



R. QUENTIN GRAFTON,  
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THE

ECONOMICS OF  
THE ENVIRONMENT  
AND NATURAL  
RESOURCES



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*This book is dedicated to the special people in our lives who share both our joys and sorrows (and everything in between!): Ariana, Brecon, and Carol-Anne; Sharon, Beth, and Kate; Allie and Nicholas; Alex and Joanne; Miriam.*

# PREFACE

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Our book is the collective effort of six economists with a great deal of help from their colleagues, teachers, families, and friends and, of course, the publisher (we especially thank Elizabeth Wald at Blackwell). As originally conceived, the book was to have only two authors (Quentin and Rob), but as the scope of the text expanded so did the need to bring in additional expertise for the chapters on non-market valuation (Vic), water (Steven), trade and biodiversity (Diane), and forestry and the global commons (Harry). We view this collective expertise as a major strength of the book.

Although there is a northern connection that links all the authors (four out of six of us work in Canada) and all of us have at least one degree from a Canadian University, the book remains very much an international text. Quentin (grew up in New Zealand and has lived in seven different countries) and Rob (grew up in the United Kingdom) currently live and work in Australia while Harry was born and raised in the United States, but is now a Canadian resident. Vic, a Canadian by birth, completed his Ph.D. at Minnesota and wrote most of his chapters while on sabbatical leave at Resources for the Future in Washington, DC, Diane and Steven, both based in Ontario, finished the final drafts of their chapters while on sabbatical leave at the University of East Anglia. This combined and varied life experience is reflected in the examples in the book that come from many different countries. It means that our book should be as suitable for students in Ames, Iowa, as in Bergen, Norway.

A book, by its very nature, does not provide for two-way communication between the reader and the author. To help overcome this barrier we welcome constructive criticism and feedback. Please direct your comments, in the first instance, to Quentin at [qgrafton@cres.anu.edu.au](mailto:qgrafton@cres.anu.edu.au)

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# INTRODUCTION

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*Difficulty is a coin which the learned conjure with so as not to reveal the vanity of their studies and which human stupidity is keen to accept as payment. (Michel de Montaigne, The Complete Essays (translated by M. A. Screech), Book II, Essay 12, p. 566)*

## THE ENVIRONMENTAL CHALLENGE

Our environment and its natural resources provide us with enormous benefits. They sustain life on earth and give us the means to exist and to enjoy the amenities of nature. Despite their importance, we often fail to consider the full costs and benefits of enjoying the environment. We frequently neglect the underlying dynamics of nature, and our institutions and governance structures fall short of what is needed to sustainably manage the environment and its resources.

This book provides the tools, experiences and insights that economists and decision-makers have gained from the management (or mismanagement!) of nature. Whether the challenge is to understand how we can prevent overfishing, develop ways to overcome the institutional barriers to global warming, value a mountain lake, or simply reduce air pollution levels in a cost-effective manner in our neighborhood, this book provides a guide to the study of such issues.

## WHAT THIS BOOK OFFERS

Many texts examine environmental, resource, and ecological economics. Most are focused on a narrow set of topics while a few books offer a comprehensive treatment, but at a level that is often unsuitable for advanced undergraduate or graduate-level courses.

Our book covers the essential topics students need to understand environmental problems and their possible solutions. Each chapter is written as the equivalent of 6–8 hours of lectures that would normally be covered in upper-level undergraduate or master's and Ph.D. courses in environmental and natural resource economics. The 15 topics covered in the book could each be of book length, but we have restricted the length to about 30 pages. The chapters are *not* designed to provide

every detail of the subject. Instead, our goal is to provide you, the reader, with the fundamental theoretical insights, the major issues of the topic or discipline, and an appreciation of the real-world problems and challenges that motivate the subject. Each chapter has extensive further reading that will enable you to pursue the topic further should you wish.

As is true of all books, we have not included every topic that might be discussed in courses in environmental, resource, and ecological economics. In particular, we do not have a separate chapter on sustainable development, but many aspects of the issues of sustainability appear in various chapters and, in particular, the chapter on growth and the environment and the concluding chapter that focuses on how we can sustain our environment. We also do not have a separate chapter on population growth, but address the importance of demographics in our chapter on growth and the environment. Topics that we have also eschewed from writing are those that focus on a particular technique, such as cost–benefit analysis, as we believe theory, practice, and techniques need to be addressed together and understood in terms of how and why they are applied.

## WHAT YOU NEED TO KNOW

We have written the book for readers who have prior training in microeconomics. The assumed background is the equivalent of a third-year course in microeconomics offered in an honors program or a good undergraduate degree in economics. Thus no prior courses or training in environmental or resource economics is required. We expect that most economics students at an advanced undergraduate level, and all graduate students in economics, will have the necessary background to read all the chapters in the book.

## HOW THE BOOK IS ORGANIZED

The book covers all of the major topics in environmental and resource economics and is subdivided into four main parts. The first part contains several chapters that provide a more extensive discussion on general theoretical approaches to environmental and natural resources and includes chapters on economic modeling, methods of pollution control, and property rights and incentives. The second part consists of chapters on particular natural resources of the environment including fisheries, forestry, water, and non-renewable resources. The third part covers the theory and practice of environmental valuation and includes chapters on stated preference approaches and indirect methods of environmental valuation. The fourth and final part focuses on larger-scale issues involving the linkages and interaction between human activities and the environment, with chapters on the global commons, economic growth and the environment, trade

and the environment, biodiversity, and environmental accounting. Our book also features a glossary that defines specialized terms used in the text and are given in *italic* the first time they appear in a chapter.

We believe that you will be able to use this book to gain greater insights into the environmental issues facing us today. The concepts, tools and practices you will learn in the following chapters will help you understand the trade-offs and choices we face and the ways in which we might improve the world around us.



