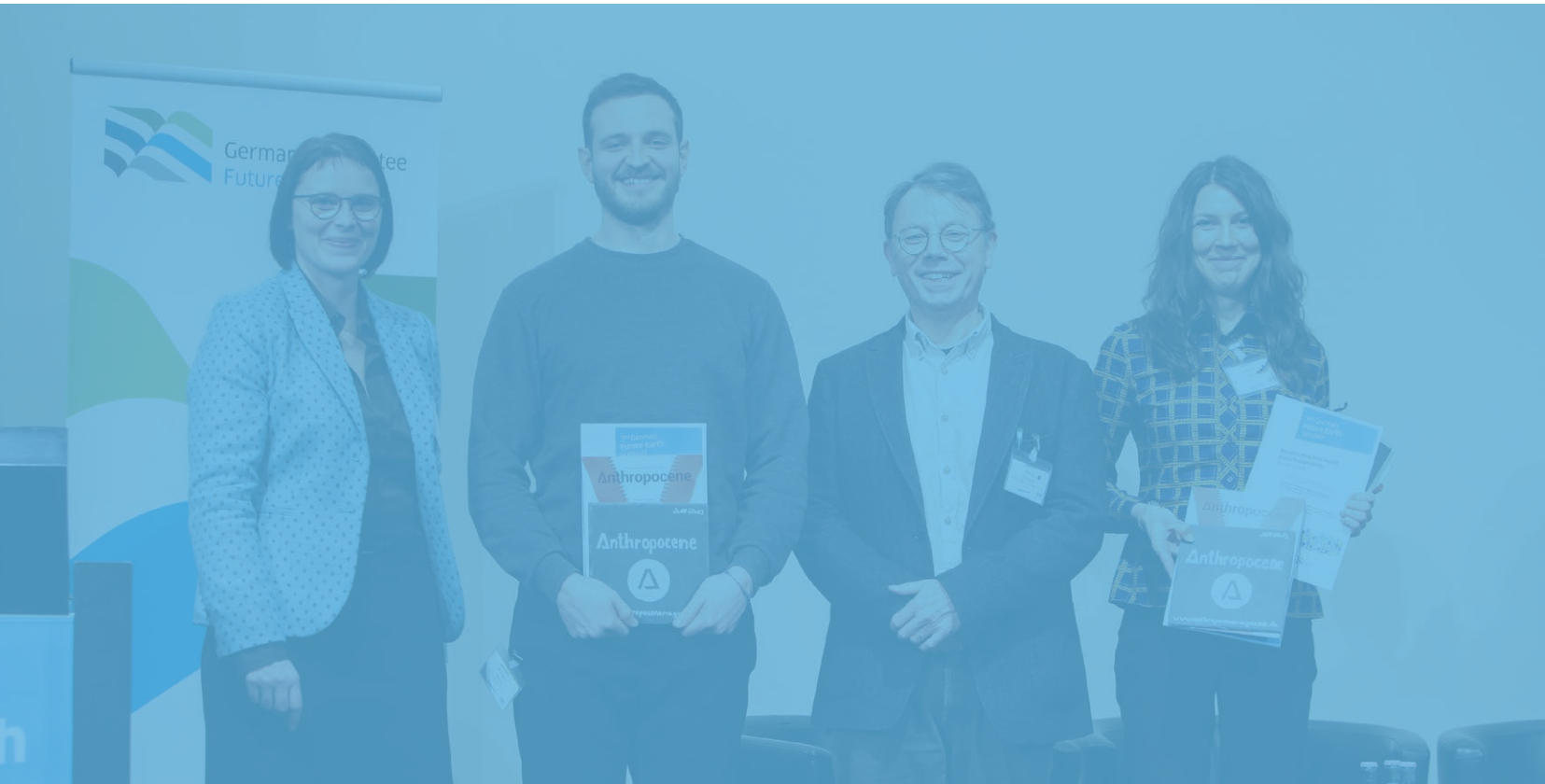
**Global action is great, but don't forget about local!**

Berlin, 8/2/2018

As contribution to

futureearth WCRP German Committee Future Earth

## New ways of communicating your research: the Research Blog Post Award



## IV. The way forward: sustainability in science and research

The summit concluded with an outlook on new and exciting initiatives that promote sustainability in science and research in Germany. By selecting five initiatives focusing on different aspects, the session successfully demonstrated the multidimensionality of sustainability in science and research. Issues addressed included, for example, sustainability as a research topic, the sustainability of research processes and institutions, and the promotion of sustainability through the science-policy interface and international cooperation in education and research.

Moderated by *Karen Pittel (ifo Institute) and Josh Tewksbury (Future Earth),* the representatives of *LeNa (Katharina Helming from the Leibniz Centre for Agricultural Landscape Research), Hoch-N (Claudia Schmitt from the Universität Hamburg), netzwerk N (Jana Holz from netzwerk N), the Bilateral SDG Graduate Schools (Christoph Hansert from DAAD) and SDSN Germany (Adolf Kloke-Lesch from SDSN Germany)* discussed their initiatives with the audience and invited them to get involved.

• The **student initiative "netzwerk N"** aims to mainstream the idea of sustainable development in universities. It is an open network of initiatives, undergraduate, graduate and PhD students and young professionals who are working together to advance sustainability in higher education across Germany, Austria and the Netherlands. netzwerk N is part of the UN Decade of Education for Sustainable Development.

• The **non-university initiative "LeNa"** is a framework that aims to better integrate sustainability in research and in the management practices of research organisations. It was developed by major German research associations including the Helmholtz Association of German Research Centres (HGF), the Fraunhofer-Gesellschaft and the Leibniz Association (WGL) to support processes for sustainability transformations. These associations comprise a total of 178 research institutes/centres/units from the fields of the life sciences, natural sciences, social sciences, engineering sciences and humanities, from fundamental to applied and solution-oriented research, including programme-oriented research and contract research.

• The **"HOCH N"** (stands for "Sustainability at Higher Education Institutions: develop - network – report") network involves eleven German universities and is designed to explore questions such as the following: How can higher education institutions contribute to sustainable development in the fields of governance, sustainability reporting, teaching, research, operations and transfer? What joint understanding of sustainability and transformation might be developed? The universities form an open network to promote the sustainable development of their organisations and beyond.

• The **DAAD's "Bilateral SDG Graduate Schools"** programme seeks to contribute to achieving the Sustainable Development Goals through bilateral partnerships between higher education institutions in Germany and developing countries. The four SDG graduate schools aim to offer qualified postgraduate students high-quality training in development-related degree courses. The graduate schools are expected to increase teaching capacities, to contribute to sustainable development in line with the SDGs and to develop top-quality, cosmopolitan universities.

• **SDSN Germany** is the German network of the international Sustainable Development Solutions Network that was founded in April 2014 by leading German knowledge centres. The network pools knowledge, experience and capacities of German academic, corporate and civil society organisations in order to contribute to the sustainable development of Germany as well as to German efforts towards global sustainability. SDSN Germany aims to promote sustainable development as a guiding principle for government, business and society with a particular focus on Germany and Europe, and works in partnership with the German Committee Future Earth for many activities.

While targeting different aspects of sustainability in science and research, all of these initiatives conduct activities that aim to generate further knowledge and learning to facilitate the finding of solutions for global sustainability challenges. They are models for the variety of sustainability initiatives in research, business and civil society in Germany.
It is likely that one of the main future challenges may well be knowledge exchange and learning across multiple sectors and regions. The German Committee Future Earth will therefore work to strengthen collaborative activities and support the further development of the science of complex (societal) systems, where academic exchange occurs not just between Germany and the countries in the Global South, but also between OECD countries.


