

Preface

The Integrated Water Resources Management (IWRM) paradigm has entered the lexicon of water managers and stakeholders as the mainstream approach to the planning and management of water resource systems. It is the central pillar of the EU Water Framework Directive, which is widely accepted as the most significant piece of water legislation produced in the past 20 years, as well as the inspiring principle of all the water related activities sponsored by UNESCO in developing countries. However, despite huge inputs of financial resources, implementation of full IWRM remains elusive in most of the cases, we argue, owing to the lack of a systematic approach and the inadequacy of tools and techniques to address the intrinsically complex nature of water resource systems.

With the purpose of dealing with the recent progress made in overcoming the operational difficulties posed by the IWRM paradigm, a Workshop on Modelling and Control for Planning and Managing Water Systems sponsored by the IFAC Technical Committee 8.3 on the Modelling and Control of Environmental Systems, was held at the Istituto Veneto di Scienze Lettere ed Arti, Venice, Italy from September 29th – October 1st, 2004. The aim of the Workshop was twofold: first, to present the state of the art of modelling and control techniques applied to water resource systems; and, second, to foster an integrated and participatory approach. In order to emphasize the role of System Analysis and Control Theory methodologies as different stages of an integrated, multi-objective approach to planning and management, within a participatory decision-making prospective, the themes of the three days were:

1st day: Modelling: participatory modelling techniques.

2nd day: Managing: Decision Support Systems and algorithms for policy design.

3rd day: Planning: Decision Support Systems and tools for participatory decision-making and negotiations.

The unifying idea of the Workshop has been clarified since the call for papers in a position paper made available on the Workshop web-site. Each day/theme was introduced by an invited paper, presented over approximately 90 minutes, and was organized into two

sessions, involving two papers each, with a total duration of approximately 120 minutes. The other accepted papers were presented through an afternoon poster session followed by a 90-minute discussion, chaired by the invited speaker, which concluded the day. The unusual scheduling of the Workshop was conceived with the aim of reconciling the need, recognized in all conferences, to have a greater time dedicated to each paper, in order to understand and discuss it effectively, with the equally important objective of being able to take advantage of many contributions in order to form a meaningful picture of the variety of research in progress.

This volume is an outgrowth of the Workshop and contains selected papers among those orally presented. All the contributions to the Workshop were carefully reviewed by a board of international experts and those collected in this volume have been further revised and improved on the basis of the fruitful discussion that followed the presentation. We believe that the contributors have done invaluable work which have resulted in something more than a mere collection of papers: a monograph with many authors that will facilitate the increased appropriate application of the IWRM template by practitioners, decision-makers and scientists.

Reflecting the framework of the Workshop, the book is composed of three parts, *Modelling, Managing and MODSS* and *Planning and MODSS*, plus an opening and a closing chapter. The introductory chapter is a post-Workshop revision of the position paper that enunciates the principles which drove the Workshop. It formalizes the IWRM paradigm in a nine-step decision-making procedure that provides the reader with a conceptual map of the book and shows the value of its subject matter. Each part is opened by an invited contribution from an outstanding scientist in the field: Prof. Peter Young from Lancaster University, UK, Prof. Aris Georgakakos from GeorgiaTech, USA, and Prof. Slobodan Simonovic from Western Ontario University, Canada. Present and future research directions on the border between System Analysis and IWRM are surveyed in the chapter that closes the volume, where a pool of scientists and experts, coordinated by Prof. Anthony Jakeman from the Australian National University, suggests a research agenda to achieve sustainable (environmental, economic and social) outcomes in the implementation of the IWRM paradigm.

We acknowledge with much gratitude the support of the International Federation of Automatic Control and the Istituto Veneto di Scienze Lettere ed Arti, of all the contributors to this volume as well as of all the conference participants, and last but not least, of our colleagues Daniele de Rigo and Enrico Weber for their essential role in the organization of the Workshop.

Milano, April 30th 2006

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