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Abstract conference talk:

Development of a system of systems framework to better understanding feedback loops and multi-scale interactions in social-ecological systems in Sub-Saharan Africa

Martin Schultze¹ & Christine Fürst¹

¹Institute for Geography and Geosciences Martin-Luther University of Halle Wittenberg (Germany)

In Sub-Saharan Africa, food and water security are directly linked through the management of agricultural landscapes. Population growth, climate change or land degradation cause increasing stress on natural resources and threaten the local livelihood. It is quite challenging to capture these complex non-linear social-ecological system dynamics in order to develop adaptive strategies for a sustainable food and water management. While no single modelling approach addresses all social, economic and ecological interdependencies, we suggest to implement a multi-disciplinary framework across spatial and temporal scales.

This talk presents a novel system of systems framework to include local land management in modelling regional land-use changes by combining the models ECOSERV (France), GISCAME (Germany) and MOWASIA (Burkina Faso). We will give an overview about preliminary scenario results of this on-going study reflecting the complexity of drivers, existing agricultural practices and human-nature interactions in different agro-ecosystems. According to nested social-ecological feedback loops, this approach incorporates different qualitative and quantitative knowledge sources such as local experts, stakeholder perception or already existing results provided by previous projects. Finally, we will discuss how stakeholders and local experts assessed the pre-developed scenarios to identify major trajectories in agricultural system. Such knowledge is essential in developing sustainable scenarios to strengthen food and water security.