

Preface

The vital needs of society, whether domestic, agricultural or industrial, demand the planning, construction and operation of various types of water management projects. Responsibility for the implementation of such projects rests with many different individuals and organizations, including water authorities, politicians, economists, developmental, planning and environmental agencies, consulting engineers and building contractors.

Water resource projects need compilations of past hydrological data and information for use in their planning, design and construction, plus a continuous stream of new data for use in forecasting future conditions and optimizing the day-to-day operation of the systems. In recent years, concerns over social and environmental aspects and the threat of climate change have led to calls for an ever increasing number of special studies, many requiring data and information not previously used in such a context. In addition, the rising demand for water has led authorities to apply an integrated approach to water resources management, incorporating surface and underground water, including return flows, with consideration of all potential uses: industrial, river navigation, irrigation, municipal and environmental. For this reason, water management now requires much more information than in the past, including, besides the purely hydrological data, also ecological, economic, social, political and institutional information.

From this it is clear that the efficiency and reliability with which one can manage water resource systems depend, to a large extent, on the quantity and quality of the hydrological information used in their planning and operation. This in turn highlights the importance of the role of the hydrologist in investigating the spatial and temporal distribution of the Earth's water resources, and their quality, at all scales.

It is well recognized that optimum results in the planning and management of water resource systems can best be achieved by a truly integrated cooperation between those involved in hydrology, water management and water use with those versed in economics, ecology and the social sciences. Unfortunately many important political, economic and social decisions, with significant and sustainable impacts on the environment and thus on the hydrological regime and water resources, are still made today without an adequate input of hydrological expertise. Thus the implementation of projects can lead to conflict between managers on the one hand and hydrologists on the other. Managers may wish to implement projects quickly and at low cost, while hydrologists and environmentalists would like greater attention to be given to the principles of sustainability and ecological compatibility. These demands from hydrologists and environmentalists – as important as they are – may in practice delay the implementation of projects and can often make them more expensive, although they may reduce the uncertainty surrounding the design and make it more cost effective in the long run.

In recent times, the growing concern over the potential impact of climate change has added a new dimension to this problem, raising the question: to what extent should hydrologists and their colleagues, the climatologists, be involved in the medium- to long-term planning of water resource development and what knowledge do they really have that can be used effectively in making decisions on priorities in the face of increasing demands for scarce water resources?

The purpose of the *The Role of Hydrology in Water Resources Management* symposium was to discuss ways in which hydrologists could contribute most effectively to the planning and management of freshwater projects, including the efficient operation of existing systems faced with new socio-political situations. It was also to address how water resource managers could capitalise on the hydrological expertise available to them. At the symposium, hydrologists and

water resource managers were invited to discuss these topics, taking into account the need to include more environmental, social and economic aspects in the planning and management of such projects while keeping in mind the sustainability of water resource systems and related projects. As hydraulic and water management projects can have negative impacts on the environment, contributors with expertise in environmental matters were particularly welcome.

Contributions by hydrologists were expected to deal with the following questions:

1. What can hydrology offer to water managers at different levels?
2. What hydrological inputs are needed to attain the goal of integrated water resources management?
3. Are hydrologists sufficiently involved in planning and managing hydraulic and water management projects?
4. How can hydrologists promote the compilation and use of integrated sets of data and information in the process of planning and managing hydraulic and water management projects?
5. Are the principles of sustainability and environmental compatibility sufficiently considered in the planning and management of projects?
6. Which research activities are necessary in hydrology and related sciences to satisfy future needs arising from the move to integrated water resources management?

Contributions from water managers were required to reflect on the following questions:

1. What are their requests to hydrology and to hydrologists?
2. What type of information can water manager offer to hydrologists?
3. Which contributions can be offered to hydrologists and environmentalists during the planning and managing processes?
4. Have hydrologists contributed constructively to the planning and managing processes in the past?
5. How and in which fields are hydrologists supposed to achieve progress in water resources management by developing new and innovative methodologies?
6. What experiences have been gained from cooperation with hydrologists up to the present?

This symposium was convened by the International Association of Hydrological Sciences (IAHS) as a contribution to the International Hydrology Programme (IHP-UNESCO) with the support of the Italian National Committees for the IHP and for IAHS and a number of other Italian bodies, both governmental and non governmental. The symposium took place 13–16 October 2008 in the Quisisana Hotel on the isle of Capri, Italy.

About 100 participants attended the Symposium, with 67 coming from outside Italy. After the Opening Ceremony, a Round Table on the Archaeology of Water with contributions on water and Roman urbanisation, Roman fountains and thermal baths, and Roman water technologies was presented. The symposium was divided into five sessions and this volume follows this pattern. Each session was opened by an invited paper. About 30 papers were presented by participants, after screening by the Scientific Committee. There was also a poster session with 16 posters.

There seemed to be agreement that the symposium had attracted a larger number of interesting and well presented papers and that it had been a very good medium for disseminating knowledge and for fruitful discussions.

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