

Introduction

Welcome to the third volume of *The World's Water*. What started as an effort to explore a variety of critical water issues and to disseminate water data and information has now expanded into a larger endeavor. In recent years, attention to water problems has grown as our understanding of the connections between this vital resource and human and ecological health has improved. Now, more than ever, policy makers and the public need useful information and knowledge about both water problems and their potential solutions. The goal of *The World's Water* is to fill at least part of that need. In this volume, with new authors and new data, we continue to try to raise important questions and offer new insights and approaches.

In 2002, the world will come together to review progress since the Earth Summit in Rio de Janeiro in 1992, including improvements in protecting and managing our freshwater resources. In 2003, Japan will host the Third World Water Forum; Spain will host a major World Water Congress. Tens of millions of dollars will be spent on these efforts, and tens of thousands of people will participate. Among the fundamental questions they will be asking is whether all of the efforts of the past decade have produced any real progress. Has there been any? More than a billion people still lack access to adequate safe drinking water. Nearly two and a half billion people lack access to improved sanitation. Thousands still die every day from water-related diseases. New instances of water-related conflict and violence are reported weekly. Climate change and impacts on water seems to be accelerating.

Despite the long way to go, progress *is* being made. The world is refocusing attention on critical unmet water needs, and for the first time since the 1980s has set an explicit goal—to reduce by half the proportion of people unable to reach or afford safe drinking water. A new set of principles and criteria have been developed by the World Commission on Dams to guide the construction of dams and other water infrastructure. New

voices are beginning to be heard, including those of business and labor, local communities and representatives of the environment, and new scientists from many disciplines. Even senior policy makers are taking note: more than 110 Ministers from around the world attended the Second World Water Forum in The Hague in 2000 and issued a joint statement. Another ministerial statement on water was issued at the International Freshwater Conference in Bonn in December 2001. (Both statements are reproduced in full in the In-Brief section of this book.) Such statements do not provide water to poor people or save ecosystems, but they do lay the foundation for real actions and educate policy makers about the need for such actions.

The three volumes of this series are meant to be viewed as a compendium—a consistent and evolving collection of discussions, information, and raw data on the changing nature of the world's water. Earlier volumes of *The World's Water* have reported on various aspects of the “changing paradigm” of water management, development, and planning. This volume goes further in the chapter by Gary Wolff and Peter Gleick, describing the transition in terms of a choice of paths we can take. People do not want to “use” water. They want to drink and bathe, swim, produce goods and services, grow food, and otherwise meet human needs and desires. Achieving these ends can be done in different ways, often with radically different implications for water. One path—what we call the “hard” path—relies almost exclusively on centralized infrastructure and decision making. The second path—the “soft” path—also relies on centralized infrastructure, but complements it with extensive investment in decentralized facilities, efficient technologies, and human capital. It strives to improve the overall productivity of water use rather than seek endless sources of new supply. It delivers diverse water services matched to the users' needs, and works with water users at local and community scales. And the soft path acknowledges the importance of protecting our natural environment and meeting basic human needs for water.

This volume also tackles perhaps the most controversial issue in the water community today: the “new economy of water.” As policy makers have broadened their search for solutions to water problems, new efforts are underway to expand international trade in water and to encourage private companies to play more of a role in water provision and management. These efforts are enormously controversial. Proposals to “privatize” water systems and to include water resources in global trading agreements have led to growing disputes and even violence. Many unanswered questions remain about the true implications and consequences of treating water as an economic good and whether these new approaches can effectively, equitably, and adequately serve human and environmental needs. Should we price and sell a resource as fundamental and vital as water? Will private companies protect ecosystems, water quality, and access to water for the poor? There is little doubt that the headlong rush toward open trading markets and privatization of public water systems has failed to address important issues and concerns. We tackle these questions in Chapters 2 and 3 by Gleick, Wolff, Elizabeth L. Chalecki, and Rachel Reyes, and we offer some fundamental principles that we believe are necessary to prevent inequitable, uneconomic, and environmentally damaging privatization agreements.

