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Groundwater Legal and Policy Perspectives

Proceedings of a World Bank Seminar

WORLD BANK TECHNICAL PAPER NO. 456

Edited by
Salman M. A. Salman

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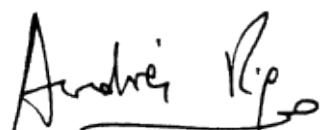
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FOREWORD

Groundwater is the least understood and least appreciated, yet the most important, natural resource available to mankind. Groundwater represents about 97% of the fresh water resources available, excluding the resources locked in polar ice. More than one and a half billion people in the urban parts of the world today depend on groundwater. Groundwater supply is more reliable than the seasonal, and sometimes erratic, surface water, and provides the main line of defense against drought. Moreover, the quality of groundwater is, by and large, superior to surface water, and cheaper to develop.

However, data on groundwater, when available, is very scanty. Many countries do not know how much groundwater exists beneath their soil, and a fairly large number of countries do not have legislation regulating the use and protection of groundwater. Although we have fairly reliable estimates of how many rivers are shared by two or more countries, no such estimates exist for transboundary aquifers, and international groundwater law is still in its early stage of development.

It is not surprising, under those circumstances, that the World Bank is now paying increasing attention to this valuable resource, through both operations and sector work. The organization of the seminar on "Groundwater: Legal and Policy Perspectives" by the Legal Vice Presidency in April 1999, should be a major contribution to this effort. The publication of the proceedings of the seminar is timely, and will certainly allow for a wider dissemination of the valuable information presented and discussed at the seminar within the Bank and its members countries and other interested institutions. This Report should also assist in a better understanding and appreciation of this valuable, but least understood and least appreciated, resource.



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SEPTEMBER 7, 1999

ABSTRACT

The structure of this Report follows closely the design and format of the seminar on "Groundwater: Legal and Policy Perspectives" held in Washington on April 19, 1999. Like the seminar, the Report consists of an introduction and four separate, but interrelated parts, each with a separate set of chapters.

The Introduction includes the keynote address delivered at the seminar. The Introduction argues that water crisis is likely to result, not from physical scarcities, but rather from two other reasons: quality deterioration and lack of investments in the water sector as a whole, including groundwater. The Introduction also highlights the linkages between groundwater and energy, and the need to ensure proper recharge of groundwater.

The first part of the Report deals with understanding groundwater. Chapter 1 explains some basic technical aspects of groundwater and discusses how groundwater is insufficiently understood, irrationally exploited, and inadequately protected. The chapter highlights some essential concepts for groundwater regulators. Chapter 2 deals with groundwater and society and describes how the perception and treatment of groundwater as a private resource has thwarted the attempts to exercise a measure of equity and control over abstraction and protection of groundwater. The chapter underscores the importance of engagement of users to encourage sustainable use of the resource.

The second part deals with the regulatory framework for groundwater. Chapter 3 surveys a number of groundwater regulations, and traces the move from private ownership of the resource to the current practice where most governments exercise a wide range of regulatory authority. The chapter discusses some issues, options and best practices associated with such regulation. Chapter 4 deals with institutional and legal issues relevant to implementation of water markets and explains how groundwater markets are used in different parts of the world today, both as a tool for efficiency, and for improving access to the resource. The chapter discusses how groundwater marketing without appropriate knowledge and management of the aquifer could prove unsustainable.

The third part deals with the World Bank experience with groundwater.

Chapter 5 discusses the objective and components of the Bank-financed Bangladesh Arsenic Mitigation - Water Supply Project. The chapter underscores the importance of considering all aspects of groundwater quality in the environmental impact assessment of development projects that impinge upon groundwater. Chapter 6 deals with groundwater resources management in Jordan, and discusses some policy and regulatory issues. The chapter explains the sources and uses of groundwater and the challenges that scarcity poses on the management of groundwater, including the issue of cost recovery. Chapter 7 deals with legal and institutional issues related to groundwater management in Mexico, and summarizes the aquifer stabilization study conducted for some of the overexploited aquifer. The chapter emphasizes the importance of users involvement, water rights and water markets and tariff. Chapter 8 discusses the World Bank experience with groundwater irrigation in Nepal and highlights some major issues that arose in some of

the Bank-financed projects there. Similar to Mexico, those issues include lack of farmers involvement and ownership in groundwater development. Chapter 9 describes the groundwater situation in Yemen and the World Bank involvement there. The chapter stresses the urgent need for a regulatory and legal framework for water resources in Yemen; a need which is typical of many developing countries.

