Putting resilience approaches into practice: an example of flood risk management under climate change

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Panel: RESILIENCE IN WATER, FLOOD AND DROUGHT RISK MANAGEMENT - CONTROLLING THE UNTAMEABLE; RECONCILING URBAN PLANNING AND WATER

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The full range of possibilities for future climate change needs to be addressed when providing adaptation and in-built adaptability for water and flood risk management systems. When the specifics of a future pressure are difficult to define—as with climate change—, then managing for resilience is a rational strategy (Allenby and Fink, 2005). Resilience is taken as the ability of a system or subsystem to maintain its identity; based on (Cumming et al., 2005). In this definition, the system could have the same identity while undergoing change, but only up to a critical threshold value. In the case of flood risk management for example, the identity threshold is typically defined by some sort of protection norm, which is the expected system capability (by society) in terms of flood frequency or risk. It is then possible to consider the flood risk management system to be a qualitative different system if, as a consequence of future climate change, it cannot comply with the imposed norm any more. This level of change then becomes a fixed point against which it is possible to assess the potential for changes in resilience. This is sometimes coined an Adaptation Tipping Point (ATP) (Kwadijk et al., 2010). When an ATP is reached, managed/adaptive responses are needed—which will have ATPs by themselves as well. Analysing different options and ATPs, will result in possible adaptation pathways (portfolios of options) for enhancing the system resilience for climate change.

Different methods can be used to develop adaptation pathways, both top down (i.e. information driven) and bottom up (i.e. socio-economically acceptable) (Dessai and Van der Sluijs, 2007). Two methodologies, Real Options (RO) analysis and ATP analysis, are particularly helpful in the identification and analysis of managed/adaptive responses, giving consideration to the full range of uncertainty in climate change projections. RO analysis is a framework which integrates expected changes in future levels of uncertainty—with the arrival of improved information—into contemporary decision making processes. In this top down framework, adaptation decisions are triggered by unacceptable changes in system identity. ATP analysis stimulates decision makers to look at the durability of the available responses under different climate change conditions. This bottom up framework favours the selection of no-regret and/or win-win options; this implies that adaptation decisions are typically triggered by opportunities to connect water and flood risk management with socio-economic development.

Even though both methods enable the development of resilient, open-ended adaptation pathways, they are less helpful in the implementation of managed/adaptive responses (Rahman, Walker and Marchau, 2008). In part this is because they do not embed the analysis in an institutional framework. This suggests that more attention has to be paid to putting resilience-

focussed approaches into practice. Therefore, this paper discusses a potential way forward for the actual implementation of managed/adaptive responses to future climate change. This is demonstrated for a hypothetical case study example of an urban flood (risk) management system.