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Water resources management under changing environment

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Water management and climate change and variability, as well as their numerous interlinkages and the extent of related hydrologic, economic, social, environmental and political impacts over time and space, have become of increasing global concern. Uncertainties that prevent us from forecasting the likely future multidimensional and multi-sectoral impacts of climate change make policy alternatives, management, governance and development decisions, as well as investment choices on adaptation strategies, most challenging under the best of circumstances. As a consequence, non-climatic factors have become more relevant. Resource use and governance—that is, decision-making by multiple actors with numerous and dissimilar interests, and the formal and informal institutions they form—are some of the most important ones (Tortajada, 2016).

From the anthropocentric viewpoint, there is the concern that the extent and speed of the effects on global and local human and natural environments will be such that policies and institutions will not be enough to provide appropriate and timely responses. This, in turn, will result in economic, social, environmental and political vulnerabilities that will expose humankind to risks of irreversible change. (Carrao, Naumann and Barbosa, 2016; Mastrandrea, et al., 2015; Turner et al., 2013).

Resilience to change is often discussed in the context of climate change as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change (IPCC, 2007). However, the related issues are much broader. Social and ecological systems have always had capacity to adapt to stress, and they have been essential to the progress of societies throughout the history of humankind. It has been the numerous local changes that have allowed systems to respond, cope and adapt (Tortajada et al. 2017).

In the case of climate variability and change, conceptual frameworks could be more useful for decision making purposes if they referred more clearly to the non-climatic diversity of the local and regional contexts; if they considered the capacity of coupled human–environment systems to respond, cope and adapt to increasing stress; and if they studied the strengths and weaknesses of policy, institutional, governance, infrastructural and financial mechanisms that are necessary to fully function under different conditions. As discussed by Biermann et al. (2016) conceptual frameworks can be useful only when they consider broad cross-scalar perspectives and recognize the diversity of local and regional contexts and situations.

Some of the events related to climate and human change that expose the vulnerabilities of both human and natural environments are extreme events such as droughts and floods. They result in institutional responses (policies, management, governance or market mechanisms) that aim to re-establish a point of equilibrium for systems to respond and operate as soon as possible, initially in the short-term, and later on in the long-term. Their impacts depend on their severity and on the risks and vulnerabilities of the systems they affect, which in turn rely on policy and governance responses as well as economic, social, infrastructural and human and resource capacities (Mastrandrea et al., 2015).

This presentation will focus on water resources management under changing human and natural environments. It will discuss examples of different cities in Monsoon Asia.

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