@netzwerkn

netzwerk

# Students for Sustainability

## - A Bottom-up Approach for Transforming Higher Education -

# SUMMARIES COMMUNITY FORUM
# SESSIONS

## FINANCE & ECONOMICS
## RECONNECTING ECONOMICS AND FINANCE TO EARTH

There is a need to reconnect financial and economic systems with planetary boundaries and individual human rights across scales. The financial system is economically sustainable if it accomplishes the following triple objective without triggering any major economic crises: safeguarding people's savings, financing investments and reallocating current and emerging risk factors, such as hydro-meteorological risks related to climate change that are already impacting commodity markets. At the same time, either financial markets will finance the transition to global sustainability or it will not happen. Even though the costs of renewable energy are falling, investment in renewable energy remains challenging in countries with high capital costs: financial and policy de-risking is critical for reducing financing costs and leveraging significant investment.
At the EU level, secure renewable energy policies are expected to further reduce costs by addressing regulatory risk and facilitating hedging. Without secure policies in place, private business has the option of establish long-term contracts between project developers and energy suppliers. Regardless of the contributions to sustainability of renewable technology, there is disproportionate consumption by those in higher wealth brackets; global change research needs to take this disparity into account to inform personal and political decisions. One possible approach is to include the concept of agency and create socio-metabolic classes.
Beyond science, the central question posed by the organisers of this session to the speakers was "how can your research results contribute to the science-policy interface?" The ensuing debate produced an interesting paradox: while lobbies bring their interests to policymakers in the form of concrete plans with specific changes that favour their interests, scientists produce countless papers and debates that trigger interesting narratives but do not materialise

**ORGANISERS/AUTHORS**

Roger Cremades, Climate Service Center Germany
Laszlo Zsolnai, Corvinus University of Budapest
Armin Haas, Institute for Advanced Sustainability Studies Potsdam
Gerd Leipold, Climate Transparency
Thomas Walker, Concordia University Montreal
Antonia Schuster, Potsdam Institute for Climate Impact Research
Michael Jakob, Mercator Research Institute on Global Commons and Climate Change
Nils May, German Institute for Economic Research
Joe Rini, Institute for Advanced Sustainability Studies Potsdam
Ilona Otto, Potsdam Institute for Climate Impact Research

into clear and specific plans embedded into current political and administrative realities. Public participation and involvement in the formulation of plans will facilitate their approval. Policymakers are busy with multiple tasks and agendas and cannot pay attention to the vast number of academic papers.

However good the policies that we co-create to achieve sustainability, the business world is an indispensable and vital cooperation partner. Multiple examples across sectors show that progressive and ethical business models are emerging that are able to incorporate critical suggestions from social and environmental movements. Some of these business models, e. g. that of Univlever, involve large consumer pools. The remaining challenge for these pro-social business models is to drive forward the co-evolution of consumers' preferences and sustainable production.

## NATURAL ASSETS
# SHIFTING THE PARADIGM - SEEKING ALTERNATIVE LAND MANAGEMENT APPROACHES FOR SUSTAINABLE AGRICULTURE

It is recognised that human well-being depends on natural assets. At the same time, our natural ecosystems are being degraded, mainly due to land use and climate change, and are less and less able to provide benefits. In order to mitigate and counteract this development, the Natural Assets KAN advocates the fair stewardship and sustainable use of the natural assets of terrestrial, freshwater and marine ecosystems. Activities of this KAN should be geared towards increasing the understanding of the relationships between biodiversity, ecosystems and their benefits to society, and towards developing more effective management and governance approaches.

Food security is an important topic within the Natural Assets KAN. Trying to produce enough food to feed a growing world population while at the same time conserving natural assets is one of the most pressing challenges today. Small-scale farmers especially in the Global South are most likely to be negatively affected by climate change and to have to deal with ecological constraints. This is why this interactive session focused specifically on food security in drylands.

Approximately 30 people participated in the session; most were scientists and experts with an agricultural or ecological background. First up was Cornelia Krug who presented the conceptual framework of the Natural Assets KAN and the outcomes of the first workshops that aimed to establish specific project groups. Kristin Krewenka subsequently provided a short introduction to drylands and the challenges of farming them.

Gesine Schütte then presented established alternative land management projects in drylands and the factors that were identified as key to the successful implementation of these projects. These three presentations were followed by a discussion of the paradigm shift that the participants considered necessary for agriculture, in particular in marginal regions and drylands. The discussion came up with the following key points:

**ORGANISERS/AUTHORS**

Cornelia Krug, Universität Zürich
Ariane de Bermond, Universität Bern
Kristin Krewenka, Universität Hamburg
Gesine Schütte, Universität Hamburg

With regard to implementing sustainable agricultural concepts, the main challenge identified was the political context of the focal countries that could either favour or hinder projects. Governments have the power to decide which management strategies are promoted or subsidised and which approaches are ignored.

The participants also identified knowledge gaps in current agricultural research and elaborated possibilities for more promising research projects on sustainable agriculture. They agreed that the failure to understand and integrate locals and their cultural values and traditions represents the major gap in agricultural research on adaptive management practices. With regard to the acceptance and implementation of innovative approaches, it was generally agreed that research should focus not only on technical management aspects, but also on the socioeconomic mechanisms which underlie the decision-making of farmers and stakeholders. The discussion concluded that the sustainable implementation of projects could be achieved with the following measures:
(i) The identification of a champion within the local community who is highly integrated in research projects and committed to implementing and propagating the use of new techniques/management measures once the project has come to an end. (ii) The invention of new technologies could improve the acceptance of agricultural work. The participants were keenly aware that young people in particular often reject traditional agricultural techniques and labour-intensive field work. They felt that designing technical equipment to facilitate farm work as well as promoting the technical understanding and education of those who apply it, will make working in rural areas more interesting and rewarding by boosting the prospects of local people in the agricultural sector. The expectation is that this will offer young people new prospects and make them less inclined to migrate to cities or abroad.

The session participants agreed that new research projects that investigate adaptive and eco-friendly approaches would benefit from a thorough review of projects on sustainable agriculture that already exist in order to highlight positive examples and indicate a possible way forward. It was also agreed that case studies showing the successful implementation of sustainable agriculture should be screened and key factors that lead to success assessed. Those present highlighted that this should be done not only with good practice examples, but also with projects and techniques that had been unsuccessful, including lessons learnt from such experiences. It was decided that producing a concluding report would be useful for future projects.

The participants subsequently discussed the current state of small-scale farmers in general, hypothesising that most people rely on subsistence farming for their livelihood. It was questioned whether large-scale agriculture should be generally considered as unsustainable, or whether new technologies on a huge spatial scale generate a new form of sustainable agriculture that improves food security and the livelihood of farmers in drylands and marginal regions.

After a lively and creative discussion, the participants of this session formulated the following questions for future research:

- To what spatial extent can alternative/environmentally friendly systems (e.g. permaculture) be expanded and still meet the concept of sustainability and at what scale is the tipping point of economic and ecological efficiency reached?

- Is it possible to invent large-scale environmentally friendly technologies (robots, etc.) for improving the working conditions of farmers and boosting yields?

- Would investment in dryland agriculture, including technical improvements using restoration approaches lead to more food security and zero hunger in affected regions?

- What would be appropriate ways for assessing the potential of ecosystems and for creating sustainable flows to use and maintain them?

SUSTAINABLE DEVELOPMENT GOALS

# SDG'S AND TRADE-OFFS: BIOMASS AS AN EXAMPLE OF THE ROLE OF SCIENCE IN POLICY FORMULATION AND IMPLEMENTATION

Tools such as models and scenario analysis can be helpful in addressing SDG trade-offs (as shown for the biomass case) – they cannot resolve problems, but they can help make options visible, and trade-offs transparent.

New approaches moving from matrix to network analysis can help identify SDGs with strong co-achievement linkages to other SDGs, and mark those that are assumed to have negative trade-offs.
The following issues were highlighted in the discussion:

- **Context** matters in SDG implementation

- **Landscape approach** could provide a useful framework for SDG implementation

    - The concept of **"landscapes"** in relation to achieving more sustainable land use and with it the associated benefits for food security, climate change, biodiversity conservation, poverty alleviation, education, peaceful and resilient societies etc. can link the implementation of the SDGs from global complexity to local reality

- Focus of implementation, on which scale?

