



## **2014 GLOBAL LAND PROJECT OPEN SCIENCE MEETING** *Land transformations: between global challenges and local realities*

**March 19<sup>th</sup> – 21<sup>st</sup>, 2014**  
**Berlin, Germany**

### **ABSTRACT TEMPLATE**

*How validating future LUCC based on scenario-based modeling approach?*

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#### ***Conference Session***

- NUMBER: 0068
- TITLE: Opportunities and challenges in land change modeling
- CATEGORY: Round-table Discussion Session

#### ***Presentation Format***

- FORMAT: *Flash Talk Presentation*



## *Abstract*

### *How validating future LUCC based on scenario-based modeling approach?*

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Validation of LUCC model outcomes is crucial in LUCC modeling (Pontius 2008). It becomes even more fundamental when exploring the future using the combination of scenarios and LUCC models. The proposed model assessment approach aims at improving the plausibility of future LUCC for scenario planning (Amer et al. 2013). Indeed, scenario validation is based on five criteria commonly accepted: plausibility, consistency, creativity, relevance and transparency (Durance and Godet 2010; Alcamo and Henrichs 2009). Thus, when LUCC models are used under prospective perspectives (Houet et al. 2010a) or scenario land use planning (Xiang and Clarke 2003), model validation contributes to improve the transparency and plausibility criteria by answering the two following questions ‘How does the model work?’ and ‘How does the model perform for simulating the LUCC dynamics and processes defined by the scenario?’. Because prospective scenarios define realistic LUCC, aiming at being plausible, the model’s capacity to simulate realistic LUCC improves scenarios’ plausibility (Houet and Gaucherel 2007). Inversely, if the model’s assessment cannot prove its ability to accurately simulate realistic LUCC defined by future scenarios, the corresponding simulated LUCC maps could remain implausible. Indeed, if the land demand is attained, it does not necessarily mean that LUCC dynamics are realistic or that path dependence, as defined by Brown et al. (2005), is accurate.

The proposed overall assessment of realistic LUCC simulations consists in combining several (existing) approaches and indices (sensitivity tests on LUCC processes and input parameters, comparison of simulated vs. observed landscape over a past period, model ability to simulate contrasted LUCC, etc.) answering the two following questions: (i) Does the model accurately simulate various LUCC we expect it to perform (i.e. at each time step; over the whole simulation; at multiple spatial scales)? (ii) Does the initial landscape influence the model capacity to simulate scenario-based LUCC?

When using LUCC models for scenario-based studies, we suggest using a combined approach for assessing the model performance because, in most cases, the use of a single index assesses the predictive power of the model (ROC, LUCC budgets, Kappa, etc.). Single indices assessing model outcome plausibility are not common. Most importantly, we assume that such a combined approach helps in the understanding of how the model functions and improves the transparency of scenario results, and thus is particularly suitable to improve scenario plausibility.

This contribution aims at contributing to the “relative merits of different modeling approaches” and the “limits of predictability in land systems” discussion topics.

## Reference

Houet T., Schaller N., Castets M., Gaucherel C., (2013) Improving the simulation of plausible fine scale landscape changes: A combined process-based / optimization approach. *International Journal of Geographical Science* (Submitted)

## Case Studies

Is your presentation/poster addressing a case study? Indicate:

- YES/NO: NO