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Book Reviews

Water Resources of North America
Edited by Asit K. Biswas
Berlin, Springer, 2003

All current assessments indicate that water is becoming an increasingly scarce resource and that more countries will become water stressed this century. Some experts even warn that possible water wars are much more likely than ever before. In the Preface, the Editor, Professor A. K. Biswas, does not abandon the readers in such devastating scenarios, rather through his visionary thoughts and logical analyses he offers an optimistic scenario. He argues that current assessment of water scarcity is somehow overstated. Due to the better management practices, extensive reuse and recycling practices, demand management, and availability of reliable water statistics in the coming decades, one can now be cautiously optimistic about global water crisis. Unfortunately, current water scenarios are often based on unreliable data and information. In many parts of the world the quality and extent of data do not allow professionals to assess, analyse and evaluate the water problems.

To overcome this crucial constraint in North America, this book offers a reliable assessment of the current status of water resources in Canada, the USA and Mexico. Following the Preface that sets the context, this book consists of three parts aimed at analysing the water resources of these three countries separately along with 155 figures and 46 tables.

The first part, authored by Luc Vesconi, presents an overall water status in Canada. Canada represents 7% of global water resources with just 0.5% of the world's population. Nine per cent of all freshwater discharged into the world's ocean comes from Canada. Although blessed by a high quality of water, 20–40% of rural wells are contaminated. The contamination of groundwater by nitrate and bacteria is of continuing concern. Surface water is abundant and relatively clean, but pollution due to industrial and municipal discharge, spills, runoff and deposition of airborne pollutants are affecting the quality of water. The Water Survey of Canada is responsible for operating water quality monitoring. Federal government, under the Canada Water Act and the Canadian Environment Protection Act, monitors surface water quality through Environment Canada. Nearly 81% of Canadians have access to municipal sewer systems, of which 93% had wastewater treatment facilities in 1994. In Ontario, Prairie and Quebec provinces, the majority of the population is serviced by wastewater treatment facilities. But in Atlantic Provinces, 50% of the population with sewage system was out of treatment facilities.

Ageing municipal infrastructure is another challenge, which Canada should overcome to reach North American Standards. Like other nations, conflict between wetland conservation and wetland utilization is posing serious threats

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to Canada's 1.2 million km^2 of wetlands. Through developing the Flood Damage Reduction Program in 1975, Canada established a world leadership role in flood management. But still local governments are facing challenges in flood management due to a lack of political will, inadequate capacity or the absence of watershed management mechanisms.

In 14 elaborate chapters, Vesconi describes water quality, water quantity, water uses, fisheries, water and nature, health issues, and community participation issues. Three guest authors, Owen Saunders, Chris Morry and Janick Lalonde, contribute to the chapters on the institutional and legal framework of Canadian water resources management, fisheries and aquaculture, and water and energy. After ornately explaining the aforementioned themes accompanied by 22 figures and 16 tables, Chapter 14 points out 12 prevalent water issues in Canada. The author suggests that to infuse economic, social and cultural factors into water management, an Integrated Water Resources Management approach concept should be more actively promoted throughout the country. Readers of this part will find substantial information and data regarding Canada's water resources.

The following part of the book, Chapters 15–26, written by five experienced water professionals at Oregon State University, is devoted to the current water status of the USA. In the USA, surface water accounts for 81% and groundwater for 19% of the total water withdrawals. Of total water withdrawals, the arid Pacific and Mountain regions account for 32% and the East North Central and South Atlantic regions account for 30% of water withdrawals. Although by 2040 the anticipated population increase is 41%, the total withdrawal will increase only 7% due to the projected higher efficiency in water uses. There are concerns about climate change effects, preservation of aquatic habitats, riparian ecosystems and water quality that will be the driving forces in future water development approaches. Non-point source pollution is the major cause of water quality deterioration. Fifty-seven per cent of the watersheds have moderate to severe water quality problems.

