



Change Ahead: Transient Scenarios for Long-term Water Management

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While the use of an ensemble of transient scenarios is common in climate change studies, they are rarely used in water management studies. Present planning studies on long-term water management often use a few plausible futures for one or two projection years, ignoring the dynamic aspect of adaptation through the interaction between the water system and society. Over the course of time society experiences, learns and adapts to changes and events, making policy responses part of a plausible future, and thus the success of a water management strategy.

Exploring transient scenarios and policy options over time can support decision making on water management strategies in an uncertain and changing environment. We have developed and applied such a method, called exploring adaptation pathways (Haasnoot et al., 2012; Haasnoot et al., 2011). This method uses multiple realisations of transient scenarios to assess the efficacy of policy actions over time. In case specified objectives are not achieved anymore, an adaptation tipping point (Kwadijk et al., 2010) is reached. After reaching a tipping point, additional actions are needed to reach the objectives. As a result, a pathway emerges.

In this presentation we describe the development of transient scenarios for long term water management, and how these scenarios can be used for long term water management under uncertainty. We illustrate this with thought experiments, and results from computational modeling experiment for exploring adaptation pathways in the lower Rhine delta. The results and the thought experiments show, among others, that climate variability is at least just as important as climate change for taking decisions in water management.

References

- Haasnoot, M., Middelkoop, H., Offermans, A., Beek, E., Deursen, W.A.v. (2012) Exploring pathways for sustainable water management in river deltas in a changing environment. *Climatic Change* 115, 795-819.
- Haasnoot, M., Middelkoop, H., van Beek, E., van Deursen, W.P.A. (2011) A Method to Develop Sustainable Water Management Strategies for an Uncertain Future. *Sustainable Development* 19, 369-381.
- Kwadijk, J.C.J., Haasnoot, M., Mulder, J.P.M., Hoogvliet, M.M.C., Jeuken, A.B.M., van der Krogt, R.A.A., van Oostrom, N.G.C., Schelfhout, H.A., van Velzen, E.H., van Waveren, H., de Wit, M.J.M. (2010) Using adaptation tipping points to prepare for climate change and sea level rise: a case study in the Netherlands. *Wiley Interdisciplinary Reviews: Climate Change* 1, 729-740.