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## **Adaptive and Integrated Water Management**

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(Editors)

# **Adaptive and Integrated Water Management**

Coping with Complexity and Uncertainty

With 72 Figures

 Springer

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# Preface

Ladies and Gentlemen,

This year's International Conference on Adaptive and Integrative Water Management in Basel, Switzerland, will bring together more than 250 leading scientists, policy and decision makers from all over the world to discuss new scientific findings and analyse possible implications for water policy. I am pleased that this event takes place with the patronage of the European Parliament, as the initiative is of utmost European interest.

The conference comes at a very special time. Rising temperatures, changing weather conditions, floods in some parts of the world and rapidly spreading drought zones in other regions may permanently alter - and damage - our planet. Scientific reports have established that climate change is a fact and an acute challenge for policy makers worldwide. Climate change is happening and even accelerating. Doing nothing is not an option. The European Parliament has called for Europe to prepare urgently to face up to and tackle these developments. At the beginning of this year, at their Spring Summit, European heads of state and government committed themselves to binding, rapid and responsible measures to combat climate change.

In this context, many voices argue for a profound shift in water management practices. Today's problems of water supply and quality are expected to grow and intensify due to the effects of climate change over the next decades. The sustainable management of water resources is one of the major challenges for environmental policy in the 21<sup>st</sup> century. And at the heart of the problem is that the world's freshwater resources are very unequally distributed. In addition, even in countries which do not have problems of scarcity, a major cause of water shortage and sanitation problems is poor water governance. Even in Europe, almost 18 % of the population suffers from "water stress".

The European Union strives for a sustainable concept of water quantity and quality management within its borders. Since the early days of European water policy in the 1970s a complex set of directives and regulations has been put in place. In October 2000 the European Parliament approved the Water Framework Directive, which represents a milestone in EU water

policy. The Framework Directive covers all inland and coastal waters and represents a powerful tool to address the various pressures on water supply. The Directive not only commits the EU to achieve a "good condition" for all European waters, but also obliges all EU Member States to use water fees policy as an efficient tool for the protection of water resources. In order to support Member States in the implementation process and to involve a broad range of stakeholders, a Common Implementation Process was set up. Furthermore, a platform for sharing information and experience has been established, and the streamlining of reporting has started. The implementation of the legislation is well under way. WISE, a common reporting platform, aims to harmonise and simplify the required reporting.

Parallel to the implementation of the Directive, EU water policy is undergoing a reshaping process: Within the EU, we have undertaken new water actions. The Groundwater Directive entered into force on 16 January 2007. The Floods Directive and the Marine Strategy Directive have been proposed and are under way.

We need to start thinking about how to better integrate the impacts of climate change on water resources, in particular the issue of water scarcity and droughts into all relevant areas of EU policy.

"Adaptation" - tackling the present problems of a changing climate, such as increased rainfall, higher temperatures, scarce water or more frequent storms, while also anticipating future change in aiming to cost-effectively reduce risk and damage - has become the magic term in today's politics. On 29 June 2007, the European Commission adopted its first policy document on "adaptation to climate change in Europe - options for EU action". This Green Paper builds on the work and findings of the European Climate Change Programme.

The international Conference on Adaptive and Integrative Water Management 2007 will address a lot of the issues raised in the recent European Commission paper. This book provides a selection among the contributions preparing for the Conference on Adaptive and Integrative Water Management. Chapter topics range from adaptive steps toward groundwater protection, to regional water management regimes, managing flood risks, improvement of water use and conceptual considerations, as well as methodological analyses of case studies on water management from across the world.

The book successfully aims to contribute to developing and disseminating a much needed knowledge base in the field of water policy. We in Europe can only achieve the ambitious goal of future sustainable management of the world's water resources by building on innovative concepts and methodological approaches developed by scientific experts in close cooperation with policy and decision makers. Besides focusing on techni-

cal solutions to individual problems, water management needs to take better account of the complexity and uncertainty of this task and therefore requires that we employ more adaptive and flexible strategies.

The European Parliament supports all efforts made by researchers and scientists in addressing these topics of crucial scientific importance, welcoming a cross disciplinary approach.

The Conference on Adaptive and Integrated Water Management provides an important new exchange forum for both, scientists and policy makers. By supporting scientific networks and touching upon sensitive issues relating to water management, the conference will give vital aid to our common project, sustainable future water governance, in Europe and globally.

Hans-Gert Pöttering,  
President of the European Parliament

## **Preface of editors**

What to do if the past does not tell us much about what we can expect for the future? Increasingly water resources management has to cope with situations that have not previously been experienced. Australia faces an extreme drought which threatens the existence of many farmers who have always relied on water supply for irrigation. At the same time what used to be once-in-a-century floods have in some areas occurred several times within one decade. Such events have sharpened awareness of the limitations of current water resources management approaches to cope with complexity and uncertainty and highlights the need to develop and implement integrated and adaptive approaches. Climate change will place significantly more pressure on the water sector. Despite human capacity to adapt, current knowledge of water resource management regimes and what determines their performance and their complex dynamics is quite fragmented. Major research efforts integrating the social, natural and engineering sciences and the scientific and the policy communities are needed to improve this situation.

These are the challenges tackled in the first international conference on Adaptive and Integrated Water Management organized under the leadership of the European project NeWater (New Approaches to Adaptive Water Management under Uncertainty). The conference places a strong emphasis on the human dimension, water governance, learning processes and change management – themes that have for a long time been neglected in water resources management but that are crucial for improving current practices. This book includes a number of papers addressing the key themes of the conference. The topics covered range from conceptual and methodological considerations to case study applications and practical guidance for policy and practitioners. Experiences reported are drawn from case studies from all over the world. A major task for the future is the carrying out of systematic comparative studies to identify those water management lessons from which generalisations can be made. Based on available evidence it is already clear that no generic recipes exist, but what is required are diagnostic approaches that allow the development and implementation of processes of change in management practice tailored to the current situation in a given basin. Furthermore, knowledge gaps should not

be used as an excuse for delaying action. The current knowledge base is sufficient to support a transition in water resource management to adaptive and integrated approaches. These approaches are urgently needed to guarantee water-related services without compromising environmental, economic or social sustainability and to decrease the vulnerability of societies to water-related hazards. The fact that the conference takes place under the auspices of the European Parliament is a clear signal of the political relevance and timeliness of the conference theme. We expect that the book will provide a valuable source of inspiration and guidance for scientists, policy makers and practitioners in their work on water policy and management.

We want to thank all contributors to this book for their efforts in providing high quality manuscripts and to Patrick Wild, Torsten Hoch and Stefan Riffert from the CAIWA team at the University of Osnabrück who worked day and night to ensure that the book would be available for the conference. The financial support for the NeWater project from the European Commission is gratefully acknowledged.

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