



## Discussion Minutes

### D1 – Modelling the Nexus: Case Studies

**Chair:** Aiko Endo

**Speakers:** Anthony Halog, Julia Kleinteich, Sara Lotfi, Robert Lütke-meier

**Minutes:** Geeske Scholz

### Discussions after each presentation

#### **Anthony Halog - Modelling the complex interdependencies for co-existence potential between coal seam gas and agricultural industries in Australia**

- Q: How do you plan to develop an ABM here?
- A: Start with a stakeholder analysis and their attributes. Then combine this bottom-up approach with the top-down system dynamics model.

#### **Julia Kleinteich - The boom of hydropower dams in Africa – their chances, consequences and ecological risks for drinking water quality**

- Q: Have you thought about process based models for the transport?
- A: Satellite images, in the future maybe case studies for the entire river system
  
- Q: Is the focus on the entire continent Africa?
- A: At the moment yes, we are looking for interesting places for case studies. We excluded South Africa because there is already a lot of research
  
- Q: Name of the project?
- A: Several projects and already one more submitted
  
- Q: Why is there more hydropower in South Africa?
- A: There is a strong potential and the energy demand will increase. Also, the energy can be exported

Clarification: the many small hydropower installations in Europe were not visible because in the maps only those with more than 1 MW were shown

Further comments: It could be very interesting to include the effects of climate change. Also, the impact of hydropower on marine/coastal systems would be interesting to investigate.



### **Sara Lofti - Modeling the role of water, food and energy policies in self-organization of water resources systems**

- Q: What kind of decision model do you plan to use for your agents?
- A: Derived from empirical data, if-then rules, the BDI model was too constraining
  
- Q: Are the consumption of fossil fuel and global warming taken into account?
- A: Not considered because this is not the main concern in Iran, GHG emissions are simply not the priority
  
- Q/comment: How many illegal wells exist? This could be identified via remote sensing
  
- Q: Which options do the farmers have?
- A: They can stick to the crops, or change the crops. There is no communication included

There is awareness of the problem, but if a farmer doesn't take the water his neighbor will take it. Furthermore, there is only a weak national strategy and weak law enforcement. The written water strategy is not strictly enforced, there is an implementation problem. The farmers collaborate on illegal wells.

### **Robert Lütkeemeier - Blended Drought Index (BDI): Estimating Drought Risk in the Cuvelai Basin Using Multiple Satellite Datasets**

- Comment: Comparing crop models to this remote sensing data could be really good, but more data for the models is needed. The validation can be difficult, for example, the yield for big farmers that irrigate increases in drought years
- Comment/short discussion about the combination of the different indicators
- Short remark on consecutive drought years
- A: This study focusses on the risk of drought
- Short discussion if there are rivers (in some parts) and that hydrological drought might be interesting for the evaluation, although data is not available
- In the study area the focus is on rain-fed irrigation
- Remark: It might be interesting to define the weights of different indicators together with stakeholders
- Aiko Endo and colleagues are also working on the development of an integrated indicator
- The combination with ABM would be interesting
- The data is also used for the local population in so far as it is integrated with what is already there. It could be useful for infrastructure planning



## General Discussion:

Aiko Endo (Chair) prepared a slide with discussion questions. It was decided to focus on a question on interdisciplinary dimension of the projects. The presenters answered as follows:

**Anthony Halog:** Anthony points out that system science is a holistic approach to include all dimensions of sustainability. Combining ABM with System Dynamics is promising to address any problem – hybrid models are promising. He sees problems in the complexity.

**Julia Kleinteich:** Julia points out that while her project is already very interdisciplinary, even if the willingness is there, it is not easy to find a common language. Different methods in a joint approach are promising but also challenging, and things take longer

**Sara Lofti:** Sara's project is transdisciplinary, which is new for the apartment she is working in. She is one of the first PhD with social aspects in their work, and gathering data is not always easy (willingness and honesty of stakeholders).

**Robert Lütke-meier:** Robert states that drought is a problem where both natural and social sciences are needed. Also there is a need to include non-scientist (transdisciplinary), and for this to use the right language. The index method seems to be easy enough to include stakeholders.