

# Preface

Some of the main concerns globally at present include climate variability and change, their potential implications, and related uncertainty. Extreme events have become development challenges of increasing importance from all points of view—economic, social, and environmental—for countries worldwide. Floods that displace thousands of people and droughts that cause reservoirs to decline to record limits affect the economies of entire countries, constrain livelihoods, and affect the environment—and they seem to have become too-frequent events, not only in developing countries but also in developed ones. There is also the impression that economic, social, and ecological impacts have become more serious. More important, there does not seem to be an end in sight.

Decision makers, water users, researchers, and the general public all wonder what the future will look like. How will the environment change? How much will we have to adapt to the changing conditions and what this will mean regarding quality of life? These concerns have resulted in increasing attention to adaptation strategies. These strategies are expected to potentially allow growing populations to maintain, and also improve, living standards and make the world as resilient as realistically possible.

Regarding water resources, in order to provide water in the required quantity and quality for all sectors (domestic, livestock, food, energy, the environment), adaptation strategies have to ensure that resources are conserved and supply is maintained (and even increased under situations of stress). This requires further studies on whether past events are analogues for the future and to what extent, and if lessons from previous droughts and floods can be applied to future events.

Given that reservoirs are some of the most important buffers against droughts and that one of their most important roles is flood protection, the question arises as to whether construction of new reservoirs should be encouraged or whether small projects should be developed instead. Because new construction may not always be possible for economic, social, environmental, or dogmatic reasons, a feasible

alternative is to look into their reoperation, which may be more effective under the present, and perhaps also future, conditions. A limitation could be, however, that reoperation of reservoirs requires management, governance, and financial considerations that are not always easy to realize.

With the objective to advance the understanding of infrastructure and governance aspects in the context of resilience and climate change adaptation as well as the policy implications for water resources management, the World Water Council and the National Water Commission of Mexico (CONAGUA) in collaboration with the National Association of Water and Sanitation Utilities of Mexico (ANEAS) have supported a series of case studies to study these issues in depth. They are included in this book.

The case studies discuss floods and droughts events in projects, basins, and regions. The geographical focus includes the Arid Americas (United States and Mexico), Australia, Brazil, China, Egypt, France, Nepal, Mexico, Pakistan, Turkey, and South Africa. The case studies discuss the relevance of infrastructure in adaptation strategies; how infrastructure has been planned, operated, and managed to date; how operation is changing; how it should change more to respond to changing climatic, economic, social, and environmental situations; and what the constraints are for any change. Governance aspects (policies, institutions, and decision-making) and technical and knowledge limitations are a sizeable part of the analyses. These comprise how decision-making has improved and should improve more, considering the needs and wants of economic sectors, societies, natural environments, users, riparian countries, etc.

The studies explain that extreme events are not new and that civilizations have adapted to them throughout history. What is different at present is the extent to which human activities have overexploited natural resources, including water. As a consequence, resources are now scarce, polluted, misallocated, mismanaged, and misgoverned, which exacerbates the impacts of both droughts and floods. A mix of policy options, managerial, governance, technology, and also behavioral alternatives will have to be tried based on multisectoral needs and resource availability under local conditions so that resilience becomes an achievable aim under specific scenarios.

In this context, water infrastructure is essential to build resilience contributing to adaptation to climate variability and change. However, for it to be effective, it needs to be planned and managed within a governance framework that considers long-term perspectives and multisector and multilevel actor needs and perspectives.

Improved monitoring will be more essential to identify shock events and understand to what degree physical and natural events can adapt to them and how. Furthermore, it is necessary to plan for strategies that are able to contribute toward building their resilience. Progress in knowledge, science, and technology will allow a more comprehensive understanding of future climate events. In the end, however, it will be decision-making that will predetermine the course of events.

Climate variability and change are forcing the implementation of policies and practices that aim at reducing water demand; improving management, development, and governance; and building systems that are more resilient. Sustainable water management will be improved in particular, but it will be the overall socioeconomic development of the countries and their populations that will gain in the long run.

Singapore

Cecilia Tortajada  
Senior Research Fellow