

PRICING IRRIGATION WATER:
A LITERATURE SURVEY

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Washington, D.C.

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ABSTRACT

In addressing water scarcity and increased population pressures many countries are adopting water-pricing mechanisms as their primary means to regulate irrigation water consumption. “Getting prices right” is seen as a desirable way to allocate water efficiently, but how to accomplish this remains a debatable issue. Water pricing methods are sensitive to the physical, social, institutional and political setting in each location. It is therefore necessary, when assessing the costs and benefits of a particular irrigation project, to cater the pricing method accordingly.

This paper surveys current and past views on the many aspects of irrigation services and pricing. The result will be useful in developing a comprehensive guideline for water policy practitioners as they address the growing demand for these services and need to allocate scarce water resources efficiently. This survey is organized to illustrate efficient pricing methods followed by alternatives to market failure and considerations of income distribution, water institutions and political economies of irrigation water pricing. Existing irrigation case studies, data sources, and methodologies are compared and referenced.

ACKNOWLEDGEMENTS

This literature review was commissioned as a part of a wider research project, entitled “Guidelines for Pricing Irrigation Water Based on Efficiency, Implementation and Equity Concerns,” funded by the research committee of the World Bank. This project headed by Ariel Dinar, Yacov Tsur, and Terry Roe will include this survey as a chapter in their final manuscript for this research project. I have gratefully incorporated many of their comments, observations, and work on irrigation water pricing into this literature review.

The goal of this survey was to provide an exhaustive literature review of relevant articles surrounding irrigation and its pricing over the last two decades. In doing so, I hoped to have included salient discussion of the major contributors to this large body of literature, but acknowledge that valuable works may have been overlooked or omitted due to constraints on time and access. Lastly I would once again like to acknowledge the extensive comments and editorial suggestions provided by Geoffrey Spencer, Shobha Shetty, Alex Norsworthy, R. Maria Saleth, Yacov Tsur, Terry Roe, and Ariel Dinar.

EXECUTIVE SUMMARY

As a result of the Bank's implementation of the 1993 Water Resource Policy, loans for investment in water projects often include a component requiring the implementation of some form of water pricing. If this condition is to serve a useful purpose, water pricing should be implemented appropriately. Yet, the notion of desirable (or optimal) water pricing does not at all command consensus among economists, let alone policy makers. Despite the pervasiveness of water pricing in developed countries, there is still disagreement regarding the appropriate means by which to price water and the levels of water charges. This is partly due to confusion of basic fundamentals, and also because the performance of a water pricing method is quite sensitive to the prevailing conditions. Moreover, many countries lack the tradition, experience, and appropriate institutions to price irrigation water. This enhances the need for a comprehensive study that will (a) resolve common misconceptions and myths associated with irrigation water pricing, (b) define precisely the notion of efficient water pricing, account for implementation costs, (c) define and incorporate equity criteria, and (d) put together a guideline for water pricing in a wide variety of circumstances. The project, "Guidelines for Pricing Irrigation Water Based on Efficiency, Implementation and Equity Concerns," funded by the research committee of the World Bank will address this issue.

This literature review then serves to provide the necessary foundation of existing normative and positive studies relevant to pricing irrigation water as related to this project and will be included as a chapter in the aforementioned project. In addition, it is hoped that the included literature and discussion will provide a useful reference and foundation of relevant pricing issues for irrigation practitioners.

Tsur and Dinar (1995, 1997) analyzed different pricing practices vis-à-vis their efficiency performance, cost of implementation, and equity effects. Along these lines, this literature survey seeks to review and synthesize the most relevant and current research available pertaining to the many aspects of irrigation water pricing. The body of literature examining these movements is vast and diverse. Most works are normative in nature, dealing with how water should be priced, with some description of actual practicalities and applications. A few are purely description (e.g., Dinar and Subramanian, 1997). There are many compilations, which include the literature of a particular aspect of water pricing and irrigation:

- *Conflict and Cooperation on Trans-Boundary Water Resources*, edited by Richard Just and Sinaia Netanyahu.
- *Markets for Water: Potential and Performance*, edited by K. William Easter, Mark W. Rosegrant, and Ariel Dinar.
- *Decentralization and Coordination of Water Resource Management*, edited by Douglas D. Parker and Yacov Tsur.
- *Economics of Water Resources: From Regulation to Privatization*, edited by Nicolas Spulber and Asghar Sabbaghi.
- *The Economics and Management of Water and Drainage in Agriculture*, edited by Ariel Dinar and David Zilberman.

However, a comprehensive review is lacking. This survey seeks to address this issue by summarizing the accumulated knowledge regarding the implementation and performance of existing water pricing methods over the last two decades. This is confined to the resource economics literature pertaining to irrigation water, including external material only when particularly pertinent.

These indicate that the methods surrounding irrigation water pricing have many dimensions, both theoretical and practical. That these issues will become increasingly important, as future water and food demands increase, is not in question. Efficiently pricing water will help meet these increasing demand, but what is the best way to increase pricing efficiency? Many argue that water markets offer one solution, however, under which circumstances are water markets viable? What effect will decentralization have on farm production and the rest of the economy? What are the forces that are moving towards decentralization or (re)centralization? The answers to these questions and related methodologies are complex and often site specific. To help contrast these, a list of case studies and relevant methodologies are included in the appendices.