Going Beyond Ecosystem Services – Methodological and Theoretical Linkages to Social-Ecological Systems

Marion Mehring*1,2, Diana Hummel1,2, and Alexandra Lux1,2

1Institute for Social-Ecological Research (ISOE) – Hamburger Allee 45 60486 Frankfurt am Main, Germany
2Biodiversity and Climate Research Centre (BiK-F) – Senckenberganlage 25 60325 Frankfurt am Main, Germany

Abstract

The interactions of ecological and societal transformations are high on the political agenda and a priority topic in science. Political and societal initiatives around the CBD – Convention on Biological Diversity target the relevance of biodiversity and climate change for human development and poverty reduction. Research programmes like Future Earth aim at providing knowledge for such initiatives. However, the recent attempts and shortcomings in halting global biodiversity loss, combating global climate change and fostering human development have proven that a transdisciplinary research approach is needed to approach these global challenges, but barely implemented in biodiversity research yet. Such a transdisciplinary research considers the issues of i) defining sustainable societal adaptations to climate induced changes in biodiversity and ii) facilitating an adequate understanding of the social-ecological reproduction of ecosystem functions, including their conservation and restoration. Addressing these social-ecological transformation processes, the resilience perspective – the capacity to deal with shocks and continue to develop – becomes relevant. We interpret resilience as a heuristic concept in order to understand and cope with the effects of climate-driven biodiversity change. In this view, the concept of social-ecological systems (SES) supporting society with biodiversity driven ecosystem services (ESS) outlines an excellent analytical framework to attempt the global development challenges and their regional and local responses.

Climate change is one major driver of the dynamics of SES. The transformations resulting from these dynamics influence the ecosystems, their services (ESS) and functions as well as the societal components of the SES, and vice versa. A major challenge is therefore to understand the processes, dynamics and interactions of such transformations. Under a resilience perspective, the absorbing or buffer capacity of a SES, and its self-organization and adaptive capacity comes into view. Addressing climate resilience of SES represents a novel transdisciplinary research approach bridging biodiversity with society, and science with policy and management. Such a research approach has to go beyond traditional methodologies separating mitigation and adaptation strategies in conservation and use of biodiversity under climate change conditions. It rather focuses on understanding, evaluating and shaping transformations in SES and uses resilience as a descriptive concept, namely a transdisciplinary "boundary object" that is situated at the intersections of different fields of research.

*Speaker
The aim of the presented paper is to reflect the multiple ways to frame social-ecological transformation in biodiversity research. The paper will draw a picture of the embeddedness of ecosystem services in social-ecological systems and the practical implications of such a theoretical view.

This paper on methodological and theoretical linkages between ESS and SES refers to two themes of the conference: “new methodologies and tools” and “development challenges through a resilience lens”. Presenting our particular conceptual model of social-ecological systems supporting society with biodiversity driven ecosystem services, we seek to discuss the methodological challenges to foster the resilience of SES in the context of social-ecological transformation at the interface between global biodiversity loss, climate change and its societal relevance and implications.

**Keywords:** Biodiversity, Social ecological systems, Ecosystem services, Transformation, Resilience