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Asit K. Biswas · Cecilia Tortajada
Philippe Rohner
Editors

Assessing Global Water Megatrends



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Editors

Asit K. Biswas
Lee Kuan Yew School of Public Policy
National University of Singapore
Singapore
Singapore

Philippe Rohner
Pictet Asset Management
Geneva
Switzerland

Cecilia Tortajada
Institute of Water Policy, Lee Kuan Yew
School of Public Policy
National University of Singapore
Singapore
Singapore

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Foreword

‘Water is life’s matter and matrix, mother and medium. There is no life without water’, so said Albert Szent-Gyorgyi, a Hungarian Nobel Prize winner for Medicine.

Indeed, water is life and therefore any assessment of global water megatrends is necessarily an examination of the trajectory of human development. Professor Asit Biswas, Dr Cecilia Tortajada and Dr Philippe Rohner have combined their unique expertise in putting together this volume that captures and weaves together important concepts such as the current population growth patterns and how they will impact water, the issue of sustainability in urban water management, the role of technology in addressing water management issues and the convolutions of the water-energy-food nexus. In order to address all these challenges, the authors make strong arguments for why fundamental changes in water management are necessary.

The issue of water and the global megatrends impacting all of us are areas close to the heart of Singapore. Singapore is at the vanguard of water management, driven by necessity and whose evolution mirrors the global water megatrends. From a starting point of near zero natural water resources, the island-nation has built for itself a diversified ‘Four National Taps’ water resource portfolio. Indeed, without the confidence that Singapore’s water supply is always clean, safe and reliable, we would not have attracted investments into Singapore nor prospered.

Operationally, the National Water Agency of Singapore, PUB, is faced with the challenge of ensuring the sustainability of its closed water loop while at the same time meeting growing water demand from our industry and population. In tackling these challenges, PUB has invested heavily in research and development as well as supported the test-bedding and implementation of many new technologies in areas such as desalination and reuse, watershed management, wastewater treatment for resource recovery and industrial water technologies. Moving forward, PUB will be exploring co-location synergies between power generation and desalination, and also food waste and sludge co-digestion. In doing so, Singapore will once again be demonstrating its willingness to embrace new approaches and transform scarcity into opportunity.

This book is also seminal in drawing together perspectives from a geographically diverse list of renowned international contributors and truly reflects the universal nature of the challenge we face. May it serve as a call to action for us all!

Singapore
August 2017

Masagos Zulkifli
Minister for the Environment and Water Resources,
Government of Singapore

Preface

John F. Kennedy once said: ‘Change is the law of life. And those who look only the past or present are certain to miss the future’. He also said: ‘Anyone who can solve the problem of water will be worthy of two Nobel Prizes—one for peace and one for science’.

More than half a century after President Kennedy’s death, the above two statements appear to be more prophetic than ever, especially for the water sector. The water profession has been claiming for at least the past 40 years that business as usual can no longer be an option but behaving consistently that as if there are no feasible business unusual solutions. It is still trying to solve tomorrow’s water problems with yesterday’s mindsets, experience, models and day-before-yesterday’s knowledge-base. Incremental developments of the past can no longer be options when the complexities and the uncertainties associated with the new generation of water problems are increasing almost exponentially.

Reliable forecasting of the future that is actionable is a vastly complex and difficult task, not only for the water sector but also for all other areas. However, one fact can be predicted with complete certainty: the world in 2050 will be vastly different to what it is today.

The changes during the next three decades will come from all parts of the world, from different sectors and disciplines, from academia, businesses, public sectors and non-governmental organisation (NGO) communities, as well as from rapidly changing social attitudes and perceptions and steadily advancing aspirations from people from all over the world. Taken as a whole, these changes will be far-ranging, far-reaching and far-embracing. All of these will have ramifications for water management.

The water sector has always been an integral and essential component of the global systems. It will be affected by the future global changes, and, in turn, will affect them. These constant interactions will create numerous feedback loops that will be difficult to predict and even harder to manage. Most of these changes are likely to originate from non-water sectors and, seemingly, from non-water-related issues on which the water profession will have, at best, limited say or control. All these will make water management beyond 2030 an exceeding complex task, and

this complexity will only increase progressively with time. The extent, magnitude and typology of the future water problems and their solutions will vary from place to place as well as over time. Consequently, water planning and management processes and practices are likely to change more during the next 20 years compared to the past 100 years. Most of the catalysts that will be driving these changes will come from outside the water sector but they will have profound implications on how water is managed.

The water profession has mostly ignored global forces that are often external to the sector even though such forces are already shaping water use and availability patterns (both in terms of quantity and quality), as well as planning and management practices. These forces will continue to increase progressively into the future. Unfortunately, the water profession has mostly neglected, in the past, the various water-related implications of the forces of globalisation, ageing society, free trade, and the information and communication revolution. Taken together, these developments, and others associated with them, will unleash forces that are likely to affect water governance in a variety of expected but mostly unexpected ways. When assessed perceptively, systematically and holistically, their impacts are already visible in all countries of the world, ranging from the USA to Uruguay, and from China to Cameroon. The impacts of these unleashed forces are only likely to increase in the future.