Readers of the second part will gain a good foundation of knowledge about the USA's physical context, socio-economic aspects, institutional framework for water management, water availability and uses with future projections, water quality, agriculture, hydroelectric power generation, municipal and industrial uses of water, public health issues as well as the constraints/challenges in managing water resources efficiently. The authors give thorough analyses of all the above-mentioned topics through extensive data and relevant illustrations along with particular guidelines for the future. The authors mention that improvement and protection of water quality and watershed health are the major challenges for US water managers. They also quest for new environmental policies that consider the entire hydrological cycle. Like Canada, the ageing water infrastructure should be repaired. They mention that technological and scientific advances are needed to assess the existing infrastructure. As a whole, the authors describe the overall water status of the USA in these 12 chapters with extensive data and information along with 85 figures and nine tables. In the glossary, the definitions of technical terms are also presented that will help readers to go through chapters conveniently.

The Third World Centre for Water Management, a policy-oriented global think-tank based on Mexico, led by Biswas, authors the last part of the book. This part, Chapters 27–38, offers an overall knowledge about the water resources

of the United Mexican States. The physical and socio-economic context of Mexico, the status of surface water and groundwater, water availability, uses of water with special focus on agriculture, public and industrial uses, power generation, aquaculture, water quality as well as regulatory framework of Mexico's water resources management are described. Through 48 figures and 21 tables, these chapters provide extensive reliable data from authentic sources to analyse the current status of Mexico's water resources. The most creditable constituent of this part is that along with every chapter, expert analysis is provided to focus the major challenges. The final two chapters of this part offer the overall assessment and recommendations for Mexican water resources development. Chapter 37 describes eight factors precisely that are important determinants for improving Mexican water resources management. In a final comment, the author mentions that water development based on short-term financial benefits without considering the social and environmental effects is ineffective. The recommendations put forward will certainly help Mexico overcome its current water crisis. As mentioned in the final chapter, the main challenge for Mexican water managers is to find a way so that economic, social and environmental benefits are maximized and costs are minimized.

This book has achieved its goal of bringing together a wide range of knowledge about North American water resources with extensive reliable data and clear figures. The extraordinary rich contents of this book covered the water aspects of USA, Canada and Mexico, and also offered some realistic analysis of the future. I can guarantee that this book will be a precious reading for researchers, academicians, policy-makers, hydrologists, conservationists, students and water professionals interested/involved in the water resources of North America from any disciplinary perspective. The book could be used as a general reference as well as for specific and detailed information on North American water resources.

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Water Policies and Institutions in Latin America
Edited by Cecilia Tortajada, Benedito P. F. Braga, Asit K. Biswas and Luis E. Garcia
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Since water is fundamental to the biochemistry of all living organisms, water mismanagement affects everything, from health to human rights, the environment to the economy, sovereignty to social justice, poverty to politics, culture to conflict. An increasing number of countries are experiencing water stress, yet in most countries mechanisms and institutions to manage water resources in an integrated manner and implement the policies are either missing or inadequate. Without a practical, reasonable and feasible institutional framework for imple-

menting water policies, effective and efficient water management is simply not attainable. For this reason, a book such as this one, in an academic arena, that tries systemically to discuss and assesses the water institutions and policies in regional terms to a wide audience and in a very clear way, deserves appreciation for its unique approach.

This book is a collection of 10 papers on the present situations and future requirements of water policies and institutions in Latin American countries and is authored by well-known experts of the region in relevant fields. The first chapter, written by Professor Asit K. Biswas, describes the evolution of water policies in the last three decades with special focus on the United Nations Water Conference 1977. The author then critically reviews the existing water-management practices; the challenges for reaching multistakeholder consensus; the risk and uncertainties involved in water policies; and the forecasts for new development paths in the 21st century, which would change substantially the current water-management practices. Chapter 2, authored by Axel Dourojeanni R., describes the challenges of integrated water resources management (IWRM), highlighting the large gap between internationally agreed principles and the realities of Latin America and the Caribbean states. To analyse the challenges, this chapter describes the water administration systems of these countries under three categories; the obstacles of IWRM implementation with some suggestions; and then nicely clarifies the need for basin-wide water management. At the end, after diagnosing the past failed water management attempts in several countries, the author concludes that current so-called 'water crisis' is rather an institutional crisis.

