



**ENVIRONMENTAL  
ECONOMICS AND  
POLICY** SECOND EDITION

**T O M T I E T E N B E R G**

# *Environmental Economics and Policy*

SECOND EDITION

Tom Tietenberg  
*Colby College*

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# PREFACE TO THE SECOND EDITION

About two decades ago, while on a plane heading for a conference, I struck up a conversation with the passenger next to me. During the course of that conversation he asked me what I did for a living. After mulling over my response that I was an environmental economist, he asked, “Isn’t that a contradiction in terms?”

He had a point. The economy has been a major source of environmental degradation. Developers pave over wetlands. Timber companies denude the forests. Fishermen deplete the oceans. Industries pollute the waters. And on and on.

Recently, however, those same powerful forces that have historically been associated with environmental degradation have been enlisted in the struggle to protect the environment. Buying and selling quotas have helped restore New Zealand fisheries. Pharmaceutical companies are investing in biodiversity preservation. Peak-load and congestion pricing have encouraged the better use of existing power plants and roads rather than the building of new ones. By-the-bag charging for solid waste has stimulated recycling and reduced the volume of waste. “Green fees” are raising revenues for environmental improvement while discouraging environmentally destructive behavior. The list goes on.

The success of these approaches in providing a politically feasible and effective means of changing environmentally destructive behavior has attracted much wider interest in the field of environmental economics. Environmental groups, states, local governments, national governments, and even international organizations are beginning to incorporate the principles and techniques of environmental economics in their efforts to preserve and protect the environment.

But environmental economics is not a naturally hospitable field. Most of the economic principles that underlie these approaches flow from some intimidating mathematical models, making them inaccessible to all but those who are willing to invest the time and effort to learn the underlying mathematics. This lack of accessible textbooks has created a void. *Environmental Economics and Policy* is designed specifically to fill that void. It was written to communicate the powerful insights of the field to those taking economics courses designed for nonmajors or, more generally, to an audience with little or no training in economics.

With its strong emphasis on public policy, this book shows how economics can be used both to understand the behavioral sources of environmental problems and to provide the foundation for innovative solutions. Chapters 1 through 4 of the book describe the basic economic approach to the environment, laying out the underlying values, as well as the procedures used to translate those values into policy-relevant principles. Chapters 5 through 18 deal with natural resource economics (analyzing the flow of materials and energy from the environment into the economy) and environmental economics (analyzing the flow of waste products into the environment). Chapters 19 through 21 focus on sustainable development, reflecting the demonstrated, current global interest in finding new, environmentally compat-

ible means of lifting the world's poor out of poverty. Throughout, the manner in which the principles can be applied is illustrated by a host of specific international examples. Considerable attention has been paid to environmental problems and policies in Eastern and Western Europe, Japan, and the developing nations, as well as in the United States.

This second edition of *Environmental Economics and Policy* is an economics book, but it goes beyond economics. Insights from the natural and physical sciences, literature, and political science, as well as other disciplines, are scattered liberally throughout the text. In some cases, these references raise unresolved issues that economic analysis can help resolve, whereas in others they affect the structure of the economic analysis or provide a contrasting point of view.

Students looking for additional sources of information on this subject don't have to look very far. A number of journals are now devoted either exclusively or mostly to the topics covered in this book. One, *Ecological Economics*, is a journal dedicated to bringing economists and ecologists closer together in a common search for appropriate solutions for environmental challenges. Interested readers can also find advanced work in the field in *Land Economics*, *Journal of Environmental Economics and Management*, *Environmental and Resource Economics*, *Resource and Energy Economics*, and *Natural Resources Journal*, among others.

New resources for student research projects have been made available in response to the growing popularity of the field. Original research on topics related to international environmental and natural resource issues was formerly very difficult for students to conduct because of the paucity of data. A number of good sources now exist; among these are *World Resources* (Washington, DC: Oxford University Press, published annually), which has an extensive data appendix, and *OECD Environmental Data* (Paris: Organization for Economic Co-operation and Development, published periodically).

A couple of Internet sources will be mentioned here because they are so closely related to the focus of environmental and natural resource economics. One place to keep up to date on activities related to environmental economics is the home page of the Association of Environmental and Resource Economists (AERE). The Web address is <http://128.163.26.168/econ/faculty/blomquis/AERED/Aere.htm>. This site contains information on graduate programs and two discussion lists related to topics in environmental and resource economics. Another is the home page for the International Society for Ecological Economics; its Web site is <http://kabir.umd.edu/ISEE/ISEEhome.html>.

