

## Book Review

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### **Water Resource Economics: The Analysis of Scarcity, Policy and Projects (Second Edition)**

By Ronald Griffin

Cambridge, MA: The MIT Press, 493 pp.

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The second edition of *Water Resource Economics: The Analysis of Scarcity, Policy and Projects*, like the first edition by Ronald Griffin, is an excellent textbook in water economics, with a focus on water quantity management. As the second edition, the book includes much of what was in the first edition. The biggest changes are the addition of Chapter 4, a new chapter on risk and uncertainty, and the expansion of the case studies on water marketing in Chapter 8. In the second edition, the author incorporates additional example from other countries; however, the main emphasis is still on water markets in the United States.

The purpose of the book is to introduce the economic way of thinking about water-related issues to any interested reader. One of the strong points of the book is its balance between economic theory and practical applications to water resource management. Therefore, the book can reach a wide range of audiences, including both economists and non-economists. To this end, the author provides an excellent overview of the tools frequently used in natural resource economics in the first four chapters, which form the foundation for the analysis in subsequent chapters.

Chapter 1 introduces the economic way of thinking and issues in water management. This chapter categorizes most of the contemporary water issues into those that are related to supply or demand. In addition, it emphasizes the interdependence between demand and supply in water issues, thereby highlighting the role of economic analysis in effective water management. The chapter concludes with a summary of the future challenges in water management and the role of economics in resolving these challenges.

Chapters 2 and 3 develop the basic economic theory of resource allocation, which form the foundation for the subsequent chapters of the book. Chapter 2 specifies the necessary economic concepts to perform time-insensitive economic analysis, including the supply–demand model, opportunity cost, marginal thinking, and economic efficiency. The author emphasizes that understanding economic efficiency is particularly important for the case of a natural resource like water, as the use of water often involves tradeoffs between different groups of stakeholders, both intra-generationally and inter-generationally. Chapter 3 expands the theory in Chapter 2 and focuses on efficiency in a dynamic setting. In the new edition, this chapter places more emphasis on describing the concept of time preference and its relationship with the market interest rates, which is particularly useful for non-economist readers. Chapter 3 also discusses alternative methods of evaluating projects (for example, net present value, internal rate of return, benefit–cost ratio and annualized net benefits) with applications to water management.

Chapter 4, a new chapter in the second edition, further expands the economic concepts of Chapters 2 and 3 to consider the issue of risk and uncertainty in resource management. This is an important addition to the book because water planning is subject to a great amount of uncertainty, for example, variability in weather patterns and climate change. This chapter provides a good introduction to the concept of risk and risk management techniques. In addition, the author points out that failures to incorporate risk and uncertainty into water management decisions tend to overestimate the optimal level of water use.

Chapters 5 through 7 discuss institutional economics, water law and the role of economics in evaluating water policy. The focus of Chapter 5 is on institutional economics and water law. The author emphasizes that free-market solutions to many water problems may be infeasible, due to the complications in establishing private property rights to water. This chapter also provides an excellent summary of existing water laws and regulations relevant to the United States. In Chapters 6 and 7, the author demonstrates the applications of economic concepts developed in earlier chapters to the assessment of water policy and water projects. Chapter 6 analyzes both demand-management and supply-enhancement water policies and emphasizes the importance of considering secondary effects in the welfare analysis of the policies. In this chapter, the author also briefly mentions the framework for policy analysis in a multi-period setting and in situations where risk and uncertainty play an important role. In the next edition, it would be nice if the author could expand this section and include some real-world examples of dynamic policy analysis under uncertainty. Chapter 7 presents applications of cost–benefit analysis (CBA) to water project evaluations. A key highlight of this chapter is the example project analysis in Section 7.6. This is particularly useful for readers to visualize

the process of CBA in reality. Unfortunately, the author restricts his discussion in Chapter 7 to only CBA; therefore, in the future, it would be helpful if the author also provides an overview of other project analysis tools (e.g., cost effectiveness analysis, risk assessment analysis, etc.) and discusses the merits of each tool in comparison with CBA.

The focus of Chapters 8 and 9 is on market solutions to water scarcity. Chapter 8 discusses water marketing, a management tool for natural water, which is water that has not been processed by a retail water facility. The chapter starts with a discussion of water marketing's history, terminology and structure, which is followed by an excellent discussion of case studies both inside and outside the United States. Chapter 9 discusses water pricing, a management tool for retail water. The chapter provides a great summary of common water pricing structures, highlighting the common mistakes in water pricing practices that leads to inefficient water use. Another strong point of the chapter is the demonstration of water pricing practices through a number of analytic examples.

Chapters 10 through 12 focus on the estimation of water demand and supply functions. Chapter 10 outlines the methods available to estimate water demand while Chapter 11 concentrates on water supply estimation techniques. Chapter 12 reviews methods of incorporating both demand and supply into water analysis. While these chapters provide a great overview of the methods available to estimate water supply and demand, most of the examples in these chapters are in the context of the United States or developed countries. In the next edition, it would be nice if the author could incorporate the modeling of water supply and demand in low-income countries.

The concluding chapter summarizes the major contributions of economics to effective water management. The author points out that economic principles are useful tools in solving the water scarcity problem. He also emphasizes that the application of economic principles must be combined with better education of all water users and stakeholders in order to avoid the potential policy disputes in new water projects.

In summary, *Water Resource Economics*, is a great book for graduate and advanced undergraduate students in economics and water science majors. The book is full of economic intuition and practical examples; therefore, it is an excellent reference source for both economics and non-economics readers. I used the book for an interdisciplinary graduate course in water economics, where I focused on the foundation Chapters 1 through 3 and the chapters on water marketing, pricing, policy and cost-benefit analysis. In addition, I complemented the book with a number of academic journal articles, local case studies and extended some of the discussion in the book to the context of low-income countries. In the next

edition, it would be helpful if the author could expand the applications of economic principles to developing countries and developed countries other than the United States. Finally, as the main focus of the book is on water quantity management, issues in water quality management and the interrelationship between water quality and quantity management is beyond the scope of this book.

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