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## **Synthesis of micro-scale human decision making to mitigate risks to ecosystem services**

### **Focal areas of discussion**

This meeting was the fourth in a series of five meetings. The goals for this meeting was to finish a framework paper, take stock of the bibliometric analysis paper and align and further develop the modeling activities of the different subgroups.

The framework paper aims to review a selection of human behavioral theories relevant for decisions in the context of natural resource management by resource users. We distinguish theories like rational choice, bounded rationality, theory of planned behavior, habitual behavior, descriptive norms and prospect theory. The theories have very different disciplinary roots and the proposed framework aims to provide a systematic way to map, organize and communicate the theories among those scholars who study human environmental interactions. During the workshop the different theories were discussed in the context of the framework, and the framework was improved in that process.

An update was given on the bibliometric analysis where we look at intersection of social science literature that refer to the key behavioral theories and natural resource management literature. More than 20,000 papers were selected in that search process. The diversity of disciplines and citation patterns makes it very difficult to identify most influential papers or bridging papers.

Different subgroups worked in the months before this meeting on developing models of specific social-ecological systems to implement the seven selected behavioral theories and analyze their implications. These models included a model of farmers coping with rainfall variability and making decisions on livestock, restoration and off-farm labor in northern Chile; a pastoralism model based on case studies in Kenia; a fishery model based on the case of the Baltic sea, and an abstract model of the Gaia hypothesis (Daisyworld) where agents appropriate different types of daisies and impact their ecosystem services.

Besides reporting on the initial results of those models, we exchanges the challenges of implementing the various behavioral theories and aligned the way we perform analysis of the models and report the results. Most of the models were also used for the group projects in the summer course (see below).

### **Content of the presentations**

Presentations at the working group meeting were informal and mainly aimed to report progress as discussed above. There was a public seminar at iDiv Public Seminar by Marco Janssen, Maja

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Schlüter, Gunnar Dreßler and Kirill Orach, entitled *Capturing diversity of human decision making in modeling social-ecological systems*.

The presentation provided the goals of the project, the framework and examples of our modeling activities motivating the need to take into account the diversity of human motivations and decision making.

### **Proposed outputs**

The framework paper entitles "A framework for mapping and comparing behavioral theories in models of social-ecological systems" will be submitted in September to the journal *Ecological Economics*.

Various modeling papers will be advanced and discussed in the December meeting. After the December meeting those will be submitted to journals. The models will also be documented and archived in the computational model library of OpenABM and as such available for the broader community. We will also discuss a synthesis paper building on the individual models at the December meeting.

We will continue our summer school beyond the 2015 edition.

### **Types of activities**

Since this meeting was the fourth of our working group we had about 20% presentations, 10% brainstorming, and 70% on work on outputs (plenary and in subgroups).

### **Next steps**

The week after this meeting in Leipzig we had a summer school on modeling human behavior in social-ecological systems (<https://www.ufz.de/index.php?en=33352>) building on the models and framework of our working group. This was very successful. In January 2017 a winter school is planned in Arizona on the same topic, and in the summer of 2016 various subgroups of the working group aim to meet up in conferences such as the Environmental Modelling and Software conference in Toulouse.