    - Local/regional/global: policymakers need to consider the impacts their policies will have across local, national and global scales

    - **Consistency** across scales is what matters

- Support, promote and force **stakeholder-network idea – include civil society**

    - What are the criteria to "make people happy"?

- **Geography** in relation to landscapes – where to find synergies

- **Governance:** holistic thinking and acting

    - Environment includes society and society includes economy

    - Need for prioritising – this is a political issue requiring stakeholder participation


**ORGANISERS/AUTHORS**

Uwe Fritsche, International Institute for Sustainability Analysis and Strategy
Ulrike Eppler, International Institute for Sustainability Analysis and Strategy

# SYSTEMS OF SUSTAINABLE CONSUMPTION AND PRODUCTION
# INTERNATIONAL SPILLOVERS IN SDG IMPLEMENTATION AND SUSTAINABLE SUPPLY CHAINS

On February 8th 2018, around 40 participants from academia, government and the private sector attended the Knowledge-Action Network (KAN) session on "Systems of Sustainable Consumption and Production (SSCP)". The session led by the SSCP KAN in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH was aimed at facilitating the exchange of information between stakeholders from academia, government and the private sector with regard to the global impact of production and consumption and related spillovers on achieving the SDGs.

**ORGANISERS/AUTHORS**

Larissa Kwiatkowski, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Nora Löhr, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Holger Hoff, Potsdam Institute for Climate Impact Research
Leonie Dendler, Federal Institute for Risk Assessment (BfR)

**Background**

The Sustainable Development Goals (SDGs) and the 2030 Agenda for Sustainable Development are universal to all countries, both developed and developing ones. However, some countries seem only able to achieve the SDGs by externalising socio-economic and environmental footprints to other countries. In order to effectively reduce negative spillovers (“footprints”) and to enhance positive spillovers ("handprints"), it is vital to ensure that the complex global supply chains and the associated costs and benefits across entire value chains are better understood and more transparent.

This session stimulated an exchange of different perspectives on sustainable supply chains between stakeholders from academia, the private sector and government. Participants outlined what information they required to be able to take action on international spillovers. In response to common challenges, the researchers and practitioners present provided an overview of the state-of-the-art knowledge, methods and data available in this field.

**Results of the fishbowl discussion**

Decision-makers from public institutions and the private sector stressed the importance of addressing global footprints and their inclusion in sustainability strategies. Although scientific knowledge and tools for understanding supply chains and footprints are rapidly evolving (including outside the public sector too), e.g. in terms of hybrid methods with better spatial, temporal, sectoral and product resolution, the dissemination and utilisation of available information is lagging behind. Thus, representatives of the private sector and the German Federal Ministry for Economic Cooperation and Development (BMZ) and the German Federal Ministry of Food and Agriculture (BMEL) called for translating and reducing the complexity of scientific results to achieve more practical approaches as well as a systemic approach to consumption and production. Although simple solutions may not be sufficient to address the complexity of the topic, they may nevertheless be useful for continuous learning and iterative improvement. The BMZ and BMEL representatives stressed their commitment to addressing the externalisation of footprints and sustainable supply chains through their involvement in roundtables on cocoa, protein feed and other areas.

Furthermore, there is currently a strong trend towards governing supply chains with standardising certifications. Increasingly standardised supply chains make it more difficult for small-scale farmers to adhere to standards, and shifting the burden in this direction clearly needs to be avoided. Overall sustainability indicators, certifications and labels need to be co-developed. In this context, it is also important to address trade-offs between different environmental and socio-economic footprints (including equity and fairness aspects) and between different SDGs. The science community responded to this call to action by highlighting the challenges associated with measuring spillover effects on sustainable consumption and production. Although the necessary methods are available (LCA, MRIO and hybrid methods), data is lacking and equal access to available environmental and social information on industrial production (e.g. via an open platform) needs to be improved. Furthermore, existing (SDG) indicators and indices do not sufficiently address the sustainability of supply chains and the externalisation of footprints. Digitisation and new technologies could help bridge the divide between calls for simplification and more practical solutions for consumption and production on the one hand and calls for increasingly complex global supply chains on the other.

**Way forward**

At the end of the session, the participants came to the agreement that further approaches need to be discussed and shared in a participatory and democratic process (complementing bottom-up consumer action with top-down policy action on both the consumption and production side) based on scientific information, as well as building on ongoing activities and mainstreaming knowledge into policy processes. The session made a contribution towards gaining an understanding of the type, format, scope and resolution of actionable information about sustainable consumption and production patterns required by practitioners and decision-makers in the public and private sectors. These insights will be used to identify and quantify critical supply chains and footprints as well as developing spillover indicators, which provide the knowledge base for integrating spillovers in policy- and decision-making.

Engaging with and informing the private sector as well as including partners along supply chains, in particular those from the Global South (through GIZ projects, Future Earth partners, etc.) is central to successfully bridging the gap between the demand for and supply of improved spillover information. Therefore, GIZ and Future Earth's Knowledge-Action Network on Systems of Sustainable Consumption and Production will be contacting suitable stakeholders in the near future to plan next steps.

# TRANSFORMATIONS
# TRANSFORMATIVE INDICATORS AND THE TRANSFORMATION OF WORK

The term “transformation” has gained much traction in recent years, and various groups and networks including the Future Earth KAN on this topic have made progress in defining and operationalising it. Yet key issues remain unsolved: the term is often used as abbreviation of “sustainable transformation” or “socio-ecological transformation”, causing confusion to those outside the sustainability community. The theoretical foundation of the transformation debate is so diverse to the extent that it sometimes appears weak.

Therefore, at the start of the session, two presentations were given on the different origins and concepts of transformations, and were followed by a discussion with participants.

The first presentation by Hans Haake focused in particular on the debate in the German-speaking world and the definition of a socio-ecological transformation, with particular emphasis on the term “Great Transformation” put forward by the German Advisory Council on Global Change (WBGU). The second presentation by Georg Jochum discussed Karl Polanyi’s Great Transformation concept. According to Polanyi, the commodification of labour and nature as well as the counter-movements directed against it formed the core of the great transformation in industrial society. Taking Polanyi’s work, the presenter argued that the socio-ecological transformation towards sustainability must focus on working society and a “work turnaround”. In the ensuing debate, the potentials and risks of this fundamental transformation were discussed.

In the second part of the session, specific roles, strategies and transformations to sustainability themes were outlined in two presentations and then discussed in working groups. Katharina Schleicher presented the participatory development of well-being indicators in a research project carried out at the TransZent in Wuppertal and their transformative implementation into municipal processes. After describing the project, she presented the concept of transformative research where researchers are actively involved in the transformation processes, initiating and supporting changes designed to lead to sustainability. Ana Cárdenas gave the next presentation in which she outlined some conceptual thoughts on the transformation of work. These two different topics were further discussed and developed in a one-hour working group session.

The group working on transformative indicators and transformative science closely examined transformative indicators and the role of indicators in the “Great Transformation”. The discussion started with an exercise that involved spontaneously creating potential indicator sets, which quickly raised some more fundamental issues. It was clear that there was a broad set of topics that would need to be included in indicators for the transformation, ranging from green spaces and resource footprints to participation and education. More importantly though, crucial questions were

**ORGANISERS/AUTHORS**

Katharina Schleicher, Center for Transformation Research and Sustainability - TransZent
Georg Jochum, Technical University Munich
Hans Haake, Wuppertal Institute
Ana Cardenas, Institut für Sozialwissenschaftliche Forschung München
Beate Littig, Institut für Höhere Studien Wien
Ingo Matuschek, Universität Duisburg-Essen

raised for future consideration: are we measuring the capacity to transform, the process of transformation or changed states in relevant areas? Do we focus on what we have or on where we want to go? How can indicators based on the data that we have drive transformation to something entirely new? It became clear that there is significant interest in the role of indicators during transformations but that their various forms and roles need to be clarified.