The fourth part deals with international groundwater law. Chapter 10 describes the evolution and context of the legal principles that govern the use and protection of shared groundwater resources, including a discussion of what constitutes international groundwater. The chapter discusses the sources of such principles and concludes that international groundwater law is still in the embryonic stage. Chapter 11 deals with international groundwater law and the World Bank policy for projects involving transboundary groundwater. After similarly tracing the legal principles for shared aquifers, the chapter analyzes the World Bank practice in the few cases involving such shared aquifers. The chapter underscores the need for the policy to incorporate the practice as enunciated in the few projects involving transboundary groundwater. Chapter 12 highlights principles of international environmental law that may be relevant to transboundary groundwater, particularly those incorporated in the Rio Declaration and the concept of sustainable development. The chapter discusses how the application of the precautionary modalities could be extended to transboundary groundwater.

ACKNOWLEDGMENTS

The organization of the seminar on "Groundwater: Legal and Policy Perspectives" on April 19, 1999, and the preparation and editing of the proceedings of the seminar has been a demanding job, and I would like to thank all the colleagues who assisted me in both tasks. At the outset, I would like to extend my sincere thanks and appreciation to the guest speakers: Messrs. Asit Biswas, Stephen Foster, Jacob Burke, Stefano Burchi, Miguel Solanes, Stephen McCaffrey and Raj Krishna for their outstanding presentations, and for their contribution to this Report. My special thanks are extended to Mr. Andres Rigo Sureda for his advise throughout the preparation of the seminar, and for his introductory remarks that provided the directions for the seminar. I would also like to thank the Bank colleagues: Messrs. Nadim Khouri, Andrew Macoun, Ohn Myint, David Freestone, Tony Garvey, and Mmes. Karen Hudes and Karin Kemper who rearranged their mission plans and their other assignments to be present and give their presentations at the seminar, and for the contribution to this Report. My thanks and appreciation are also extended to Messrs. Marcus Moench, Claude Sauveplane, Hazim El Naser and Ms. Sarwat Chowdhury for their contribution to this Report.

I am also grateful to the coordinators of the sessions of the seminar: Messrs. David Grey, Ashok Subramanian and Paatii Ofosu Amaah for the smooth running of those sessions, and for the extensive preparatory work. I would also like to thank Mmes. Rosemary Thompson-Elhosseine and Valerie Peters from the Legal Vice Presidency, and Misun Choi from the World Bank Institute for their help with the logistics of the seminar. My special thanks and appreciation are extended to Mr. Goetz Reichert for his assistance in putting together this Report.

I would also like to acknowledge the assistance of, and funding from, the World Bank Institute, the Water Resources Management Thematic Group and the Legal Vice Presidency, and to thank the colleagues who facilitated such assistance and funding.

Last, but not least, I would like to thank the participants for devoting the entire day for the seminar, and for the lively discussion that enriched the seminar.

INTRODUCTION

WATER CRISIS: CURRENT PERCEPTIONS AND FUTURE REALITIES*

Asit Biswas**

Introduction

Mr. Leonardo da Vinci, the eminent renaissance scholar and philosopher said, "water is the driver of nature." Many may have considered it to be an overstatement in the past, but at the threshold of the third millennium, no sane individual would disagree with Mr. da Vinci's view. Water is becoming an increasingly scarce resource for most of the world's citizens. The current trends indicate that the overall situation is likely to deteriorate further, at least for the next decade, unless the water profession eschews "business as usual" practices, which can only allow incremental changes to occur.

Global Water Perspective: 1990-2000

Strangely enough, the water profession as a whole neither realized nor appreciated the seriousness of the global water situation as late as 1990, even though a few serious scholars have been pointing out the increasing seriousness of the situation from around 1982. For example, the seriousness of the crisis was not a major issue, either at the International Conference on Water and the Environment, which was organized by the UN system in Dublin, or at the UN Conference on Environment and Development at Rio de Janeiro. Held in 1992, both Conferences are considered important events for the water sector for the current decade. It is now being increasingly recognized that the Dublin Conference was poorly planned and organized, and thus, not surprisingly, it produced very little, if any, worthwhile results. Furthermore, as the Dublin Conference was expected to make the necessary inputs to the Rio discussions, water did not receive adequate emphasis at Rio. For all practical purposes, water was basically ignored at Rio by all the heads of states, whose primary interests were focussed on issues like climate