Preface

Many parts of the world are extremely vulnerable environments with declining potable water resources and an increasing risk of extreme events due to population growth, intensification of agriculture and urbanisation, and limited development opportunities. With the increasing difficulties of meeting human demands on water resource quantity and quality, new concepts in water management need to be explored, with a move away from centralised command and control approaches to more participatory multi-stakeholder approaches that have the potential to be more flexible and responsive. New concepts, such as Integrated Water Resources Management (IWRM) and Adaptive Management (AM) are being put into practice, but their scientific basis has not been fully explored.

During the joint Convention of the International Association of Hydrological Sciences (IAHS) and the International Association of Hydrogeologists (IAH), 6–12 September 2009, in Hyderabad, India, a symposium was held entitled *Improving Integrated Surface and Groundwater Resources Management in a Vulnerable and Changing World*. The Symposium was organised by the IAHS International Commission on Water Resources Systems (ICWRS), together with the IAHS International Commissions on Water Quality (ICWQ), Remote Sensing (ICRS) and the International Association of Hydrogeologists (IAH). The broad coverage and the multi-facetted nature of the subject area are reflected in the large number of contributions to the symposium drawn from a range of disciplines. Out of the contributions, 50 papers were selected for this volume.

Given the integrated nature of water resources management it has been very difficult to organise the papers into groups. An attempt has been made, in order to assist the reader in more quickly finding the papers of interest. However, in most cases, more than one subject is dealt with and the section heading under which a paper has been listed relates to its main emphasis within integrated water resources management rather than to the subject of the paper.

The volume starts with the keynote presentation of the symposium, which deals with managing aquifers to sustain irrigation with examples from Australia, India and the Philippines. The first section of the volume is on water resources availability where the focus, in the main, is on assessing the water budget of catchments and aquifers, and managing their quantitative aspects. This includes two case studies on artificial recharge. Water for food has been singled out as an individual section because of its importance at the global scale. The emphasis is on the effect of crop production on water resources and suitable methods of managing water for irrigation purposes. The next section takes a closer look at the water quality of both surface and ground waters, including saltwater intrusion problems. Floods and droughts are dealt with in the next section. Change assessment and management is a particularly timely issue. The main subjects in this section deal with the effects of water works on the streamflow and groundwater regime, changes in erosion and land cover, and climate change. A number of papers in this section propose adaptive management strategies. The following section deals with the methodological aspects of monitoring and optimisation. The monitoring studies make

use of satellite data. The optimisation studies focus on the mathematical aspects of integrated water resources management. The final section on integrating water resources management presents the papers that include water demand, water allocation and policies, in addition to the other subjects dealt with in this volume.

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