The second working group focused on the role of work in the process of transformation. Referring to the UNDP report entitled "Work for Human Development" (2015), which recommends "moving to sustainable work", the group discussed scenarios for a transformation of current working societies in relation to two specific issues. First, the relationship between paid and unpaid work: based on an extended understanding of the term "work", the participants debated if a move to sustainable work has to include a change in the relationships and valences of all societally necessary forms of work (paid work, care work in private households, voluntary work in the community, and work as a self-provider). Second, the structure and functioning of global value chains and their impacts on labour conditions and the natural environment were debated. Scenarios of a transformation to socially and ecologically sustainable work chains were mooted.

# CHALLENGES OF THE **WATER-ENERGY-FOOD NEXUS**

In the KAN session involving the Karlsruhe Institute of Technology ITAS, the University of Duisburg-Essen and the University of Kassel, participants had the opportunity to discuss the many and varied challenges related to the water-energy-food nexus.

Group 1 (researchers from KIT/ITAS) discussed the non-technical impediments to implementing sustainable water-energy nexus infrastructures in urban contexts. The participants decided what had to be "created", "amplified" or "eliminated" in terms of behaviour, communication, institutions and utilities to reach a technical nexus vision in which wastewater is recycled and used for recovering or generating energy. A combination of a bottom-up approach (i.e. reaching out to the public and showing them the benefits of an infrastructural transformation) and a top-down approach (i.e. creating incentives, legislations and restrictions similar to the ones applied to alternative energies and fuels) were considered paramount for moving forward.

Group 2 (representatives from the University of Duisburg-Essen) debated the positive and negative effects of decentralising water-energy-food Nexus in urban systems in terms of resilience, efficiency and environmental performance both from an infrastructural and an institutional perspective. The researchers started by discussing various urban concepts that favour the decentralisation of water-energy-food Nexus in urban systems using the 6-3-5 method. The participants came up with the following four urban scenarios: (1) city of neighbourhoods, (2) multi-stakeholder partnership or 4P model (public, private, people, partnership), (3) city of short ways, (4) half-city and half-village (globalised urban networks). The parameters describing each of these scenarios and favouring the decentralisation, decarbonisation and digitisation of the water-energy-food nexuswere listed. In a subsequent phase, the scenarios will be assessed using these criteria and


**ORGANISERS/AUTHORS**

J. Friedrich, Karlsruhe Institute of Technology
Ani Melkonyan, Universität Duisburg-Essen
Sisira Withanachchi, Universität Kassel
Sören Köpke, Universität Kassel
Angelika Ploeger, Universität Kassel
Klaus Krumme, Universität Duisburg-Essen
Helmut Lehn, Karlsruhe Institute of Technology
Witold-Roger Poganietz, Karlsruhe Institute of Technology

applying multiple-criteria decision tools to evaluate the efficiency, resilience and environmental performance of each scenario.

Group 3 (researchers from the University of Kassel) discussed diverse levels of social conflict over water resources, including conflicts over the control, allocation and governance of water as a resource, as well as the conflicting dimensions of water infrastructures. Social conflicts over water are always local but are embedded in regional, national and global dynamics. Several real-world cases were discussed. The strengths and challenges of civil participation and its importance in the decision-making processes of water resource management issues were analysed. The group also looked at practical examples of functional and dysfunctional public participation. They concluded that if people are not given the opportunity to participate in governing water resources and actively contributing to the decision-making process, they will only ever be passive participants. Some solutions for innovative interventions included: shared resource ownership at a grassroots level, implementation of democratic water-use associations, quotas for subaltern social groups, participatory research on water-energy-food nexus issues, and adaptation of participatory approaches to suit their respective social and cultural contexts.

Although the focus of each of the three groups was quite different, all concluded that the water-energy-food nexus can have significant positive impacts on sustainable development and should therefore be employed despite diverse challenges. As there is no one-size-fits-all solution, the transformation of the physical water-energy-food infrastructures requires scientific instruments appropriate for a specific context. Typical instruments range from stakeholder involvement to modelling and assessment approaches. Despite the complexity of the water-energy-food nexus, the session participants agreed that society is key to reaching any nexus vision.

SUMMARIES COMMUNITY FORUM

**ROUNDTABLE**

# INDICATORS MEASURING GLOBAL RESPONSIBILITY
# WHAT DO STAKEHOLDERS EXPECT FROM SCIENCE IN TERMS OF GLOBAL RESPONSIBILITY INDICATORS?

SDSN Germany organised a roundtable on “Indicators measuring global responsibility” facilitated by the executive director of SDSN Germany, Adolf Kloke-Lesch, as part of the “Managing Expectations” section to discuss what different stakeholders expect and require of science.

The discussion began with a presentation on the “SDG Index and Dashboards” by Dr. Christian Kroll from the Bertelsmann Foundation. Together with the global SDSN, the Bertelsmann Foundation has developed an index that collects and systematically presents data on the status of SDGs in 157 countries. The SDG Index and Dashboards Report of 2017, entitled “Global Responsibilities”, focused on the so-called spillover effects. Data collection is and will continue to be the biggest challenge for comprehensive assessment of spillover effects.

Following Kroll’s presentation, Nadine-Lan Hönighaus from econsense spoke about the business perspective. Long before the emergence of the 2030 Agenda, sustainability was a live issue for the many companies that had already developed and successfully implemented strategies and sustainability projects. From a business perspective, sustainability is not necessarily just a challenge but also an opportunity for companies to improve their future viability and profitability. Nevertheless, science is needed to advance knowledge and instruments with regard to the SDGs and its indicators.

Hermann Ott, Deutscher Naturschutzring (German Nature Conservation Society), highlighted the role of reports in tracking the achievements and challenges of spillover effects. One particular problem is that such reports tend to be compiled on a voluntary rather than compulsory basis. Furthermore, the question arises as

**ORGANISERS/AUTHORS**

Janina Sturm, Sustainable Development Solutions Network Germany

to whether the crucial determinants of sustainable development are adequately measured. He also emphasised the critical role of civil society in this process and put forward a case for establishing dialogue channels with stakeholders.

Oliver Wieck, International Chamber of Commerce (ICC), spoke about the role of business in achieving the goals of the 2030 Agenda. He referred to the publication "Global Compact Germany 2017" which gives an overview of 29 companies and their achievements with regard to the implementation of the SDGs. He added that, from a business perspective, the lack of data is the biggest challenge for identifying and reducing negative spillover effects.

Finally, participants contributed to a lively and controversial discussion as to whether regulation is needed to achieve the SDGs or whether pushing forward innovation for implementing the SDGs necessitates freedom of action. Another topic of discussion focused on how spillover effects could be made visible in order to raise consumer awareness of these interdependencies. Science can play an important role by developing instruments and improving the measurability of spillover effects.

## SCIENCE AND POLICY
# BEYOND "SPEAKING TRUTH TO POWER"? THE IMPLICATIONS OF CO-CREATION FOR RESEARCH AND POLICY ADVICE

The roundtable "Beyond speaking truth to power? The implications of co-creation for research and policy advice" convened by Joachim Spangenberg and Jeremias Herberg discussed the notion of co-creation as challenging the conventional relationship between scientists and policy advisors: if science itself enters into co-creation and information dissemination, what is the role of policy advisors, what is their added value and under what circumstances can they be successful? And conversely, how does co-creation shape the role of scientists in policy advice?

A broad variety of practitioners took part in the roundtable. Many stressed how systemic obstacles, diverging stakeholder needs, practical considerations and conceptual deficiencies result in a continuing gap between co-creation in literature and co-creation in action. Three subgroups shared insights from development work, climate research, transdisciplinary sustainability studies, future studies and presented concrete policy problems.