In Chapter 3, Luis E. Garcia elaborately describes the institutional framework for water resources management in the region. This chapter also introduces a new conceptual model of water resources organization to regulate the allocation of water among competing uses, regulation of the use of water for public and productive uses, and, most importantly, to ensure environmental sustainability. Chapter 4, authored by Luiz Gabriel T. de Azevedo, offers a useful framework for economic rationalization in implementing water pricing reform and describes the institutional aspects of water pricing reforms by analysing three approaches, i.e. long-term vision, doing by learning and the Big Bang approach. The most creditable part of this chapter is the selection of several criteria when taking a decision whether or not to adopt water pricing reforms and by introducing the basic underlying conditions for a successful reform process. This chapter will be worthy reading for decision-makers and water experts for the execution of an effective water pricing system. Chapter 5 describes the role of water planning and appropriate laws as a basis for IWRM. To describe the significance of planning, Antonio Embid Irujo, a Spaniard Law academician, chose the Spanish Water Act 29/1985, which enforces planning of all public water domains and water basins. The author analyses this act elaborately to focus the extents of planning in achieving IWRM. This chapter continues to offer readers the multidimensional faces of water management and the necessity of legal tools for the implementation of IWRM.

Chapters 6–8 document case studies from Sao Paulo in Brazil, Chile and Mexico. In Chapter 6, the Sao Paulo water resources management model, which is based on a Tennessee Valley Authority model, is described elaborately. The legal instruments, regulations and organization of the state water council are also portrayed. The author, Flavio Terra Bath, also gives a clear idea about the

Brazil national water management structure. Chapter 7 has a lucid account on the economic and institutional framework of water resources management in Chile. The author, Carlos Salazar from the National Water Authority of Chile, based the chapter on his practical experiences and identified the limitations and challenges of implementing IWRM. Actions needed to overcome these challenges are also suggested. Chapter 8, by Cecilia Tortajada, presents the overall picture of water and environmental policies and institutions in Mexico. To do so, the author describes the institutional development in Mexico, the legal framework (the General Law on Ecological Equilibrium and Environmental Protection) and the laws relating to wastewater management. The author also identifies the obstacles to implement these laws at field level and concludes that overall socio-eco-environmental development in Mexico is only possible by adopting appropriate legal and institutional frameworks for water management.

As water does not acknowledge political boundaries, why restrict water management to such boundaries? To answer this question, the authors of Chapter 9 brilliantly put forward some proposals for the decentralization of water management in Mexico through basin-wide management. By analysing the success achieved in the Lerma-Chapala basin, the authors, from the National Water Commission of Mexico, argue that a basin-based water management approach is desirable to alleviate the severity of the water problems. To implement IWRM in Mexico, the authors point out 14 specific suggestions. The concluding chapter (Chapter 10) describes the positive results of international cooperation based on the principle of reasonable utilization and equitable utilization, and principles of no harm. To do so, Lilian del Castillo presents the success of The Paraná River Bilateral Commission, jointly managed by Argentina and Paraguay. The successes achieved through this commission reveals that transboundary cooperation could enhance the overall development of all riparian countries.

This book offers comprehensive reviews of the present water policies and institutions in Latin America. To fill the gap between the water-development principles and realities, it recommends some realistic proposals to make the future policies and institutions more effective and implementable to attain IWRM as well as to achieve the three IWRM goals, i.e. social development, economic growth and environmental sustainability. As a whole, the book is well produced and well illustrated and will be worthy reading for policy-makers, economists, hydrologists, environmentalists, environmental lawyers and university students studying water management. I strongly recommend it to anyone who wants to know and comprehend the multidimensional faces of water management and the challenges of water resources management in the developing world, as well as to learn about the ways to overcome those challenges.

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