



# Water management for an increasingly complex and interrelated world

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As the President of the International Water Resources Association (IWRA), I very much welcome an opportunity to share my views on the future of water management with the readers of the *World Atlas on Hydropower and Dams*.

The IWRA is one of the oldest professional associations in the area of water. It is the only water association which has consistently taken a multidisciplinary, multi-use, multi-sectoral, multi-stakeholder and holistic approach to water management, right from its very inception. The complexity of water management at present, and the need for a coordinated approach in the future, has made the role of IWRA more relevant and important compared with when the Association was first established in 1972.

In the present-day world, both developed and developing countries are facing issues where some of the existing paradigms are confronted with harsh practical realities. These make their implementation exceedingly complex and difficult, where inappropriate and inefficient management practices often prevail, and where a futuristic vision for a much needed broader perspective on key issues related to development still has to be formulated, let alone implemented. Good policies which can be implemented in practice are needed in all resource management sectors (including in energy and agriculture), if economic, social and equitable development is to be achieved all over the world.

In terms of social and environmental challenges, their increasing complexities and global reaches make it essential to develop more ambitious intersectoral policy alternatives which are economically efficient, socially and politically acceptable, environmentally friendly, and institutionally practical to implement.

With increasing interactions between energy, agriculture, water and environmental sectors, future development policies should be carefully formulated and implemented, with a full understanding and appreciation of their complex interrelationships and interactions. The issue is further complicated by the dynamic nature of these interlinkages.

The water development landscape has thus undergone radical changes in recent years, a process which is likely to continue in the foreseeable future. All the current and emerging trends indicate that the future changes and uncertainties are likely to multiply.

Accordingly, in an uncertain and unpredictable future world, knowledge generation, synthesis and dissemination, as well as knowledge application, will play increasingly important roles to ensure efficient and equitable water management and development.

The needs of the world and the expectations of society are also changing very fast. This is likely to result in changing responses from different actors, including their extent and levels of participation. To be able to identify, understand and appreciate these emerging changes, and then propose policy options which are conceptually sound and usable in a real world, the water community must interact with as many interested parties as possible, engaging in a dual and concurrent process of knowledge generation, synthesis and application.

Development challenges, societal needs, and even ideological preferences of the different actors involved and their relationships with water, are exceedingly complex to define and analyse reliably at present. These are likely to become even more complex in the future. Accordingly, water professionals and decision-makers will need to acquire a different mindset, and a much more open and flexible approach than ever before in human history, to understand and manage these interrelations.

With the involvement of multiple actors in the arena of water resources planning, development and management, the introduction of ethical issues such as responsibility, accountability, transparency, equity and fairness (challenges that are invariably associated with such complex issues as efficient and equitable water resources management) have already become extremely complex. In addition, simultaneous consideration of complex and interrelated issues such as water and food production, bio-

energy and electricity generation for an increasingly energy-hungry world, as well as uncertainties introduced by issues like climate change, free trade, and globalization, is making water management a much more challenging task than that which previous generations faced.

Within this overall context, it will be useful to study the authoritative OECD publication, *Environmental Outlook to 2030* (2008), which analyses the global importance and likely impacts of rapidly emerging economies as they become major economic and trade partners, competitors, resource users and polluters on a scale which is comparable to some of the largest OECD countries. For example, the combined primary energy consumption of Brazil, Russia, India and China is expected to increase by 72 per cent between 2005 and 2030, compared with 29 per cent for the 30 OECD countries. In terms of greenhouse gas emissions, unless ambitious policy actions are implemented in these countries, they will increase by 46 per cent to 2030, surpassing those of the 30 OECD countries combined. The report also estimates that more than 60 per cent of the combined population of Brazil, Russia, India and China are now living in medium to severe water stress. This estimate is expected to increase to 80 per cent by 2030, unless new measures to better manage water resources are introduced.

The global production of bio-ethanol has doubled to more than 50 billion litres per year between 2000 and 2007, while that of biodiesel has increased eleven-fold, to almost 11 billion litres within the corresponding time period. It is estimated that food and biofuel production together will require a 10 per cent increase in farmland worldwide by 2030, with a further losses of wildlife habitat.

The impacts of such massive energy-related developments on the water sector are yet to be authoritatively studied, even though these are already being felt by both developed and developing countries. Their increasing social and environmental pressures are being felt mainly by developing countries at present, because they are less equipped than





developed countries to manage and adapt to such rapid changes in financial and institutional terms. Even for developed countries, these changes have largely outpaced the benefits of any efficiency gains that have been witnessed in recent years. New and innovative policy actions are thus urgently needed for more efficient management of natural resources, including water, for both developed and developing world.

The global water community must engage more actively on issues related to development and knowledge generation from outside the water sector, which may have a bearing on water planning and management in the future. This should include consideration of appropriate policy options to tackle key water-related issues, as a result of their increasingly complex and often cross-sectoral nature, but always within the framework of social and economic development. Different actors need to work together to

ensure the formulation and implementation of coherent policies for water resources management by considering the problems of the present and the future, rather than focusing on issues of the past which are no longer important or relevant. Ensuring improved communication between a multiplicity of groups having different interests and agendas, dissimilar ethics, values and norms, and the absence of an overall consensus about the types of goals that are to be pursued, will present formidable challenges that will require extraordinary measures of coordination, collaboration and cooperation which simply does not exist at present.

The IWRA continues to be engaged in developing multidisciplinary, multi-sectoral and multi-actors platforms for regular dialogues between key sectors influencing water management, both from within and outside the water sector. It is also making a deter-

mined attempt to develop stronger partnerships with other interested groups to address effectively global, regional and national challenges that the water sector is likely to face in the future. Any one professional association, irrespective of its strengths, simply cannot help to manage the present and the emerging water problems of the future. The water profession as a whole must develop functional partnerships and effective networks. On behalf of IWRA, I would like to invite cordially all the readers of this *Atlas* to join hands with us to identify and solve the water-related problems of the future. Together, and as partners, we can accomplish much more than any one individual group. We simply have no other choice.

*Sebastián Ruiz*