RobustNature Excellence Cluster Initiative – Robustness and resilience of Nature-Society Systems in the evolving Anthropocene

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Background & Motivation

- Our planet is facing existential challenges such as the **decline of biodiversity**, **climate change** and **environmental pollution**
- Interactions and interdependencies of these areas on a global scale are identified as major challenges for international research in future
- Constant changes as well as robustness and resilience of highly dynamic higher-level system functionalities are neither well understood nor quantified

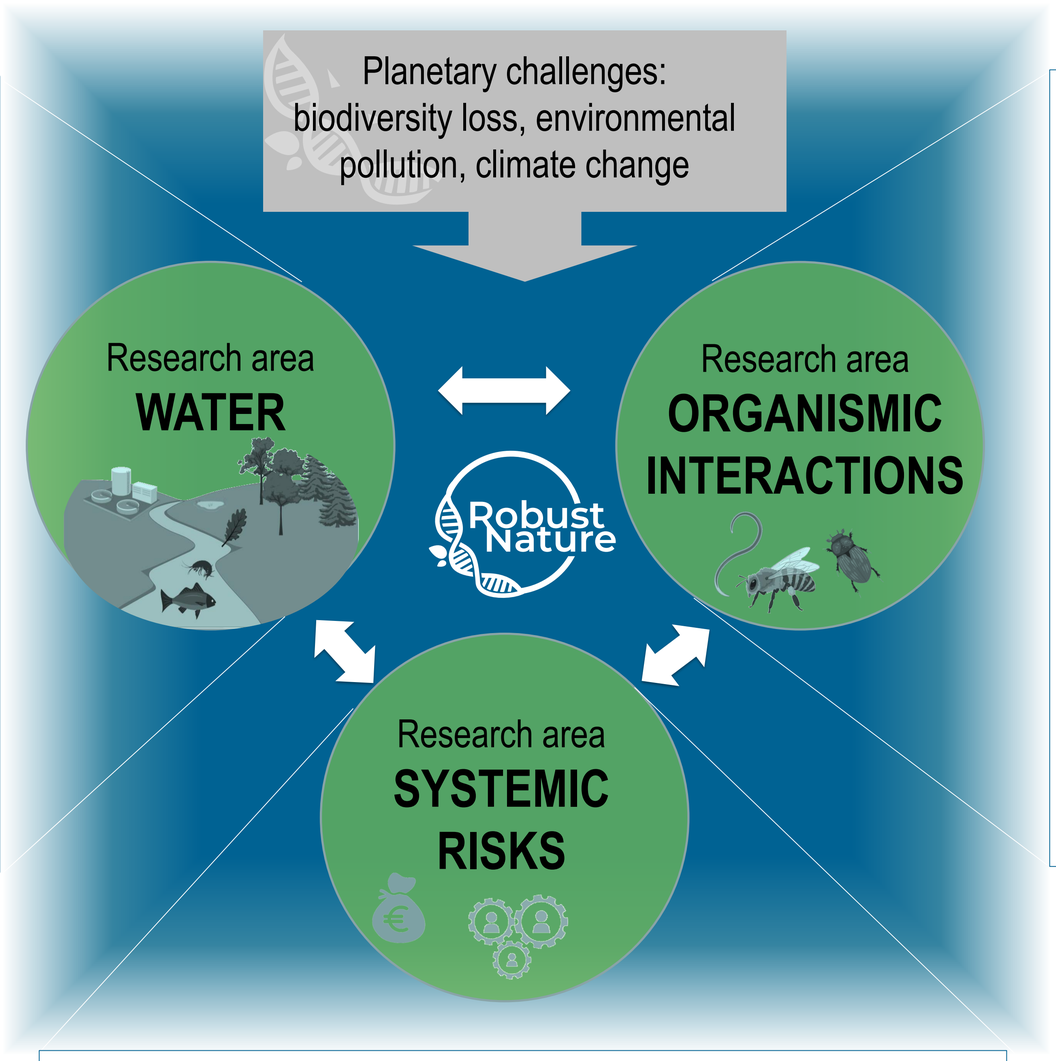
Vision & Mission

- Improve the understanding of **robustness** and **resilience** of Nature-Society Systems in a multi-scale approach
- Understand the interactions between environmental pollution, biodiversity loss and climate change
- Develop incorporating strategies for **interdisciplinary** approaches of natural and social science
- Develop a **knowledge-based transformation** research – from knowledge to action

Scientific program

Robustness, resilience & multiple stressors in aquatic systems

- Performing proof-of-concept studies at three selected catchment areas in Germany (Nidda, Hessian Ried, Holtemme)
- Application of a multiscale approach from molecule to ecosystem
- Derivation of integrative concepts in aquatic ecology, nature conservation, and water policy
- Improvement of diagnostic capability in identifying relevant stressors and interactions with aquatic ecosystems



Robustness, resilience & organismic interactions

- Systematic quantification of robustness at the organismic level in a multiscale approach using a broad variety of model organisms
- Determination of the "normal state" of biological systems from molecules to ecosystems
- One- to oligo-dimensional characterization of physical, chemical and biological stressors (e.g. temperature, salinity) on biological systems
- Identification of robustness/resilience thresholds and comparison with the current and future environmental situation

Robustness in the areas of conflicts: nature, society & economy

- Examination of global environmental problems from social-ecological and social science perspectives
- Identification of societal drivers of environmental changes
- Developing levers for sustainable transformation of Nature-Society systems on different scales

We invite researchers for collaboration, expert dialogues, and scientific exchange

Learn more about RobustNature:

Structural program

SynergyFund projects

- Innovative method to implement the research questions and to strengthen interdisciplinary collaborations
- 11 joint feasibility studies in the context of RobustNature already funded

→ support of early career scientists (>60% of leading PIs within 7 years after PhD)

→ strong network with up to 6 (inter)national departments involved

→ topics: understanding of mechanistic processes, changing environment, etc.

Consortium & network

- The holistic concept of RobustNature needs to:

→ combine interdisciplinary expertise

→ establish a cluster project with long-term perspective

- Our approach:

→ a huge interdisciplinary consortium: core institutions from Goethe University Frankfurt with international partners from academia and industry

This project has received funding from Goethe University Frankfurt, Germany