# The Sustainable Development Goals - conceptual approaches for science and research

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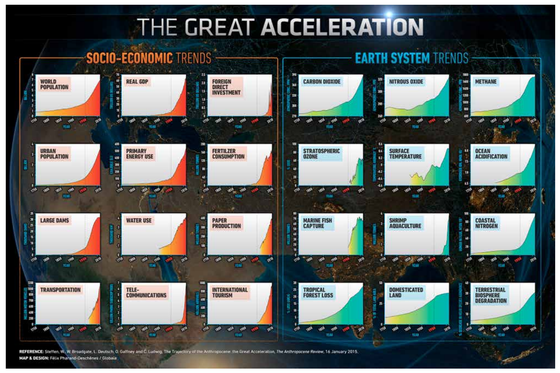
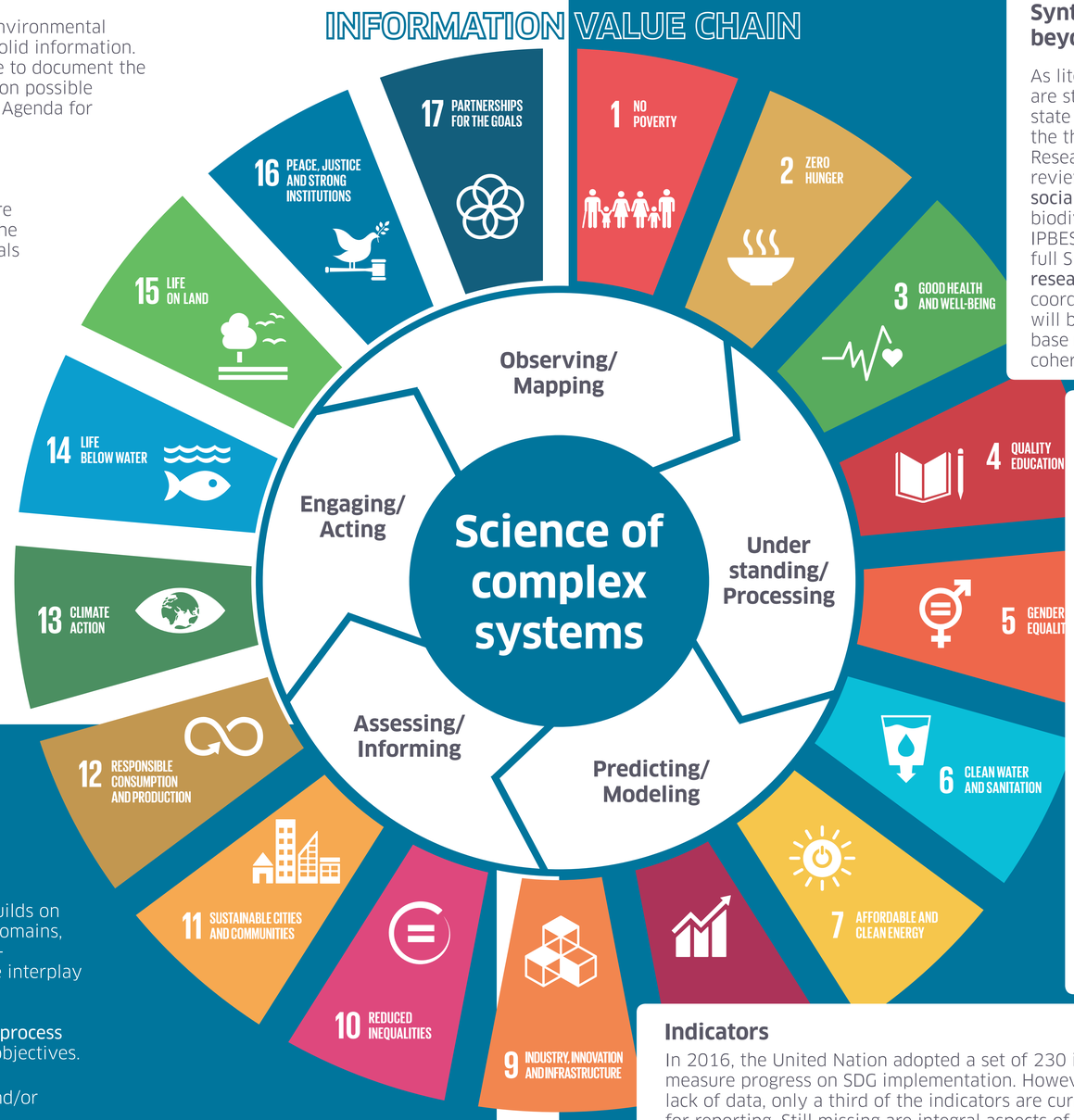
## From a degraded and unequal Earth system to global sustainable societies

Challenged to provide answers to some of the world's biggest societal and environmental problems, the scientific community has consistently delivered exciting and solid information. This is often used to assess the situation in many different parts of the globe to document the anthropogenic cause of environmental changes and to provide perspectives on possible development scenarios. However, with the new political framework of 2030 Agenda for Sustainable Development, comprising environmental, economic, social and institutional aspects, more integrated knowledge is needed to facilitate the successful implementation of the associated 17 SDGs and its 169 targets. The 2030 Agenda explicitly recognises that sustainability challenges are fundamentally interrelated. Focusing exclusively on single SDGs will therefore not be effective. This means that science (and society) need to be aware of the broad SDG spectrum to find the best pathway to progress towards all the goals and to global sustainable societies.