Two on-line lists that involve material covered by this book are RES-ECON and ECOL-ECON. Subscription to the former is through <http://128.163.26.168/econ/faculty/blomquis/AERE-D/Aere.htm>; subscription to the latter is through <http://csf.colorado.edu/listproc.html>. The former is a more academically inclined list that focuses on problems related to natural resource management, whereas the latter is a more wide-ranging discussion list that deals with sustainable development.

## NEW TO THIS EDITION

The second edition has increased the international focus of the book. In this edition, greater attention has been paid to environmental problems and policies in Eastern and Western Europe, Japan, and the developing nations than was the case in the previous edition.

New boxed examples highlight special topics, including (1) Choosing Between Preservation and Development in Australia; (2) Income-Generating Activities as Fertility Control: Bangladesh; (3) The International Tropical Timber Agreement; (4) Trust Funds for Conservation; (5) Free-Access Harvesting of the Minke Whale; (6) Local Approaches to Wildlife Protection: Zimbabwe; (7) The Sulfur Allowance Program; (8) Why and How Do Environmentalists Buy Pollution?; (9) Tradeable Permits for Ozone-Depleting Chemicals; (10) Getting the Lead Out: The Lead Phaseout Program; (11) Counterproductive Policy Design; (12) Lead Recycling; (13) Implementing the “Take-Back” Principle; (14) The Bet; (15) Performance Bonds for Brominated Flame Retardants; and (16) Reputational Strategies for Pollution Control in Indonesia.

Several previously included topics have received considerably more attention in this edition, including intertemporal optimization with depletable resources, alternative property-rights regimes, the various definitions of *sustainability*, procedures for measuring sustainability, examples of sustainable common-property regimes, the *Exxon Valdez* oil spill, the evolution of contingent valuation as it becomes more deeply imbedded in public policy, externalities of family size decisions, statistical evidence of the fertility consequences of empowering women, policy on water pricing, peak-hour pricing, sustainable agriculture, overcapitalization in fisheries, the expanding use of individual transferable quotas (ITQs) in fisheries, threats to biodiversity, sulfur allowance trading, policies to control global warming, measurement of the social costs associated with road transport, the economics of alternative fuels for vehicles, and valuing the benefits from water pollution control. Also covered in greater depth are such topics as

- the costs of Superfund cleanup
- trade and the environment
- German recycling law
- the effect of agricultural policies on the environment
- sustainable population levels
- nuclear contamination by public weapons facilities
- the economics of windpower
- food import dependence in developing countries
- the Regional Clean Air Incentives (RECLAIM) market in California
- the economics of congestion pricing
- low- and zero vehicle-emission policies
- the International Agreement on Transboundary Movement of Hazardous Waste
- the incidence of hazardous-waste-siting decisions
- the distribution of pollution generation
- the employment effects of energy conservation
- the human development index (HDI)
- the “Porter hypothesis”
- information strategies for controlling pollution

All data and references to governing legislation in the previous edition have been updated. Some completely new data and artwork have been added.

This edition retains a strong policy orientation. Though a great deal of theory and empirical evidence is discussed, their inclusion is motivated by the desire to increase understanding

of intriguing policy problems, and these aspects are discussed in the context of those problems. This explicit integration of research and policy within each chapter avoids the problem frequently encountered in applied economics textbooks—that is, in such texts the theory developed in earlier chapters is often only loosely connected to the rest of the book. The many insights gleaned from other disciplines, have an important role to play in overcoming the typical textbooks' tendency to accept the material uncritically at a superficial level; instead, this text highlights those characteristics that make the economics approach unique.

## ACKNOWLEDGMENTS

Perhaps the most rewarding part of writing this book has been that it has put me in touch with so many thoughtful people I had not previously met. I very much appreciate the faculty and students who pointed out areas of particular strength or areas where coverage could be expanded in this edition. The support this book has received from faculty and students has been gratifying and energizing. One can begin to understand the magnitude of my debt to my colleagues by glancing at the several hundred names in the lists of references contained in the name index. Because their research contributions make this an exciting field, full of insights worthy of being shared, my task was easier and a lot more fun than it might otherwise have been.

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*Tom Tietenberg*  
*Sand Cove*  
*Prospect Harbor, Maine*

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