

ENVIRONMENTAL ECONOMICS

AN INTRODUCTION

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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.” And 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 like 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. I wrote it on the assumption that it's possible to present the major principles of economics in a fairly commonsensical, though rigorous, way and then apply them to questions of environmental quality.

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 U.S., 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.

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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Barry C. Field

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INTRODUCTORY

This first section contains two introductory chapters. The first is a brief, nontechnical review of some of the main topics and ideas within environmental economics. In the second we develop a general view of the interactions between the economy and the environment, and introduce some fundamental concepts and definitions which we will use throughout the book.

WHAT IS ENVIRONMENTAL ECONOMICS?

Environmental economics is the study of environmental problems with the perspective and analytical ideas of economics. You may have thought that economics is mostly about business decisions and how to make profits in a capitalist system. This is not the case. Economics is, rather, the study of how and why “people,” whether they are consumers, firms, nonprofit organizations, or government agencies, make decisions about the use of valuable resources. It is divided into microeconomics, the study of the behavior of individuals or small groups, and macroeconomics, the study of the economic performance of economies as a whole. Environmental economics draws from both sides, but more from microeconomics than from macroeconomics. It focuses primarily on how and why people make decisions that have environmental consequences. And it focuses on how we can change economic institutions and policies to bring those environmental impacts more into balance with human desires and the needs of the ecosystem itself.

One of our first jobs, therefore, will be to get acquainted with some of the basic ideas and analytical tools of microeconomics. But we do not want to jump directly into the study of these principles because that would suggest we are more interested in the tools than in what we can do with them. We are not interested in these ideas for themselves, but for the understanding they can give us about why the natural environment gets degraded, what the consequences are, and what can be done effectively to reduce the degradation. So this first chapter will be devoted to sketching out, in reasonably commonsense terms, the types of questions environmental economists ask and the types of answers they seek. To do this we first consider briefly what we mean by the “economic approach,” and then give a series of examples of the types of environmental problems on which economists have worked. Then in the second chapter we will take a look at the broad linkages existing between economy and environment. After that we will be ready to study the economic principles we will need.

THE ECONOMIC APPROACH

Why do people behave in ways that cause environmental destruction? There are several types of answers to this question. One goes like this: Environmental degradation comes about from human behavior that is unethical or immoral. Thus, for example, the reason people pollute is because they lack the moral and ethical strength to refrain from the type of behavior that causes environmental degradation. If this is true, then the way to get people to stop polluting is somehow to increase the general level of environmental morality in the society. In fact, the environmental movement has led a great many people to focus on questions of environmental ethics, exploring the moral dimensions of human impacts on the natural environment. These moral questions are obviously of fundamental concern to any civilized society. Certainly one of the main reasons environmental issues have been put on the front burner of social concern is the sense of moral responsibility that has led people to take their concerns into the political arena.

But there are problems with relying on moral reawakening as our main approach to combatting pollution. People don't necessarily have readily available moral buttons to push, and environmental problems are too important to wait for a long process of moral rebuilding. Nor does a sense of moral outrage, by itself, help us make decisions about all the other social goals that also have ethical dimensions: housing, health care, education, crime, etc. In a world of competing objectives we have to worry about very practical questions: Are we targeting the right environmental objectives, can we really enforce certain policies, are we getting the most impact for the money, and so on. But the biggest problem with basing our approach to pollution control strictly on the moral argument is the basic assumption that people pollute because they are somehow morally underdeveloped. It is not moral underdevelopment that leads to environmental destruction; rather, it is the way we have arranged the economic system within which people go about the job of making their livings.

So a second way of approaching the question of why people pollute is to look at the way the economy and its institutions are set up, and how they lead people to make decisions that result in environmental destruction. People pollute because it's the cheapest way they have of solving a certain very practical problem. That problem is the disposal of the waste products remaining after consumers have finished using something, or after business firms have finished producing something. People make these decisions on production, consumption, and disposal within a certain set of economic and social institutions;¹ these institutions structure the *incentives* that lead people to make decisions in one direction and not in another. What we have to study is how this incentive process works and, especially, how we might restructure it so that people will be led to make

¹ By "institutions" we mean the fundamental set of public and private organizations, laws, and practices that a society uses to structure its economic activity. Markets are an economic institution, for example, as are corporations, a body of commercial law, public agencies, and so on.