## SCIENCE & SDGs: THE FOUR PILLARS

### Upstream fundamental and solution-oriented research




#### Synthesis products and integrated assessments beyond IPCC & IPBES

As literature about sustainability research is exploding and communities are still fragmented, there is a clear need for synthesis in science (incl. state of the art, robust trends, actual risks and uncertainties) to inform the the political processes in a comprehensive, adequate way. Researchers can contribute with regular scientific assessments that review the **comprehensive knowledge across the natural sciences, social sciences and humanities** and cover topics such as climate and biodiversity but also going beyond IPCC and IPBES as this assessments do not cover the full SDG range. In this way, **solution-oriented research** along with cutting-edge, globally coordinated **upstream fundamental research** will be able to create the critical knowledge base required to articulate efficient and coherent sustainable development pathways.


#### Understanding of positive and negative SDG interactions

Assessments in support of SDGs need to "go the extra mile" by assessing interlinkages (positive or negative) embedded within the SDGs as well as policy options to transform possible trade-offs into synergies. **Positive or negative interactions are always context-specific** and research is needed to assess which positive effects can, in fact, be achieved, and the nature of any likely negative effects. **Foresight**, as a science informed analysis and learning process before strategic decisions are taken, can be of invaluable help in addressing the complexity (and time pressures) in the SDG implementation processes.

**1** Identify related goals and targets, and collect knowledge (acadmeic & non-academic). Any knowledge gaps?

Unger S., et al. 2017. Achieving the Sustainable Development Goal for the Oceans. - IASS Policy Brief, 2017, 1. DOI: http://doi.org/10.2312/iass.2017.004

**2** Rate goals and targets. Positive/Negative interactions?

**GOALS SCORING**
The influence of one Sustainable Development Goal or target on another can be summarized with this simple scale.

| Interaction | Name | Explanation | Example |
|---|---|---|---|
| +3 | Indivisible | Inextricably linked to the achievement of another goal. | Ending all forms of discrimination against women and girls is indivisible from ensuring women's full and effective participation and equal opportunities for leadership. |
| +2 | Reinforcing | Aids the achievement of another goal. | Providing access to electricity reinforces water-pumping and irrigation systems. Strengthening the capacity to adapt to climate-related hazards reduces losses caused by disasters. |
| +1 | Enabling | Creates conditions that further another goal. | Providing electricity access in rural homes enables education, because it makes it possible to do homework at night with electric lighting. |
| 0 | Consistent | No significant positive or negative interactions. | Ensuring education for all does not interact significantly with infrastructure development or conservation of ocean ecosystems. |
| –1 | Constraining | Limits options on another goal. | Improved water efficiency can constrain agricultural irrigation. Reducing climate change can constrain the options for energy access. |
| –2 | Counteracting | Clashes with another goal. | Boosting consumption for growth can counteract waste reduction and climate mitigation. |
| –3 | Cancelling | Makes it impossible to reach another goal. | Fully ensuring public transparency and democratic accountability cannot be combined with national-security goals. Full protection of natural reserves excludes public access for recreation. |

Nilsson M., Griggs D., Visbeck M., 2016. Map the interactions between Sustainable Development Goals. Nature 534, 320-322

**3** Provide critical knowledge-basis & close important knowledge gaps.

## SCIENCE SUPPORT

## Cooperation and partnerships across research disciplines, other knowledge domains

Implementing the 2030 Agenda will be a continuous learning process that builds on knowledge exchange and close collaboration between different knowledge domains, regions and nations. Scientific concepts of co-design of research agendas, co-production of knowledge and co-delivery of research results can support the interplay between science and relevant stakeholders. Needs are:

- To understand research in context of 2030 Agenda as a **reflective thinking process and as a holistic approach** to achieve economic, social and environmental objectives.
- To build up **strong knowledge partnerships** where equal weight is given to academics, decision-makers, practitioners, business leaders, civil society and/or others (on a national/regional level).
- **To facilitate discussions** between different knowledge domains in order to build trust, reduce uncertainties, develop more robust pathways and better understand the challenges of implementation.
- To foster **linkages to the international level** (e.g. platforms such as Future Earth, WCRP, SDSN, UN-SAB) to ensure that the best scientific knowledge is rapidly and freely available to decision-makers around the world as well as to ensure global policy consistency, and deliver innovative international research in support of global sustainability.


Based on two high-level stakeholder discussions in 2015 and 2016 summarised in ‚Schmalzbauer B., Visbeck M. (Eds.) 2016. The contribution of science in implementing the Sustainable Development Goals. German Committee Future Earth, Stuttgart/Kiel.'

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#### Indicators

In 2016, the United Nation adopted a set of 230 indicators to measure progress on SDG implementation. However, due to lack of data, only a third of the indicators are currently suitable for reporting. Still missing are integral aspects of the indicator framework.
Science can contribute with **more and better data** on indicators as well as the development of **innovative integrated approaches** for, e.g. headline indicators, to improve policy decision-making. Furthermore, there is the need to built up **technical capacity** around the world, especially in developing countries. This includes training of scientists as well as creating institutions that can provide indicators and are sufficiently strong and transparent to remain politically independent.

#### Methods & concepts

Answering the research questions in the context of 2030 Agenda will require thinking out-of-the-box and reflecting on research methods and tools in a multidimensional way. Science could develop a **method toolbox for research** to improve understanding of methods and concepts of sciences and social sciences, as well as to advance (disciplinary) methodological approaches to more integrated methods (e.g. nexus thinking) and concepts in order to improve policy coherence in SDG implementation.