Session: "Ecosystem Services: building informed policies to orient landscape dynamics"

Title: Ecosystem services for consulting land-use strategies in West Africa

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In the context of the project WASCAL (West African Science Service Center for Climate Change and Adapted Land-use), land-use policies are intended to be analyzed, developed and recommended that perform better to future pressures. These comprise mainly increasing population growth, related augmentation of food and natural resource provisioning needs and at the same time unfavorable shortening of irrigation and drinking water due to climate change (e.g. Sanfo and Gérard, 2012). Adapted land-use strategies should correspond to such future pressures, but at the same time take into account potential trade-offs for the living environment and for needs of future generations that might not be well known or described by the current state of knowledge. Therefore, the ecosystem services concept (MEA, 2005) was chosen to assess the impact of alternative land-use strategies and help balance different currently and prospectively relevant services in the sense of ensuring sustainable development and growth.

However, so far, the ecosystem services concept is not yet used in planning and policy consulting practice in the West African context. Problems in making use of the ecosystem services concept are not only related to the lack of a broader public recognition of the concept as such. Also, the fact that assessment concepts are not well adapted to the high spatial irregularity and temporal dynamics of West African land systems complicates the direct transfer of the ecosystem services concept. Here, we need to standardize when, at which scale and with which (adapted) set of indicators different services should be assessed. Also the question, which services should be best involved to consult sustainable land-use policies in West Africa under the constraint of eminent data scarcity is not yet really answered.

Our research intends to better account for the seasonal dynamics of land-use related vegetation cover. Vegetation cover is considered to be of high relevance for biodiversity and cultural services impacting landscape structures and thus, being an indispensable element in ecosystem services provision assessment. Furthermore, improved consideration of the spatial variability and inhomogeneity of assessment units is in the works. This is done by adapting a cellular automaton based assessment approach (Fürst et al., 2010 a, b; 2012) to irregular shapes of assessment units and by enabling these “more organically-shaped cells”

to follow land-use change algorithms (grow and merge, divide, mutate) that are closer to reality then regular raster-based shapes.

The presentation will show some first experiences with the adapted ecosystem services provision assessment and will conclude on lessons learnt for further scientific and technological development of the assessment approach.

References

Fürst, C., Pietzsch, K., Frank, S., Koschke, L., Witt, A., Makeschin, F., 2012. How to better consider sectoral planning information in regional planning - example afforestation and forest conversion. Journal of Environmental Planning and Management, 1-29.

Fürst, C., Volk, M., Pietzsch, K., Makeschin, F., 2010a. Pimp your landscape: a tool for qualitative evaluation of the effects of regional planning measures on ecosystem services. Environmental Management, 46(6), 953-968.

Fürst, C., König, H.J., Pietzsch, K., Ende, H.P., Makeschin, F., 2010b. Pimp your landscape - a generic approach for integrating regional stakeholder needs into land use planning. Ecology and Society 15(3): 34. Available from: www.ecologyandsociety.org/vol15/iss3/art34/.

MEA (Millenium Ecosystem Assessment), 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. Available from: www.millenniumassessment.org.

Sanfo, S., Gérard, F., 2012. Public policies for rural poverty alleviation: The case of agricultural households in the Plateau Central area of Burkina Faso. Agricultural Systems, 110, 1-9.