The participants contributed qualitative insights with specific emphasis on four aspects:

- First, many projects are characterised by a long and often laborious "phase 0" with intensive personal exchange and the building of understanding and trust as a condition for the future collaboration, before any co-creation in the conventional sense can take place. Funding organisations, methodologists and practitioners have to bear in mind that this early phase involves particularly sensitive negotiations and is a very time- and resource-intensive part of the project work which must be allowed for in work plans and funding.

**ORGANISERS/AUTHORS**

Joachim Spangenberg, Helmholtz Centre for Environmental Research Leipzig
Jeremias Herberg, Institute for Advanced Sustainability Studies Potsdam

• Second, projects are attributed the role of an agent in its own right by local agents, with different expectations held by different stakeholders. To avoid that the project success is undermined by unrealistic expectations, projects should explicitly define their role and pursue an exit strategy emphasising their limited presence and preparing partners for their exit from the ongoing social processes. Defining their own role as a social actor also provides an opportunity for scientific reflection.

• Third, many of the shared experiences showed that the expectations of what co-creation can deliver are often unrealistic: co-creation as a collaborative and reflexive approach that needs time before any results emerge is a trust-based collaborative effort which is at risk to collapse if temporal pressure is enacted. As a result, the pace of policy work and its demands to science can easily develop faster than co-creative research. However, the fact that the demands are often at odds with what the approach can deliver is rarely discussed - the institutional and temporal fit between policy and research is an issue that urgently requires more attention.

• Fourth, policy advice that is triggered by or channelled through the notion of co-creation needs further scrutiny. A collaboration at eye level or the notion of creating something together have an ambivalent relationship with the tacit hierarchies that underpin many advisory practices. The social robustness of insights and recommendations necessitates a reliably broad base.

# SCIENTIFIC KNOWLEDGE FOR DECISION-MAKING
# THE ROLE OF THE SOCIAL SCIENCES AND HUMANITIES AT THE INTERFACE OF THE ENVIRONMENTAL SCIENCES AND INTERNATIONAL POLITICAL FORA

**Results of the roundtable discussion**

In recent decades, the natural sciences have identified human-caused environmental risks across scales that threaten natural systems, human well-being and future options for development. Recent landmark UN agreements like the Sustainable Development Goals, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction are political responses aimed at mitigating risks and fostering development. There is an increasing perception in international environmental fora that society is not just a recipient of outcomes emerging from science or from science-policy interactions, but rather an integral part of the joint development and implementation of science-based solutions for sustainable development and human security. Science-based options, including integrated models from the social sciences, humanities, economics, natural and technical sciences are needed to support solution-oriented decision-making and to provide information on adequate indicators to assess progress towards policy goals for alternative models of social change.

A new integrative policy framework is emerging that requires the full engagement of SSH (the social sciences and the humanities) to identify opportunities for sustainable development and human security, and to promote awareness of, involvement in and consensus-finding for the implementation of policies and actions for transformation towards low-carbon, and soil-, water- and biodiversity-friendly societies.

**ORGANISERS/AUTHORS**

Mariam Akhtar-Schuster, DLR Project Management Agency
Christiane Textor, DLR Project Management Agency
Jens Jetzkowitz, Helmut Schmidt Universität Hamburg
Josef Settele, Helmholtz Centre for Environmental Research – UFZ
Heike Egner, Alpen-Adria-Universität Klagenfurt
Martin Kowarsch, Mercator Research Institute on Global Commons and Climate Change


Traditionally, the natural sciences as well as the technical sciences and economics have dominated international scientific assessments, e.g. the IPCC, but SSH as well as indigenous and local knowledge are playing an increasingly important role in the IPCC and particularly in the IPBES and the UNCCD Science-Policy Interface.

However, simply integrating SSH into existing approaches to global environmental assessments is not achievable due to different jargons and taxonomies. Transforming societies therefore requires transforming how scientists with different epistemologies and 'thought styles' collaborate at the interface of international political fora. A new framework for environmental research across and beyond disciplines where SSH, natural and technical sciences and economics are involved at the same level is necessary to respond to policy needs in a timely and effective way. This framework should be based on an open and durable interdisciplinary dialogue that promotes the understanding of methods (incl. taxonomy and concepts), jargons and agendas applied by different disciplines.

**Outlook**

The outcomes of the session will be documented in a science-policy relevant format identifying options and challenges for supporting the development and consolidation of the new framework for environmental research across and beyond disciplines for the benefit of societies.

# SOCIETAL RESILIENCE **AND CLIMATE EXTREMES**

The topic of extreme events and emergent risks under global environmental change is both scientifically challenging and of major societal relevance. The "Societal Resilience and Climate Extremes" roundtable was initiated and organised by the correspondent working group of the German Committee Future Earth. It focused on identifying transdisciplinary knowledge production and information exchange processes between scientists and stakeholders. Moderated by the working group and inspired by five inputs from different scientific perspectives, 28 participants discussed practical experiences relating to how societal resilience can be improved to enhance successful responses to extreme events and how these actions could contribute to achieving specific SDGs (e.g. SDG 13: "combat climate change and its impacts", SDG 15: "sustainable use of terrestrial ecosystems" or SDG 9: "build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation". The three World Cafés highlighted the importance of the following issues:

**ORGANISERS/AUTHORS**

Petra Mahrenholz, German Environment Agency Dessau
Ilan Chabay, Institute for Advanced Sustainability Studies Potsdam
Alexander Fekete, Cologne University of Applied Science
Christian Kuhlicke, Helmholtz Centre for Environmental Research Leipzig
Grit Martinez, Ecologic Institute Berlin

## 1. What elements pose the greatest risks for social-ecological systems and what metrics are the most useful indicators across timescales?

**Elements:**

- What is affected?
  - Services and infrastructure
  - Societal cohesion and trust
  - Natural assets / ecosystem services
- What affects? (hazards, stressors, etc.)

**Metrics (quantitative as well as qualitative):**

- Essential functions and their prioritisations (survival, basic income, etc.)
- Redundancies
- People, users of those essential functions
- Thresholds
- Endurance time (e.g. being without water)
- Acceptance level (psychological aspects, aspects measurable in risk assessments) – and ignorance of risks
- Time: assigning timescales for response, for priority setting and resource allocation
- Values and culture
- Structural vs non-structural aspects
- Boundaries of socio-ecological systems
- Social / ecological system specifics
- Capacity asymmetries (differences in transport, access, awareness, etc.)
- Actions resulting from capacity planning
- Resulting changes

## 2. What procedures and related institutions are currently in place or being envisaged to cope with extreme events and risk cascades in the future? What elements are missing for improving societal resilience under future extreme events?

- Procedures and institutions follow and address specific functions
  - Multi-sector multi-actor partnerships
  - Decentralisation of manageable solutions
  - Community-based adaptation schemes
  - How can neighbourhood interaction, especially in bigger cities, be supported?
- Long-term future planning – avoidance of structural dependency
- More experimental and cooperative procedures
- Equity and justice often missing in resilience discussions
- Local institutions needed (neighbourhoods in big cities) – polycentricity perspective
- Nested and adaptive legal framework is needed and should be supplemented and supported by strong platforms, esp. on national level
- Make intent explicit
- Data needed
- Build back better after disaster!

## 3. Which good practice examples or success factors for improving social resilience are known?

- Focus on premise that good practice examples are context-specific
- Several dimensions of social vulnerability (exposure, sensitivity): resilience is the product – the coping strategy of a societal group or system to adjust and adapt to future stresses, perturbations or shocks
- Resilience is influenced by several attributes in context-specific settings, e.g.
  - Economic viability
  - Community / society knowledge including traditional knowledge, aspirations, capacity, participatory processes, historical context and experiences,
  - Community / society vitality and cultural fit,
  - Governance, understanding and execution of participatory approaches (e.g. co-design of processes).
- Success factors for improving social resilience can be
  - Simple and effective communication of climate risks and uncertainties to decision-makers,
  - Dialogue and participation (select formats appropriate to internal impact on the individuals involved),
  - Place-based contextualised analysis (from the inside not the outside).
- Good examples are ecosystem-based solutions and river programmes (flood protection, biodiversity with “room for rivers”, resettlement, e.g. in the Netherlands) but these are context-specific.
- Under-researched as yet: influence of narratives (as they differ across cultures / societal systems) and the extent to which they shape resilience.

