

● ARL	ARL – Academy for Territorial Development in the Leibniz Association, Hannover	● IPB	Leibniz Institute of Plant Biochemistry, Halle
● ATB	Leibniz Institute for Agricultural Engineering and Bioeconomy , Potsdam	● IPK	Leibniz Institute of Plant Genetics and Crop Plant Research, Gatersleben
● DIfE	German Institute of Human Nutrition Potsdam-Rehbruecke	● IPHT	Leibniz Institute of Photonic Technology, Jena
● DIE	German Institute for Adult Education – Leibniz-Centre for Lifelong Learning, Bonn	● ISAS	Leibniz-Institut für Analytische Wissenschaften – ISAS, Dortmund and Berlin
● DIW	German Institute for Economic Research Berlin	● IUF	IUF – Leibniz Research Institute for Environmental Medicine, Düsseldorf
● DSM	Deutsches Schifffahrtsmuseum – Leibniz-Institut für Maritime Geschichte, Bremerhaven	● IWH	Halle Institute for Economic Research (IWH) – Member of the Leibniz Association, Halle
● DSMZ	Leibniz-Institute DSMZ–German Collection of Microorganisms and Cell Cultures, Braunschweig	● IWM	Leibniz-Institut für Wissensmedien, Tübingen
● FZB	Research Center Borstel – Leibniz Lung Center	● LEIZA	Leibniz-Zentrum für Archäologie, Mainz
● GESIS	GESIS – Leibniz Institute for the Social Sciences, Mannheim and Köln	● LIB	Leibniz Institute for the Analysis of Biodiversity Change, Museum Alexander Koenig Bonn and Museum of Nature Hamburg
● GIGA	German Institute for Global and Area Studies / Leibniz-Institut für Globale und Regionale Studien, Hamburg	● LSB	Leibniz Institute for Food Systems Biology at the Technical University of Munich, Freising, Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science, Berlin
● IAMO	Leibniz Institute of Agricultural Development in Transition Economies, Halle	● MfN	Potsdam Institute for Climate Impact Research
● IAP	Leibniz Institute of Atmospheric Physics at the University of Rostock, Kühlungsborn	● PIK	Peace Research Institute Frankfurt, Frankfurt on the Main
● IGB	Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin	● PRIF	Leibniz Institute for Tropospheric Research, Leipzig
● IGZ	Leibniz Institute of Vegetable and Ornamental Crops, Großbeeren	● SAFE	Leibniz Institute for Financial Research SAFE, Frankfurt on the Main
● ifo	ifo Institut – Leibniz-Institut für Wirtschaftsforschung an der Universität München	● SGN	Senckenberg Society for Nature Research, Frankfurt on the Main
● IfW	Kiel Institute for the World Economy	● TIB	TIB – Leibniz Information Centre for Science and Technology and University Library, Hanover
● INP	Leibniz-Institut für Plasmaforschung und Technologie, Greifswald	● ZALF	Leibniz Centre for Agricultural Landscape Research, Müncheberg
● IÖR	Leibniz Institute of Ecological Urban and Regional Development, Dresden	● ZAS	Leibniz-Centre General Linguistics, Berlin
● IOW	Leibniz Institute for Baltic Sea Research, Warnemünde	● ZBW	ZBW – Leibniz Information Centre for Economics, Kiel and Hamburg
		● ZEW	ZEW – Leibniz Centre for European Economic Research, Mannheim
		● ZMT	Leibniz Centre for Tropical Marine Research, Bremen

- SECTION A Humanities and Educational Research
- SECTION B Economics, Social Sciences, Spatial Research
- SECTION C Life Sciences
- SECTION D Mathematics, Natural Sciences, Engineering
- SECTION E Environmental Sciences

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Systemic Sustainability

Biodiversity, Climate,
Agriculture and Food within
Planetary Boundaries



Front (object and photo): Elke Dingler

The foundations of life as a major scientific challenge

Biodiversity, climate, agriculture and food – a tense relationship

The current socio-ecological crisis is particularly apparent between biodiversity, climate, agriculture and food. The loss of biodiversity and climate change are progressing rapidly. One of the causes is the increasing intensity of agriculture worldwide, as well as food industry and demand. Environmental change in turn exacerbates the risks for agriculture and food security.

Many facets of this crisis are already being investigated. The enormous pressure to act underlines the need for more holistic and actionable knowledge. This involves the multi-layered interlinkages of the tense relationship, including goal conflicts and implementation problems, and should result in coordinated solutions. Accordingly, the exchange between science and society is becoming increasingly important.

The Leibniz Lab ‘Systemic Sustainability’

In the new scientific format of a Leibniz Lab, 41 institutions of the Leibniz Association are explicitly addressing the tension between biodiversity, climate, agriculture and food as a common area of action and conflict. Together with national and international partners, they are developing new tailored approaches to interdisciplinary and transdisciplinary knowledge integration and the systemic assessment of sustainability.

In specific dialogue formats, they tap into innovation potentials for transformations towards sustainability and target group-oriented transfer products with societal actors. Due to mutual interdependencies, they take into account the local-regional level in areas of the Global North and South, up to the international level. Boundaries of the earth system are deliberately included.

Enhanced understanding of sustainability

Significant social, economic and ecological characteristics are regarded in their complexity and dynamics as interconnected systems. This makes it possible to better understand the inter-linkages and derive coherent goals for basic social needs and the compliance of planetary boundaries. Innovations can be systemically conceived for transformative levers and capacities as well as conflicts and synergies.

Research and innovation for systemic sustainability

A novel approach

The Leibniz Lab ‘Systemic Sustainability’ combines knowledge integration with model-based assessments and systemic innovations. Its scientific activities are geared towards dialogue with societal actors. Science communication and specific products enhance the impact of the results.

Cross-level transdisciplinary dialogues

Facets of the common area of action and conflict in society and the knowledge needs from society are identified in dialogues between the Lab and actors from politics and administration, business and civil society.

Mapping of relevant discourses in selected forums enables the subsequent co-creation of goals and the co-evaluation of their achievement. Interdependencies between local-regional sites and the international level are taken into account.

Interdisciplinary and transdisciplinary knowledge integration

Biodiversity, climate, agriculture and food are each interdependent fields of research. Key interfaces between these fields and gaps in knowledge are systematically identified. On this basis, a framework concept and infrastructure for knowledge integration emerge. The new approaches are tested in pilot sites.

Assessment of systemic sustainability

Observational data and analytical findings on the interfaces between biodiversity, climate, agriculture and food are interpreted. This draws upon selected bodies of knowledge from Leibniz institutions and other sources as well as new model simulations on the status of planetary boundaries. A quantitative and qualitative knowledge base for assessing systemic sustainability evolves for the common area of action and conflict.

Systemic innovations

A wide range of solutions exist for aligning agriculture and food with biodiversity conservation and climate protection. The Lab therefore carries out holistic innovation mapping. Selected technological, economic, social and political innovations are co-designed for sustainability transformations and assessed for their potential impacts.

Science communication

The context conditions for sharing information on the common area of action and conflict ‘biodiversity, climate, agriculture and food’ are in particular characterised by misinformation and disinformation. Hence, the Lab investigates means of science communication with regard to the practical knowledge required by the actors addressed.

Target group-specific transfer products

The Leibniz Lab’s integrative and action-oriented research results in a range of actor-specific products. These extend from assessments of regulatory options for policymakers to a dashboard with data on systemic sustainability and information on new technologies for companies in the agricultural and food sector. Innovative information and educational offerings are aimed at practitioners and the general public.



Current pilot sites, marking the countries, and associated sites of the Leibniz Lab ‘Systemic Sustainability’