Assessing adaptive capacity of water governance regimes under climatic uncertainty

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PROBLEM IDENTIFICATION

Climate change is a complex, wicked problem which crosses sectoral, disciplinary, temporal and national boundaries. It is increasingly recognised that water will be the prime medium through which climate change impacts will be felt. In mountainous areas, impacts on glacial retreat and precipitation patterns, together with associated changes in runoff regimes are already observed and are projected to magnify (Fig. 1). The changing requirements and contradictory impacts on demand and supply are therefore leading to questions of whether existing water institutional frameworks are robust enough to cope. Effective water governance is seen as essential to building adaptive capacity to manage future climatic uncertainty and associated stress. To date, however, there has still been fairly minimal empirical verification of indicators of adaptive capacity, particularly at local and regional scales, and more so within the water sector. A better understanding of adaptive capacity within the water governance framework is an important component of any proactive response strategy to the "wicked problem" of climate change impacts on water resources.

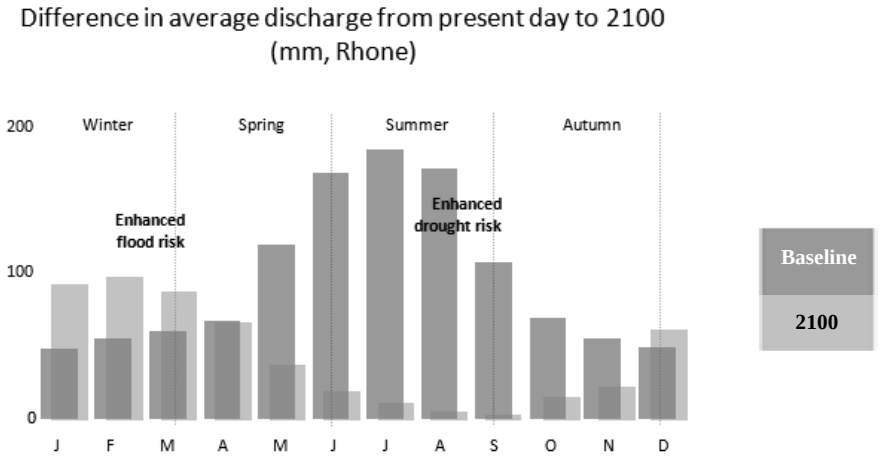

Fig. 1 Difference in seasonal distribution of run off for the River Rhone between baseline values (1961–1990) and projected values for A2 SRES scenario (800 ppm) by 2100. Adapted from Beniston (2004).

Climatic influences on mountain water resources are exacerbated by the rapid and widespread socio-economic transformations within which they are taking place. This is particularly relevant in the Canton Valais in Switzerland, since it is one of the most climate sensitive areas in the Alps. Switzerland is becoming more and more urbanised, agriculture is intensifying and mobility is increasing, resulting in growing pressures on the environment (in particular bio-diversity) from the intensity of consumptive patterns despite any gains from eco-efficiency and environmental protection. Tourism has had a major effect on the alpine environment, contributing to increased water usage (increased population, energy, artificial snow) as well as having an impact on water quality and related ecosystems. Hydroelectric production has also impacted river quantity, quality and water related ecosystems not only through decreased river flows, but also through hydro-peaking.

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THE TOOL

The aim of developing the adaptive capacity assessment tool is to build a better understanding of how institutional and governance determinants contribute to building an enabling environment to manage these impacts. It is vital to build adaptive capacity to climate change in governance arrangements since institutions should enable civil society to manage the challenge of climate change. Key questions are therefore: (1) What key components of adaptive capacity can be empirically observed in the case areas in the response to extreme events? and (2) How does the mobilisation of indicator components vary across the different sectors/uses/locales? The indicators and sub-criteria draw on current understanding and the different indicators in the discipline of adaptive capacity, adaptive governance and adaptive management, as well as the discourse on Integrated Water Resources Management (IWRM). They have been refined and developed through the author's understanding, based on results from an initial governance assessment within the Valais case area (Hill, 2010), Table 1. Future work will further operationalise the criteria of the indicators.

Table 1 Overview of adaptive capacity tentatively developed for testing in interview.

Tentative indicators	Sub-criteria
Knowledge	Right to information; Communication/public perception; Spatial planning; Access to scientific/environmental information; Exchange of data & information; Integration of scientific expertise; Quality of scientific information; Use of traditional & local knowledge
Networks	Access to participation; Selection of non-state actors; Level of influence; Type of participation; Stage in the political process; Social Networks; Professions Networks; Willingness to Cooperate
Levels of decision making	Ecological based units of decision making; Institutional arrangements;
Integration	Geographical integration; Sectoral/uses integration; Political integration
Flexibility–Predictability	Consistency in rule of the law; Rigidity of legal provisions; Iterative elements of law/institutions
Resources	Financial resources; Quantity/quality of human resources; Organisation of resources; Independence/impartiality of experts
Experience	Training & development; Years of experience
Leadership	Political commitment; Facilitating role; Initiation of partnerships; Support mobilisation; Linking of actors; Trust amongst stakeholders

KEY LESSONS

Results from initial stakeholder interviews suggest that there is a need to challenge assumptions in the adaptation literature. The Valais case supports the suggestion that there is a need for better recognition in the academic discourse on adaptation that decentralisation and participation *per se* are not *a priori* requirements for better management and enhanced resilience (Nelson *et al.*, 2007). Equally, IWRM has received considerable attention amongst the water adaptation community as the management solution to climate impacts. However, this case area underlines the fact that numerous studies have shown that a substantial gap exists between promise of the process and practice in IWRM.

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