Another theme running throughout the series is the issue of measuring water scarcity and other aspects of water problems. In this volume, Gleick, Chalecki, and Arlene Wong explore attempts to define different “indicators” and “indices” of water well-being. The use of water-related indicators to measure the vulnerability of water systems, the quality of human or ecosystem health, or the level of development, has

greatly accelerated in recent years. In part, this is the result of growing interest in human development. It also results from a growing understanding of the limitations of the traditional measures, such as gross national product, used during the twentieth century to track quality of life. Recently, new indicators have been proposed to address water-related issues, such as water availability, access to clean water and safe sanitation, the time and effort required to collect domestic water, cost and price, quality, vulnerability of water systems to climate change, and more. Such efforts are useful but fraught with limitations: this chapter discusses appropriate design and development of such indices.

The connections between water and climate change were explored in the first volume. Since then, new reports from the Intergovernmental Panel on Climate Change and the National Assessment in the United States have raised even greater concerns about the likelihood and severity of the consequences of climate change for the world's water resources. In this volume, William Burns reviews a particular set of impacts—the consequences of climate changes for the vulnerable water resources of 30,000 islands in the Pacific Ocean—home to more than 7 million people and 22 separate political entities. While the popular press has focused on the threat of inundation of island coastal areas by rising sea levels, perhaps the most critical near- and long-term threat to these islands is the possible impacts of climate change on their freshwater quality and availability.

A critical aspect of sustainable water management and use must be the protection of natural ecosystems and their water resources. The earlier volumes laid out principles for ecosystem protection and described the efforts of some nations, such as South Africa, to legally commit water to the environment. In some places, efforts are now underway to restore natural ecosystems that have been destroyed or damaged by human activities and water withdrawals, such as in the Everglades, Florida, and the Sacramento–San Joaquin Delta in California. Other ecosystems are not as fortunate and remain under threat or seriously degraded. One class of threatened ecosystems is river deltas—around the world the rich marshes, wetlands, and ecosystems at the mouths of river systems are being threatened and destroyed by both water withdrawals and water contamination. Examples include the Nile, the Yellow, the Ganges-Brahmaputra, the Jordan, the Tigris-Euphrates, and many more. Chapter 6 by Michael Cohen describes one such threatened delta—at the mouth of the Colorado River shared by the United States and Mexico—and efforts by non-governmental organizations and government agencies to try to restore regular flows there.

The first book reviewed the state of the world's dams and challenged the old paradigm of relying on ever-larger numbers of dams to meet human needs. The second volume explored new efforts to take out or decommission dams that either no longer serve a useful purpose or have caused egregious ecological impacts. In November 2000, the World Commission on Dams, headquartered in South Africa, concluded a groundbreaking two-year study on the sustainability of large dams. The work of the Commission is considered by many to be the most comprehensive assessment of dams yet undertaken. In this volume Katherine Kao Cushing summarizes the Commission's objectives, work products, and processes, and describes the varied and controversial responses to the Commission's work. In a related "In Brief," Amar Mann describes one of the consequences of failing to consider all of the consequences of major dam projects—in this case the implications of the massive Southern Anatolia Project for the rich and varied archaeology of ancient Turkey.

In late October 2001, the Mars Odyssey spacecraft reached our nearest planetary neighbor and safely entered orbit. Within a very short period of time, its instruments reported strong evidence for the presence of Martian water resources. In “Water and Space,” Chalecki offers us a summary of the fascinating search for water in outer space, including the moon, Mars, the moons of Jupiter, and far more distant places. The presence of water in space has important implications for the search for extraterrestrial life and provides a critical resource necessary for space exploration.

Some of the other information found in the first two volumes of *The World's Water* is again updated here. The Chronology on water-related conflicts has proven to be an invaluable resource for both researchers looking at the security risks of shared water resources and for policy makers seeking to reduce those risks. This Chronology has been modified and expanded, as has the section on water-related Internet sites. Both of these resources are also available at the web site associated with this book: <http://www.worldwater.org>.

Finally, we once again offer a substantial Data Section—designed to be a regular feature. Some of the data sets from the first volumes are updated here, such as the country data on water availability and water use and information on national and global access to basic water services such as clean drinking water and improved sanitation. A wide range of new data is added, however, including tables on water and economics, and data on dams worldwide. Downloadable selections from all three volumes of data tables are posted at <http://www.worldwater.org>. Thanks to all the readers who have offered feedback on these books—your suggestions and encouragement make it worth the effort.

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