The “Societal Resilience and Climate Extremes” working group of the German Committee Future Earth is going to generalise the input of this roundtable especially with respect to existing research gaps with the aim of contributing to the development of landmarks for a national and EU-level research strategy.

discuss according applicability and feasibility and those policy interventions by answering two sets of questions: the first array of questions focused on direct feedback on the suggested policy interventions:

- *Is the information provided clear? If not, what could use further explanation or clarification?*
- *From your experience, would you like to add any elements/suggestions to the interventions that you feel are missing?*
- *Are there any aspects of the intervention that you disagree with? If so why?*
- *Are you aware of any additional examples that could be included, similar to the ones described?*

The second set of questions was based on the implementation phase, and participants were asked to discuss and exchange on the following key points:

- *From your experience, where do you see opportunities to start to implement the intervention?*
- *Where do you see challenges to implementation?*
- *Do you have suggestions on how the challenges could be overcome?*

The session concluded with an open discussion format in which participants briefly shared their feedback and were informed by the organizers on how the gathered information would have been used to modify/refine the discussed policy interventions. Participants stressed strengths and weakness of the identified actions, further pointed out at the importance to account for climate change/ environmental components in the interventions, and also reinforced the message that developing policies that promote health and equity and sustainable lifestyles required integrated approaches at European, national and local level.

## SUSTAINABLE LIFESTYLES
## POLICY PATHWAYS FOR HEALTHIER AND ENVIRONMENTALLY SUSTAINABLE LIFESTYLES

The starting point for this roundtable was the challenge to develop policies that promote health and equity and provide the mechanisms to stimulate resilient and sustainable lifestyles in Europe. Integrated approaches, in which the scientific knowledge, “top-down” policies and “bottom up” pressure for change are addressed as a whole and through which a range of different actors is engaged, are difficult to implement. The key drivers of change and related challenges facing Europe can change significantly with 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 necessary actions to be undertaken requires a ‘fast forwarding into the future thinking’ perspective. We must try to anticipate what lies ahead and grasp ongoing, emerging and latent drivers of change, trends and opportunities. In this context, the session started with three presentations focusing on the INHERIT project which is being implemented by 18 partners from different European countries, representing environmental, social and health sectors. The first presentation provided participants with an overview of what the project is about, namely advancing sustainable and healthy lifestyles through the identification of ways of living, moving and consuming that protect the environment and promote health and health equity. Following, a detailed explanation was provided on the four scenarios developed within INHERIT to put into practice a forward-looking analytical approach. Each scenario is positive, describing European societies which have successfully reached the triple win of

**ORGANISERS/AUTHORS**

Rosa Strube, Collaborating Centre on Sustainable Consumption and Production
Francesca Grossi, Collaborating Centre on Sustainable Consumption and Production

reduced negative environmental impacts and improved health and health equity in Europe in the year 2040. They focus on the areas green space, energy efficient housing, active transport and consuming. Each of these scenarios, therefore, sets out a vision of societies in which people can enjoy the benefits of green space, live in energy efficient homes, engage in more active transport and consume food that is healthy and has been produced in ways that are environmentally sustainable. To conclude this round of presentation and to move into the interactive roundtable discussion, the last presentation briefly touched upon the process adopted to derive a policy route map composed of a set of 20 integrated policy interventions that address key environmental stressors of health and the underlying causes of health inequity. The route map starts in the year 2018 and ends with a future vision of the year 2040. Four policy interventions were presented, for each of the INHERIT areas, plus a general level category representative of those policy interventions, which do not fall into one of the specific areas, but which in an overarching way can foster the transition towards healthier, more equitable and sustainable European societies.

Participants were then asked to split into five groups according to the INHERIT fours areas of green space; energy efficient housing; active transport; and consuming (food & beverages) plus the general level area. The key aim was to discuss according applicability and feasibility and those policy interventions by answering two sets of questions: the first array of questions focused on direct feedback on the suggested policy interventions:

- *Is the information provided clear? If not, what could use further explanation or clarification?*
- *From your experience, would you like to add any elements/suggestions to the interventions that you feel are missing?*
- *Are there any aspects of the intervention that you disagree with? If so why?*
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# SUSTAINABLE CLIMATE LANDSCAPES
# TOWN AND COUNTRY IN THE FLOW – CREATING SUSTAINABLE CLIMATE LANDSCAPES

**1. Welcome address and introduction**
Nora Jennifer Schneevoigt, University of Bonn

**2. Surface cover and climate – what are the linkages between those two?**
Nora Jennifer Schneevoigt, 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**

- Restoration projects need time to mature; patience is essential.
- When dealing with specific climate adaptation strategies for a community, the individuals concerned have to be distinguished from the so-called "civil society", which is usually seen as an entity. It is important to integrate each individual into the project by creating a sense of belonging, proactivity and local leadership. Local experience of climate change can help make it "your problem and your project".
- Many people are more interested in better living standards than in climate adaptation strategies, thus different wording underlining individual benefits is beneficial.
- Climate adaptation should not exclusively be a top-down process, yet the the "Covenant of Mayors for Climate & Energy" helps to boost support for local activities and networking.

**ORGANISERS/AUTHORS**

Nora Jennifer Schneevoigt, University of Bonn
Anke Valentin, Wissenschaftsladen Bonn

**6. Visions for the future: drafting a roadmap towards 2030**

- Flexibility is needed for successful climate adaptation strategies. Rather than presenting people with ready-made programmes, it seems better to get locals together to develop a joint project plan based on individual local needs.
- The rich disproportionately contribute to climate change, but the poor mostly suffer from it. Hence the latter need to be integrated into climate adaptation processes. This requires addressing climate change problems by bridging the language gap between academia and the rest of society.

**7. What are the hindrances and obstacles? Why are practical measures lagging so far behind the scientific recognition of climate change?**

- Climate psychology explains the gap between science and people: climate change is too far away.
- Science should be formulated in less abstract terms in order to be put into practice. For example, short-term effects are more easily understood than long-term perspectives 100 years from now.
- Scientists should be more present in communities, civil society and the mass media rather than hiding in their ivory towers, only addressing their peers.
- The translation of scientific results into policy briefs/plans can show the impacts of climate action (and also non-adaptation) in economic terms.
- Idols/stars can bring climate change to a wider audience and increase the popularity of measures.
- Science uses indicators and numbers, yet methods like story telling work better with people and governments.
- To reach certain milieus, one should ally oneself with people/advocates from that milieu.

# FUTURE EARTH
# KNOWLEDGE ACTION NETWORKS

Future Earth's Knowledge Action Networks are the prime mechanism for delivering Future Earth' research strategy and facilitating highly integrative sustainability research. Knowledge Action Networks foster collaboration across disciplinary backgrounds on some of today's most pressing global environmental challenges. Knowledge Action Networks focus on key societal challenges as outlined in the Future Earth 2025 Vision, as well as cross-cutting topics.
The networks build on the broad range and diversity of specialist expertise represented in the large community of researchers and practitioners associated with Future Earth.
The Development Teams lead the planning and execution of the initial scoping for the Knowledge Action Networks for a limited time period.

