

Book Reviews

Groundwater Markets and Irrigation Development: Political Economy and Practical Policy

Tushaar Shah

Bombay, Oxford University Press, 1993, 262pp, £18.95, ISBN 019-563-22-73

How can Indian water resource policies better address three central sets of issues: productivity, equity and sustainability? In this well-written and clearly argued book, Tushaar Shah reviews research findings and policy experiments related to groundwater development and lift irrigation technologies in India. The book presents research on the workings of groundwater markets in different parts of India—defined as a localized institutional set-up through which owners of modern pumps supply water to other members of the community at a price. However, this information is also used to make policy recommendations for water resources management for different areas, in relation to their water economy.

Groundwater development has been critical to both economic and social transformation in India. A central theme of the book is that, despite the importance of groundwater, public policy towards its development and management is ineffective, and can neither stimulate nor regulate this precious resource in an effective manner. Key reasons for this include: the predominance of private development; the logistical limits to current legal instruments; and the fact that most public organizations have roles restricted to planning and monitoring. The real power in groundwater management lies with the users themselves—and the electricity agencies. Thus new groundwater policies have to encompass incentives for positive change and more collective action, and not just controls and restrictions. Shah's work suggests that the evolution of competitive water markets can be as—or more—beneficial than the direct transfer of subsidized technology, and also have substantial equity.

In the first part of the book, the author develops economic models to study the responses of farmers to both economics and the environment, in relation to choice of energy supply, sources, size of water-extraction mechanism, and the effects of the pricing policies of electricity agencies on operating regimes. The book then examines the development of groundwater markets in different locations. The book surveys experiences in: the fragile coastal aquifers; canal systems with conjunctive water use options; the uncertain hydrogeology of drought-prone areas with hard-rock geologies; and finally more water-abundant areas where ease of technology adoption has led to rapid development and some mining of water tables. This analysis allows the author to differentiate 'hydro-economic regimes', where different levels of groundwater development and irrigation have been feasible.

Finally Shah reviews the range of policy instruments in use for water resource

management in India, looking at power tariffs, power supply, licensing, subsidies and public tubewells. Shah draws on the earlier sections to differentiate policy options for different 'hydroeconomic regimes'. He shows how water markets can be relevant in many different areas, but need different policy instruments to develop in equitable forms. The book gives special attention to the effects of electricity services and tariffs on the nature of groundwater markets. The book includes several very useful tables categorizing water environments, policy instruments and options for water markets in different hydro-economic contexts.

The book will not only be of great interest to Indian policy makers and researchers involved with water. Its arguments and policy recommendations also have an international relevance for areas facing groundwater management problems, and similar concerns about equity and productivity in rural development. The book should also interest students and researchers in terms of documentation of research. It shows clearly how research can be structured to inform policy. The book presents new models for the study of the economics of water use and also reports the methodologies used to study change and test hypotheses about groundwater in different environments. Tushaar Shah presents his recommendations for new policy initiatives in Indian water management on the basis of evidence rather than opinion. Let us hope that this book will stimulate the debate it seeks and deserves.

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Hydropolitics Along the Jordan River: Scarce Water and its Impact on the Arab-Israeli Conflict

Aaron T. Wolf

Tokyo, United Nations University Press, 1995, viii + 272 pp., maps, diagrams, appendices, tables, references and index, ISBN 92-808-0859-1

This book is part of a series on water issues and conflict resolution sponsored by the United Nations University. *Hydropolitics Along the Jordan River: Scarce Water and its Impact on the Arab-Israeli Conflict* is an extremely interesting case study of the strategic role that water resources can play within a region. The Jordan watershed is relatively small yet it is crucially positioned given historical developments. Water shortages are rapidly becoming the norm within this watershed.

Wolf begins with a brief hydrography and a relatively extensive history of the region. The historical material sets the required context for his examination of water conflict and the potential for cooperation. A very adequate examination of important historical factors is presented as well as a nicely balanced perspective of the riparians and their relationship within the region.

Next, Wolf turns our attention to the difficult task of analysing such a complex and contentious international watershed. Chapter 3 presents a careful development of his interdisciplinary framework for evaluating watershed development and analysing water conflict. Several disciplines that have something to offer

those interested in water policy and management are summarized: physical sciences, law, political science, economics, game theory and alternative dispute resolution. These overviews present a nice, yet brief, introduction to the tools and lessons that these fields offer for the management of water resources. As a result, the interdisciplinary framework that the author develops draws on the strengths of each tradition. Wolf postulates three phases in the process of water conflict analysis: preliminary watershed analysis, the evaluation framework (options and viability) and implementation.

In Chapter 4, this interdisciplinary framework is applied to the Jordan watershed; the historical context previously developed in Chapter 2 is critical for this application. Wolf begins his analysis by addressing the water crisis in the Jordan basin. He formulates a four-stage water development plan for the watershed: (1) negotiate an equitable division of existing resources; (2) emphasize greater efficiency for water demand and supply; (3) alleviate short-term needs through interbasin water transfers (if available and politically viable); and (4) develop a regional desalinization project in cooperation-inducing stages. Wolf addresses the water conflict dimension as well by focusing on cooperation-inducing strategies for implementation efforts. He suggests three examples of cooperation-inducing implementation: an agreement for sharing existing resources, negotiations over the mountain aquifer and a Med–Dead or Red–Dead Canal desalination project. The attention given to the political viability of alternatives gives his interdisciplinary analysis much credibility.

Chapter 5 provides a concise summary of the book. An Afterword addressing significant recent events of the peace process brings the reader up to date and illustrates how change is an ever-present factor in our world. The Appendices offer many useful maps, documents, the PRINCE Political Accounting System, a water projection model, and information on the desalination projects. The bibliography is extensive; it is an excellent resource and reading list for this region.

Wolf provides readers with a well-researched and insightful study of the strategic importance of water resources. He takes his qualitative interviews and weaves a very careful story that illustrates the crucial role of water in the Jordan watershed. The consideration given to the historical contexts of political conflicts provides us with a deep and balanced treatment of the issues surrounding water in this region. Wolf gives us an example of the development and use of an interdisciplinary framework for water planning and management. In doing so, he both offers solutions and helps to broaden our perspectives. It may increasingly take this breadth of understanding with respect to our watersheds experiencing significant conflicts to generate insightful solutions to increasingly scarce water supply such as he develops in this work.

I highly recommend this book to those with an interest in Middle East water issues and to those who are new to this contentious watershed. It serves as an excellent international watershed case study for advanced undergraduates and graduate students (although an expensive supplemental paperback text at approx \$50). Additionally, it serves as a strong example of a thorough research project within an interdisciplinary framework.

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