

## **Session DD 5.1: Impacts and adaptation strategies**

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| <b>Chair</b>           | Prof.dr. Martin Wassen, University of Utrecht, Copernicus institute for sustainable development and innovation, the Netherlands   |
| <b>Keynote speaker</b> | Dr. Saleemul Huc, Director of the International Centre for Climate Change and Development (ICCCAD), Bangladesh  |
| <b>Speakers</b>        | Ashbindu Singh, United Nations Environmental Program (UNEP)<br>Iñaki Gili, Catalan Office for Climate Change, Spain (2010)<br>Arne Harms, institute of social Anthropology, Germany<br>Dr. Pytrik Reitsma, Wageningen University, the Netherlands<br>Michiel van Eupen, Wageningen University, the Netherlands<br>Dr. Tom Kuhlman, LEI, the Netherlands |
| <b>Rapporteur</b>      | Kaj van de Sandt, Climate Changes Spatial Planning, the Netherlands   |

Adaptation becomes more important in the IPCC and the UNFCCC. In Bali the COP decided that adaptation and mitigation were building blocks to Copenhagen. The Copenhagen agreement states that there has to be a balance between the funding for mitigation and adaptation. According to the agreement there are two stages of funding. This means that adaptation is recognized as a key challenge in the debate on climate change and that funding is available for action. As a result the need for scientific information on adaptation is essential. The IPCC 5<sup>th</sup> assessment report is planned to be published in 2014. Papers that are published before early 2013 form the scientific bases for the assessment. Dr. Saleemul Huq invites the adaptation scientists to publish.

According to Dr. Saleemul Huq research on adaptation should be done in close cooperation with stakeholders, such as policy makers and NGO's. And more attention should be given to the bottom up approach. The traditional top down model should be linked with a bottom up approach. Community based adaptation is the central idea in the International Center of Climate Change and Development, which is based in Bangladesh. The importance of community based adaptation is explained by Arne Harms. As an anthropologist he examined the social structures on islands in India. These islands shrink as a result of climate change. The social structures are a condition that should be taken into account by climate adaptation.

In the northern part of the Netherlands an interesting project shows us the importance of adaptation actions at different scales. Dutch farming is vulnerable to weather extremes. The frequency and intensity of these extremes will increase as a result of climate change. In close cooperation with farmers the sensitivity of various crops for climate change impacts is examined. Adaptation measures are defined at different scales (farm level, water management, etc.).

Adaptation to climate change should be placed in the context of the future. Dutch agriculture changed dramatically over the last 40 years. Scenario's can help us examine future land use and agricultural systems. Scenarios are also a tool for dealing with uncertainty. The farm systems will look differently in a Global Economy scenario than in a Regional Market scenario. In a global economy scenario production in the Netherlands needs to increase to be competitive at the global market. In a Regional Market scenario agriculture will become multifunctional.

Climate change brings also new opportunities to agriculture. The production of crops for energy or fuel brings a new opportunity. Europe can not produce straw for ethanol in a profitable way, but there are opportunities for the production of biodiesel from oilseeds. The opportunities for the Netherlands seem very limited for the production of biomass, because the Dutch farm system is not fitted for bulk production. Ton Kuhlman saw

potential for reed production in the Netherlands. Reed can grow in the Netherlands and is not vulnerable to projected climate changes. An assessment showed that reed production in the Netherlands can be profitable on peat soils if the oil prices increase and if policies aim at soil conservation. "Are reeds profitable in Indonesia (Kalimantan)?" Research is needed for the local situation. Up scaling the results for the Dutch situation to Indonesia is not possible.

The Netherlands are crowded and there are a lot of land use claims. The Land Use Scanner predicts future land use under different scenario's. Nature is not yet well implemented in this model, because the location of nature is purely based on policy decisions. The model can be improved if the allocation of land for nature can also be based on eco-hydrological information. And if changes in the hydrology as a result of climate change are part of the model. If the model can predict where nature will be located, the Dutch nature policy can be evaluated. A problem is that the hydrological models are not yet specific enough for this analysis. In Knowledge for Climate research on this issue is planned.

A Spanish study shows an example of local adaptation research. In the Ebro Delta (Cataluna, Spain) climate change will have severe impacts. The delta is important for the production of rice, fishery, fish/shellfish farms and as a nature reserve (bird migration routes). The main climate related risks are related to sea level rise. As a result the risks of flooding increase and rice production decreases. An adaptation strategy has been developed for sustainable spatial development.