## FUTURE EARTH HEALTH

Co-chairs of development team:
*Peter Daszak, EcoHealth Alliance, USA*
*Andy Haines, London School of Hygiene and Tropical Medicine, UK*

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).
http://futureearth.org/future-earth-health

## FUTURE EARTH NATURAL ASSETS

Co-chairs of development team:
*Unai Pascual, Basque Centre for Climate Change, Spain*
*Maria Jose Martinez-Harms, Pontificia Universidad Católica de Chile*

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.
http://futureearth.org/future-earth-natural-assets

## FUTURE EARTH OCEAN

Co-chairs of development team:
*Anna Zivian, Ocean Conservancy, USA*
*Rachel Cavanagh, British Antarctic Survey, UK*

The Ocean Knowledge Action Network seeks to address the challenge of climate change, overfishing, acidification, deoxygenation 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.
*Sponsor Group:*
*Future Earth*
*Intergovernmental Oceanographic Commission (IOC)*
*Scientific Committee on Oceanic Research (SCOR)*
*World Climate Research Programme (WCRP)*
http://futureearth.org/future-earth-ocean

## FUTURE EARTH SYSTEMS OF SUSTAINABLE CONSUMPTION AND PRODUCTION

Chairs of development team:
*Magnus Bengtsson, Independent researcher and consultant, Japan*
*Maurie Cohen, New Jersey Institute of Technology, USA*
*Anna Davies, Trinity College Dublin, Ireland*
*Sylvia Lorek, Sustainable Europe Research Institute, Germany*
*Patrick Schroeder, Institute of Development Studies, UK*
*Philip Vergragt, Tellus Institute, USA*

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.
http://futureearth.org/future-earth-sscp

## FUTURE EARTH URBAN

Coordinating Committee:
*Xuemei Bai, Australian National University*
*Maruxa Cardama, Cities Alliance*
*Richard Dawson, Newcastle University, UK*
*Kensuke Fukushi, University of Tokyo, Japan*

*Timon McPhearson, The New School, USA*
*Debra Roberts, Sustainable and Resilient City Initiatives Unit, eThekwini Municipality, Durban, South Africa*
*Seth Schultz, C40 Cities Climate Leadership Group*
*José Siri, UN University - International Institute for global Health, Malaysia*

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 liveable, equitable and resilient through co-developed and solutions-oriented research.
http://futureearth.org/future-earth-urban

## FUTURE EARTH WATER-ENERGY-FOOD NEXUS

Steering Committee*:
*Faten Attig-Bahar, Tunisia Polytechnic School Pamela Katic, University of Greenwich, UK*
*Chrysi Laspidou, University of Thessaly, Greece*
*Aditi Mukherji, International Center for Integrated Mountain Development, Nepal*
*Jiaguo Qi, Michigan State University, USA*
*Alice Ruhweza, Conservation International, USA*
*Marja Spierenburg, Radboud University Nijmegen, Netherlands*
*Makoto Taniguchi, Research Institute for Humanity and Nature, Japan*

**The mandate of the Development Team ended in early 2018 with the establishment of the Steering Committee. The Steering Committee initiates and stimulate activities of the Nexus Knowledge-Action Network*

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).
http://futureearth.org/future-earth-water-energy-food-nexus

## FUTURE EARTH FINANCE AND ECONOMICS (EARLY STAGE)

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 interdependencies – 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.
http://futureearth.org/future-earth-finance-economics

## FUTURE EARTH DECARBONISATION (EARLY STAGE)

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, Vol. 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 modelling 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 topic 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.

## FUTURE EARTH EMERGENT RISKS AND EXTREME EVENTS (EARLY STAGE)

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 ransformation 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.

# GERMAN COMMITTEE FUTURE EARTH
# WORKING GROUPS

Working groups are an important part of the organisation of the German Committee Future Earth because they help to further develop the national research agenda on sustainability, to facilitate and identify innovative German contributions, and to support German scientists in the development of relevant research activities within Future Earth and WCRP. The working groups enable a broad exchange of ideas with the community and provide the possibility to comprehensively work on innovative themes. While current working groups and their activities are outlined below, previous working groups have focused on the following issues:

- The social aspects in socio-ecological models and simulations of sustainability research (2015-2017)
- Co-design, co-production and co-dissemination (2015-2017)
- Positive impacts through land use change (2015-2017)
- Sustainable intensification in agriculture (2015-2017)

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), particularly Goal 8 "Decent work and economic growth". Sustainable work refers to work that promotes global human development while ensuring sustainability, and it 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 as well as economic development. This is 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:

## Sustainable work - the social-ecological transformation of the labour society

Spokesperson:
*Georg Jochum, Technische Universität München*

Duration:
2017 - 2019 (24 months)

Expected output:
Position paper; proposal for Future Earth topic

- 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”?
- What will be the relationship between wage labour and other forms of labour (e.g. care and educational work, housework, honorary positions)?
- What relationships exist between sustainability or unsustainability of the world of work and everyday life?

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Raising awareness of the unsustainable paths on which societies and economies develop, triggers the emergence of alternative lifestyle concepts. At the core of this development is social innovation. Both individual and 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 contribute to this aim, this working group seeks to foster societal transformations in the energy domain through smart combinations of social and technical innovation. It will establish an inter- and transdisciplinary network of relevant scientists and stakeholders and develop 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; another 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 behaviour?
- What can be learned from the field of energy use for other fields of consumption?

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

Spokespersons:
*Andreas Ernst, Universität Kassel*
*Birgit Blättel-Mink, Goethe Universität Frankfurt*

Duration:
2016 - 2017 (18 months)

Expected output:
Report; conceptual paper

## Urban sustainability transformations - integrated urban research

Spokespersons:
*Kerstin Krellenberg, Helmholtz Centre for Environmental Research*
*Florian Koch, Hochschule für Technik und Wirtschaft (HTW) Berlin*

Duration:
2017 - 2019 (24 months)

Expected output:
Perspective for research proposal

Cities are at the same time contributing to and affected by global environmental change. Therefore, cities play a crucial role in achieving 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 the role of science in this process, and what are possible constraints, but also the potential of transformative urban research?

## Societal resilience and climate extremes

Spokesperson:
*Markus Reichstein, Max Planck Institute for Biogeochemistry*

Duration:
2017 - 2019

Expected output:
Expert workshop addressing main research question; strategic publication describing first answers to the main research questions and outlining a new national research strategy; new interdisciplinary collaborations that apply for larger research grants

Several international bodies recognise that climate extremes are one of the major future threats to society. Yet, 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?" remains unanswered. There is a need to systematically assess which modelling approaches and data from various disciplines can be used to better respond to this question. In addition, climate extremes are usually defined with extreme weather events in mind but risks to society also emerge 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.
- Analyse appropriate and achievable approaches and methods of coupling socio-economic and behavioural 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 the 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.

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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.

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

Spokesperson:
*Wilfried Rickels, Institute for the World Economy*
*Christa A. Marandino, GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel*

Duration:
2018 - 2019 (18 months)

Expected output:
Position paper; network; participation of selected working group members at several congresses and the Global Economic Symposium in Kiel in 2019 (organization of a round table); T20 recommendation paper

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 the one hand, with maximum tolerable impacts of consumption, on the other hand.

The working group will analyse 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?

## Transformation corridors for sustainable consumption

Spokespersons:
*Melanie Jaeger-Erben, ISInova Institut für Sozialinnovation e.V. Berlin*
*Daniel Fischer, Leuphana Universität Lüneburg*

Duration:
2018-2019 (18 months)

Expected output:
Draft proposal for research project or DFG research group

# GERMAN COMMITTEE FUTURE EARTH

# DKN CO-DESIGN PROJECT GROUPS

The German Committee Future Earth supports the co-design and co-production of global sustainability research. Two co-design project groups have been founded for the time period 2017 to 2018 to explore processes of co-designing research agendas and to provide an answer to the question how to produce scientific knowledge that is valuable both to researchers and stakeholders from politics, civil society and/or business.