There is no question that future water-related issues and problems of the world will be very different to those witnessed in the past or that are being encountered at present. Historical knowledge and recent experiences will become increasingly inadequate to identify the future water problems, let alone their magnitudes and solutions. New lenses are urgently needed through which future water-related problems can be properly identified, viewed and analysed. The solutions to the new sets of emerging and evolving problems will require new insights, coordinated multidisciplinary, multisectoral knowledge and skills, adoption of new and innovative approaches, adaptable mindsets, and proactive, functional and efficient institutions that can adopt promptly and successfully new scientific, technological and management breakthroughs.

All the signs indicate that many of the currently accepted paradigms and models may have to be extensively modified, and, in some cases, may even have to be completely jettisoned. Many of the current popular paradigms, like integrated water resources management and integrated river basin management, have long passed their 'sell by' dates even though they are still being extensively used. New functional and usable paradigms have to be found that should have the potential to solve future global and national water-related problems. These new approaches and analytical tools must be able to manage diversified, even contradictory, requirements of different stakeholders and their social, economic and political agendas, changing public attitudes, perceptions and aspirations, and metamorphosing needs of institutions at various governmental levels. To these challenges must be added water-related implications of increasing and changing structure of the global population, rapid technological changes, relentless economic competitions between countries and within countries, concurrent and conflicting impacts from the forces

of globalisation and antiglobalisation, forces unleashed by climatic changes and fluctuations, and rapidly increasing aspirations of people from all over the world for a continually advancing standard of living. Since water is one of the very few common threads that connect all these and nearly all other development factors, water management in the coming decades will become increasingly more and more complex with time.

This book attempts to anticipate and analyse many of the global water challenges of the future. Our contributors who are leaders in their respective fields come from different sectors, disciplines and countries. Together, they provide a unique vision and perspective to see how the world of water is likely to change over the coming decades, and how these changes can be managed cost-effectively and also in a timely manner.

We are most grateful to many people for the idea behind this book and then for helping us to make it possible. First and foremost is Philippe Rohner of Pictet Asset Management who introduced us to the relevance and importance of megatrends for managing water in the future. We are delighted that Philippe could join us as a co-editor. We are also indebted to all the contributors who promptly accepted our invitations to write the specific chapters. After the first drafts were ready, the authors met in Singapore to review and critique all the chapters over two days. Based on these extensive and in-depth discussions, all the chapters were modified by their authors. We very much appreciate that Masagos Zulkifli, Minister of Environment and Water Resources, Government of Singapore, kindly agreed to write the Foreword to the book. Last but not least, we would also like to thank Thania Gomez of the Third World Centre for Water Management, Mexico, for all her editorial help to finalise the manuscript.

According to an African proverb, tomorrow belongs to the people who prepare for it today. We hope the process that first started in Geneva and Mexico, and then later continued in Singapore, will help water professionals from all over the world to appreciate and better understand the nature of the likely water problems of the future.

Singapore

Asit K. Biswas
Cecilia Tortajada

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Contributors

Asit K. Biswas Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore, Singapore

Paul Bulcke Nestlé SA, Vevey, Switzerland

Malin Falkenmark Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden; Stockholm International Water Institute, Stockholm, Sweden

Janet G. Hering Eawag, Swiss Federal Institute for Aquatic Science and Technology, Dübendorf, Switzerland; Swiss Federal Institute of Technology (ETH) Zürich, IBP, Zürich, Switzerland; Swiss Federal Institute of Technology Lausanne (EPFL), ENAC, Lausanne, Switzerland

James W. Hotchkies Enereau Systems Group Inc., Ridgeway, Ontario, Canada

M. Dinesh Kumar Institute for Resource Analysis and Policy (IRAP), Hyderabad, India

David A. Lloyd Owen Envisager Limited, Cardigan, Ceredigion, UK

Amina Maharjan International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

Melissa McCracken College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR, USA

David Molden International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

Aditi Mukherji International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

Christopher Napoli King Abdullah Petroleum Studies and Research Centre, Riyadh, Saudi Arabia

Peter Joo Hee Ng PUB, Singapore's National Water Agency, Singapore, Singapore

Laura E. R. Peters College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR, USA

Philippe Rohner Pictet Asset Management, Geneva, Switzerland

Christopher Scott Udall Center for Studies in Public Policy/School of Geography and Development, University of Arizona, Tucson, AZ, USA

Cecilia Tortajada Institute of Water Policy, Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore, Singapore

Kalanithy Vairavamoorthy International Water Management Institute, IWMI, Battaramulla, Sri Lanka

Olli Varis Water and Development Group, Aalto University, Espoo, Finland

Ben Wise King Abdullah Petroleum Studies and Research Centre, Riyadh, Saudi Arabia

David Wogan King Abdullah Petroleum Studies and Research Centre, Riyadh, Saudi Arabia

Aaron T. Wolf College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR, USA

Lama Yaseen King Abdullah Petroleum Studies and Research Centre, Riyadh, Saudi Arabia