



ENVIRONMENTAL ECONOMICS
Second Edition *An Introduction*

Barry C. Field

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ENVIRONMENTAL ECONOMICS

An Introduction

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ENVIRONMENTAL ECONOMICS

AN INTRODUCTION

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To Tory, Sidney, and Leslie

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PREFACE

When our descendants look back at the last part of the twentieth century, we want them to be able to say: "That's when they began to take the degradation of the natural environment, with its threats to human life and the life of the planet, seriously." Furthermore, we would like them to be able to see that around this time we took serious steps to halt and reverse this process. This book is an introduction to environmental economics, one way of approaching the steps that need to be taken. It's about the way human decisions affect the quality of the environment, how human values and institutions shape our demands for improvement in the quality of that environment, and, most especially, about how to design effective public policies to bring about these improvements.

Problems of environmental quality are not something new; in fact, history is filled with bleak examples of environmental degradation, from deforestation by ancient peoples to mountains of horse manure in urban areas in the days before automobiles. But today's world is different. For one thing, many people in economically developed countries, having reached high levels of material well-being, are beginning to ask questions: What good is great material wealth if it comes at the cost of large-scale disruptions of the ecosystem by which we are nourished? More fundamental, perhaps, is the fact that with contemporary economic, demographic, and technological developments around the world, the associated environmental repercussions are becoming much more widespread and lethal. What once were localized environmental impacts, easily rectified, have now become widespread effects that may very well turn out to be irreversible. Indeed some of our most worrisome concerns today are about global environmental impacts.

It is no wonder, then, that the quality of the natural environment has become a major focus of public concern. As we would expect, people have responded in many ways. Environmental interest groups and advocates have become vocal at every political level, especially in those countries with open political systems. Politicians have taken environmental issues into their agendas; some have sought to become environmental statespersons. Environmental law has burgeoned, becoming a specialty in many law schools. Thousands of environmental agencies

have appeared in the public sector, from local conservation commissions to environmental agencies at the United Nations. At the scientific level environmental problems have become a focus for chemists, biologists, engineers, and many others. And within economics a new focus of study has appeared: *environmental economics*, the subject of this book.

Environmental economics focuses on all the different facets of the connection between environmental quality and the economic behavior of individuals and groups of people. There is the fundamental question of how the economic system shapes economic incentives in ways that lead to environmental degradation as well as improvement. There are major problems in measuring the benefits and costs of environmental quality changes, especially intangible ones. There is a set of complicated macroeconomic questions; for example, the connection between economic growth and environmental impacts and the feedback effects of environmental laws on growth. And there are the critical issues of designing environmental policies that are both effective and equitable.

The strength of environmental economics lies in the fact that it is analytical and deals with concepts such as efficiency, trade-offs, costs, and benefits. Many believe strongly that the times call for more direct political action, more consciousness-raising, more political organizing, and, especially, more representation and influence of environmental interests on the political scene. Nobody can doubt this. We live in a complicated world, however, where human problems abound; domestically we have health care, drugs, education, violence, and other critical issues, all competing for attention and public resources. Throughout the world, vast numbers of people struggle to alter their political and economic institutions, develop their economies, and raise their material standards of living.

In these settings, just raising the political heat for environmental issues is necessary but not sufficient. We have to get hard scientific results on how people value environmental quality and how they are hurt when this quality is degraded. We also have to put together environmental policy initiatives that get the maximum impact for the economic and political resources spent. This is where environmental economics comes in. It is a way of examining the difficult trade-off types of questions that all environmental issues entail; it is also a valuable means of inquiring why people behave as they do toward the natural environment, and how we might restructure the current system to rectify harmful practices.

In fact, the subject is important enough to deserve to be widely available to the nonspecialist. Economics is a discipline that has developed a sophisticated body of theory and applied knowledge. Courses in economics now follow a hierarchy of introductory and intermediate-level principles that are designed to lead students along and prepare them for the more advanced applications courses. But these run the risk of closing off the subject, making it inaccessible to those who do not want to become specialists. This book is intended, instead, for people who have not necessarily had any economics courses, at least not yet.

It was written on the assumption that it's possible to present the major principles of economics in a fairly commonsensical, although rigorous, way and then apply them to questions of environmental quality.

When the first edition was published, there was no way of knowing how many others might be teaching a course similar to the one from which the book sprang: a course in environmental economics for people who have not necessarily had a course in economics. The reception that the book has had, therefore, is gratifying. Many people have appeared to find it useful, and the comments received back, sometimes directly and sometimes via the grapevine, have in general been quite positive. I hope the second edition will be as well received.

The basic structure, and sequence of chapters, are the same as the first edition. The first section of the book is an introduction, beginning with a chapter on what environmental economics is about, followed by one on the basic relationships between the economy and the environment. The next section is devoted to studying the "tools" of analysis, the principles of demand and cost, and the elements of economic efficiency both in market and nonmarket activities. These chapters are not meant to be completely thorough treatments of these theoretical topics; however, given the objective of the book, the introductory chapters are essential. Even those who have had a course in microeconomic principles might find them valuable for purposes of review. Section II also contains a chapter in which these economic principles are applied to a simple model of environmental pollution control. In these chapters, as well as the others, I have tried to leaven the presentation with examples taken from current sources, such as newspapers.

Section III is on environmental analysis. Here we look closely at some of the techniques that have been developed by environmental economists to answer some of the fundamental value questions that underlie environmental decision making. We focus especially on the principles of benefit-cost analysis. After this we move to Section IV, on the principles of environmental policy design. It begins with a short chapter dealing with the criteria we might use to evaluate policies, then moves on to chapters on the main approaches to environmental quality management.

Sections V and VI contain policy chapters, where we examine current developments in environmental policy with the analytical tools developed earlier. Section V is devoted to *environmental policy in the United States*, covering federal policy on water, air, and toxic materials. It also contains a chapter on environmental issues at the state and local levels. Finally, the last section looks at international issues, such as environmental policy developments in other countries, global environmental issues, and the economics of international environmental agreements.

For the second edition I have updated almost all of the exhibits, which consist primarily of dated newspaper stories. I have also added a number of examples, showing how the principles discussed in the text apply to some real-world cases. This edition also contains discussions of a number of new topics, such as

risk analysis, regulatory impact analysis, electric vehicles, the 1990 CAA SO₂ permit trading plan, environmental justice, and the economics of recycling.

This book is an introduction to the basic principles of environmental economics as they have been developed in the past and as they continue to evolve. The real world, certainly the real world of environmental policy, is much more complicated than these principles would often seem to imply. The examples discussed represent only a sample of the full range of issues that actually exists. If and when you confront that real world of environmental politics and policy, you will find it necessary to adapt these principles to all the details and nuances of reality. Unfortunately, there is not enough space in one book to look at all the ways that environmental economists have found to make the basic concepts and models more specific and relevant to concrete environmental issues. So we stick to the basic ideas and hope they excite your interest enough to make you want to pursue the refinements and adaptations of these ideas as they relate to a subject of growing relevance and importance.

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