## More land use diversity – regionalize it!

Spokesperson:
*Hermann Jungkunst, Universität Koblenz-Landau*

Duration:
2017-2018

Expected output:
Research agenda

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 so similar to one another that biodiversity on a larger scale is increasingly lost. 2) Land use may not be sustainable because land use decisions in one country affect those in other countries (e.g. 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.) from different spatial and planning levels, the co-design project aims to develop perspectives and strategies for a sustainable land use (Sustainable Development Goal 15). Extreme solutions like deforestation should be included 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 ensuing insights of the project shall result in a research agenda, with open research questions.

# SDGs and cities

Spokesperson:
*Kerstin Krellenberg, Helmholtz Centre for Environmental Research*
*Florian Koch, Hochschule für Technik und Wirtschaft (HTW) Berlin*

Duration:
2017-2018

Expected output:
Research agenda

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 will analyse success factors and obstacles of previous sustainable urban development efforts in German cities. It will thereby reveal open research questions regarding the implementation of the SDGs at the urban level. In November 2017 a workshop was organised in the context of COP23 of UNFCCC in Bonn, where practitioners (e.g. the mayors of three German cities) and researchers discussed the question: How do cities contribute to the implementation of the Paris Agreement and the SDGs and how can research support these efforts? The results of the exchange with stakeholders were fed back into the German Committee Future Earth working group “Urban Sustainability Transformations” to pave the way for the development of a perspective for national research priorities.

GERMAN COMMITTEE FUTURE EARTH

# FUTURE EARTH, THE WORLD CLIMATE RESEARCH PROGRAMME AND THE GERMAN COMMITTEE IN BRIEF

## FUTURE EARTH

**Vision:** Only by working together science and society can shape and harness knowledge that is more than just the sum of its parts – knowledge that can empower people around the world to transform their communities and environment in sustainable and equitable ways.

**Mission:** Future Earth provides the global platform for a cooperative effort to accelerate transformations to global sustainability through research and innovation.

Future Earth addresses major international targets, as formulated by the Sustainable Development Goals (SDGs), the Paris Climate Agreement, and the Sendai Framework for Disaster Risk Reduction. To achieve high-impact goals Future Earth strategy for contributing to the transformation to sustainability builds on four major areas: (1) to facilitate and amplify research, (2) to convene and mobilize networks, (3) to spark and promote innovation and (4) to turn knowledge into action.

**More information:** www.futureearth.org

## WORLD CLIMATE RESEARCH PROGRAMM (WCRP)

**Vision:** A world that uses relevant and authoritative climate science to ensure a resilient present and sustainable future for humankind.

**Mission:** The World Climate Research Programme (WCRP) coordinates and guides international climate research to develop, share and apply the climate knowledge that contributes to societal well-being.

WCRP addresses aspects of climate science that are too large and too complex to be tackled by a single nation, agency or scientific discipline. Through international science coordination and successful partnerships, WCRP leads the way in understanding the fundamentals of the climate system and in determining its interactions with human activities. WCRP research provides the climate science that underpins the United Nations Framework Convention on Climate Change and contributes to the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction.

**More information:** www.wcrp-climate.org

# GERMAN COMMITTEE FUTURE EARTH (DKN FUTURE EARTH)

**Mission:** The German Committee Future Earth acts as an independent, national research advisory board for issues related to national and international activities in Future Earth and WCRP. As a national representative of Future Earth and WCRP, the German Committee Future Earth supports und further develops the national scientific agenda, facilitates and identifies innovative German contributions, and supports German scientists in the development of relevant research activities within Future Earth and WCRP.
In this regard, the German Committee Future Earth encourages the collaboration between natural and social sciences, the humanities and engineering to advance research activities that help shape the pathways for a global sustainable society, to find a systematic approach for solutions and to generate societal relevant knowledge.

The dialogue between stakeholders from politics, economy and society, as well as the integration of their knowledge is a crucial part of Future Earth research activities. The German Committee Future Earth supports the German community in these processes and encourages the further development by providing a platform developed from scientists for scientists. It closely collaborates with the broader German community to support e.g.

- the international and national dialogue on global sustainability, e.g. in **strategic workshops** (Foresight workshop on science needs in implementing the SDG framework), **conferences** (German Future Earth Summits) or as **partner and funding organisation** of the'Science Platform Sustainability 2030'of Germany.
- the development of socially relevant research topics, including support of the dialogue between science and society, e.g. in **co-design project groups** (SDGs and cities, More land use diversity).
- the German community in designing integrated research e.g. in **working groups** on topics such as

  - Societal resilience and climate extremes (2017-2019).
  - Shipping emissions in the German Baltic and North Sea region (2018-2019).
  - Sustainable consumption (2018-2019).
  - Urban sustainability transformations (2017-2019).
  - Sustainable Work (2017-2019).
  - Social innovation in energy policy making (2016-2018).
  - The social aspects in socio-ecological models and simulations of sustainability research (2015-2017).
  - Co-design, co-production and co-dissemination (2015-2017).
  - Sustainable intensification in agriculture (2015-2017).
  - Positive impacts on land use change (2015-2017).

All activities of the German Committee Future Earth are financed by DFG and supported by the German Committee Future Earth Secretariat. The tasks of the secretariat include coordinating activities and contributions and, over the long term, providing a platform and the knowledge for the debate on new methods and topics within sustainability research in Future Earth as well as supporting dialogue on co-design of research for Future Earth in Germany.

**More information:** www.dkn-future-earth.org

## MEMBERS GERMAN COMMITTEE FUTURE EARTH

Prof. Dr. Francois 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), GERICS Climate Service Center Germany
Dr. Christiane Joerk (ex-officio), German Research Foundation DFG
Prof. Dr. Wolfgang Lucht (2013-2018), Potsdam Institute for Climate Impact Research
Prof. Dr. Karen Pittel (2013-2018), Ifo Institute – Leibniz Institute for Economic Research at the University of Munich
Prof. Dr. Christiane Schmullius (2013-2015), Friedrich Schiller University Jena
Dr. Bettina Schmalzbauer (ex-officio), German Committee Future Earth Secretariat
Prof. Dr. Martin Visbeck – Chairman – (2013-2018), GEOMAR Helmholtz Centre for Ocean Research Kiel
Prof. Dr. Volkmar Wolters (2013-2015), Justus Liebig University Giessen

## GERMAN COMMITTEE FUTURE EARTH SECRETARIAT

Dr. Bettina Schmalzbauer, Executive Director
Dr. Barbara Malburg-Graf, Community Coordination
Dr. Philipp Lange, Science Officer 'Science Platform Sustainability 2030'
M. Sc. Johannes Lundershausen, Science Officer
Juliane Barth / Anna Rozwadowska, Finance and Administrative Assistant
Student Assistant: Judith Dudenhöfer, Maike Dieterich, Carla Ebert

## PUBLICATIONS

Delzeit, R. et al. (2018) How the sustainable intensification of agriculture can contribute to the Sustainable Development Goals, Working Paper No. 18/1, German Committee Future Earth, Stuttgart/Kiel, ISBN 978-3-9813068-6-6.

Pettibone, L. et al (2018) Transdisciplanary Sustainability Research and Citizen Science: Options for Mutual Learning, GAIA 27/2 (2018): 222-225.

Schmalzbauer, B. & Visbeck, M. (Eds.) (2016) The Contribution of Science in Implementing the Sustainable Development Goals, German Committee Future Earth, Stuttgart/Kiel, ISBN 978-3-9813068-5-9.

Schmalzbauer, B. & Visbeck, M. (Eds.) (2016) 2nd German Future Earth Summit: Conference Summary Report, DKN Future Earth, Stuttgart/Kiel, ISBN 978-3-9813068-4-2.

Schmalzbauer, B. & Visbeck, M. (Eds.) (2014) 1st German Future Earth Summit: Conference Summary Report, DKN Future Earth Stuttgart/Kiel, ISBN 978-3-9813068-3-5.

**German Committee Future Earth**
**DKN Future Earth Secretariat**

Heilbronnerstr. 150
70191 Stuttgart, Germany

www.dkn-future-earth.org