

Preface

Despite gridlock in the supra-national climate governance regime and continuing uncertainty in climate modelling outputs, regional climate impacts are being observed with quickening pace from the Alps to the Andes. The stresses on linked social and ecological systems (SES) from shifting precipitation patterns, glacial retreat and associated changes in run-off regimes are exacerbating a number of underlying governance and management challenges that suggest present water governance regimes may not be robust or resilient enough to cope. While SESs have long adapted to climate influences, the speed and magnitude of change in future climatic and hydrological conditions pose serious challenges, and are increasingly recognised as potentially lying beyond human experience and the coping ranges of social and natural systems.

This book is for all those interested in the growing theoretical and management challenges surrounding climate change adaptation, adaptive capacity and resilience in the governance of linked social-ecological systems. This book looks beyond the technology, modelling, engineering and infrastructure so often associated with water resources management and climate change adaptation, to the decision making environment within which these water and adaptation decisions are made.

Climate change will not only impact on the function and operation of existing water infrastructure, but also the institutions (government agencies, ministries, river basin authorities and user group associations) that manage valuable water resources and water courses. The focus on governance looks to the broader sets of rules, norms and policy frameworks, within which institutions operate. Not only will institutions and water governance frameworks need to respond and shape adaptation responses (through the legislation, operations, policies, decisions) but they will also need to become more adaptable to better manage increasing uncertainty and change as climate change impacts become increasingly prevalent.

In order to achieve this, it is vital to go beyond the technical and hard infrastructural solutions for climate change adaptation that have so far been the corner stone of climate change adaptation. It is vital to better understand the adaptive processes that allow the regimes that govern water resources to respond to new shocks and changes

in the hydrological system, in order to build more resilient water governance systems that can bend, but not break, in the face of new and unexpected challenges. This increasing focus on adaptation has signalled a shift to focus on the need for more flexible and adaptive processes in water governance regimes, to manage uncertainty. Over the past decade, the concept of adaptive capacity, its identification and characterisation, has received increasing attention, but primarily through work relating to other related fields, such as adaptive governance and adaptive management approaches.

Despite the increasing amount of attention more recently paid to adaptive capacity and adaptive processes, the understanding of how adaptive capacity to respond to climate change may be developed within water governance regimes is still in its relative nascence. Moreover, even with the advances in the conceptualisation of adaptive capacity, there still are considerable gaps in understanding the role of different governance regimes in building adaptive capacity and challenges in mobilising proactive and reactive capacity at different scales as well as the mechanisms that allow transformation to more sustainable water resources management. To date there still has been relatively little empirical verification of indicators of adaptive capacity at local and regional levels, as well as across different scales.

This book aims to contribute to the conceptualisation and operationalisation of adaptive capacity, as well as proffering new case studies to the empirical body of evidence on adaptation and adaptive capacity. It attempts to bridge the conceptual gap by contributing a more nuanced conceptualisation and operationalisation of adaptive capacity, through better understanding how the governance context and mechanisms within those frameworks contribute to an enabling environment for adaptive capacity. It also seeks to better understand the challenges in generating adaptive capacity across temporal and spatial scales by drawing heavily on resilience based approaches.

Evidence in this book highlights the challenge of balancing out proactive and reactive responses, as well as responses to multiple forms of stress at different magnitudes of physical change and scales of governance to ensure that responses to one kind of risk do not undermine the capacity to address others. Recently, there has been a growing recognition of the challenges in ensuring that short term adaptation actions do not undermine long term social-ecological resilience, by limiting the adaptive capacity to cope with shocks at different magnitudes of change.

Adaptation and long term adaptability are not therefore one and the same thing, and this needs to be better understood in the process of developing adaptation and broader environmental policy, plans and projects that address the impacts of climate change. The framework developed in this book is therefore intended to improve the assessment of different forms of adaptation outcome in the context of transformation to more adaptive water governance frameworks for coping with climate change impacts. Closer attention is now needed to better identify and understand the nature of the trade-offs between adaptation policies, plans and adaptability across multi-scale contexts.

The two case studies presented in this book come from the highly contrasting cases of Chile and Switzerland, namely the Rhône Basin in the Canton Valais,

Switzerland, and the Aconcagua Basin in Valparaiso, Chile. Despite their many differences, both regions do represent mountain watersheds, nivo-glacial regimes, in which observed impacts of climate change on glacial melt and elevation of the snow line have been documented.

Conclusions drawn from these two geographies do encompass broader implications for other regions. Both countries have repercussions outside their national boundaries for broader water, economic and political issues. To date, most academic and practitioner studies on Chile have focussed either on issues concerning the water market (for which there is broad international interest, in terms of reports by the World Bank and the Global Water Partnership) or physical impacts of climate change. This book bridges those questions and looks at the implications of climate change for the broader governance context, and the adaptability of that context to the impacts of climate change.

Understanding the adaptability of the Chilean case is particularly relevant in the broader context of Latin American. The style of water governance in Chile has long been held as a potential model by international institutions such as the World Bank for other Latin American countries seeking to reform their own water governance frameworks. Closer inspection of the Chilean water governance context in relation to its adaptive capacity to climate change is warranted not only for water managers and policy makers in the country itself, but also for many of the international experts who often cite Chile as one potential model of water governance for other countries (often, but not limited to Latin America).

The case of Chile also has important repercussions for global economic issues, considering its important role as an exporter of water intensive/polluting commodities to the global marketplace (copper, avocado, table fruit, vegetables, and wine). Chile can also potentially serve as a “canary in the coal mine”, for a context that is more advanced in terms of global change impacts and closer to tipping points (reduced glacier melt contribution etc.) in the physical system. On the other hand, the case of Switzerland, as the water tower of Europe, has high relevance for the neighbouring European countries that its headwaters eventually flow into. The adaptability of the governance context and the impacts of climate change in the headwaters of the Alps are of high interest and relevance to those countries further downstream.

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