Introduction

Chapter 1  Water Resources in Mexico: A Conceptual Introduction
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1.1 Introduction

Water use and management is of crucial importance for everyday life and also for productive processes, as well as for the conservation and recovery of ecosystems. In only two decades (1990–2010), water consumption on the planet has doubled. In Mexico, due to population growth and agricultural and industrial production, water availability per person has become increasingly limited. This shrinking water availability is partly a consequence of the geo-ecological distribution of the population given that 58 per cent of its national territory has drylands - semi-arid, arid and hyper-arid (desert) ecosystems - that are below the average national rainfall. Due to climatic uncertainty all processes of planning for human demand and for production requirements are highly uncertain. Furthermore, it is precisely in these drylands that the main irrigation districts are located, that 70 per cent of the Gross Domestic Product (GDP) in the agricultural sector is generated, and that 92 per cent of the irrigated lands are located, with an overall efficiency of water use of below 40 per cent. Agriculture consumes most of Mexico’s water reserves (77 per cent), followed by domestic consumption with 13 per cent and industrial use with 10 per cent (CONAGUA, 2009).

The second problem for water availability in Mexico is that of periodic variations, as most rainfall occurs during the rainy season between June and October, compared with the rest of the year which is characterized by a dry season that forces peasants and agribusinesses to use water from dams, rivers and aquifers. The wide variability of the spatial and temporal distribution of rainfall has increasingly been influenced by an anthropogenically-induced climate change (CC; UNFCCC), something that has made equitable water management more difficult. Therefore, it is necessary to develop technologies that increase productivity per water drop, as well as to promote a culture of water saving, especially for agricultural, industrial and domestic activities. As water can be reused in households and for agriculture, this contributes to the challenge of developing efficient water treatment processes and the reuse of treated water.

1.2 Objectives

The complexity of water management encompasses the varied uses and reuses of water, including human, productive, agricultural and environmental factors. The objective of this book is to develop an interdisciplinary, inter-institutional and inter-sectorial diagnosis of research, institutions and infrastructure relating to water in Mexico. The Scientific Network of Water (RETAC) of the National Council on Science and Technology (CONACYT) addresses many new scientific, political, social, cultural and business challenges. Its goal is to contribute to a more sustainable administration of water, and to a more responsible and equitable water management policy. RETAC is also responding to a novel scientific policy within CONACYT, where synergies are being created between researchers, institutions, social movements, civil organizations and enterprises in order to solve complex water issues in a collective and peaceful manner. The distinctive feature of this effort is its multidisciplinary and multi-institutional outlook, featuring studies with multiple objectives in order to integrate areas of expertise and methodologies to solve complex contemporary problems relating to water.

Mexico has already been severely affected by climate change and large parts of its territory are covered by arid lands, where water availability is limited due to temporal and regional factors that are linked to the rainy season. Given these complex challenges, researchers from different disciplines have converged in order to engage in an open and honest dialogue guided by common interests so as to learn from their respective viewpoints, techniques and analytical tools. Integrating businessmen and public servants into this dialogue opens the possibility of suggesting alternatives, of offering sincere critiques of water policies, of devising strategies for mitigating the effects of more