Preface

This book concerns the application of environmental economic analysis to real-world decision-making. In particular it seeks to demonstrate a number of ways in which geographical information systems (GIS) can be employed to enhance such analyses. We have written it because, in our opinion, GIS techniques can considerably improve the way in which the complexities of the real world can be brought into economic cost-benefit analyses (CBA)[1], so reducing the reliance upon simplifying assumptions for which economists are infamous.

As we are primarily interested in demonstrating the flexibility and applicability of GIS techniques to a diversity of situations, we assume no prior knowledge of such techniques and avoid unnecessary technicalities wherever possible by referring the interested reader to related academic papers throughout. In so doing it is our objective to appeal to students, researchers, academics and, in particular, decision-makers and analysts across a broad spectrum of disciplines including economics (especially environmental, agricultural and resource economics), geography, land use planning and management, environmental science and related policy studies.

The application of GIS to environmental economic analyses is introduced gradually through the use of a diverse land use change case study. This concerns the potential for converting surplus agricultural land to multipurpose woodland in Wales. However, neither the specifics of this case study nor its location need be of particular interest to the reader as the study is designed primarily to demonstrate the flexibility of the underlying approach. The book opens by reviewing some basic economic ideas concerning value and CBA (Chapter 1), focusing in particular upon methods for valuing individuals' preferences for non-market goods such as those provided by the environment (Chapter 2). Previous studies of the recreational value of open-access woodland are reviewed and some new applications presented (Chapter 3) through which we first introduce the use of GIS techniques as a means

[1] Or benefit-cost analysis, depending upon which side of the Atlantic/Pacific you reside.

of enhancing valuation methods. This approach is then extended to the estimation of the numbers of visitors arriving at existing or potential future woodland recreation sites (Chapter 4). We then turn to consider certain other forest benefits starting with the value of timber (Chapter 5). Again GIS techniques are used to bring together a host of diverse datasets to permit modelling of timber yield and its net value (Chapter 6). These techniques are then extended to conduct an analysis of the carbon sequestration value of woodland, combining models of carbon flux in live trees, timber products and forest soils (Chapter 7). The opportunity cost of converting agricultural land to woodland is then examined, with GIS providing the medium for undertaking assessments of the principal farming sectors in the case study area (Chapter 8). All of these sub-analyses are synthesised through our GIS to undertake a spatial CBA considering, for each location across our entire study area, what the consequences of land use change from agriculture to woodland would be (Chapter 9). Finally we summarise the strengths and weaknesses of our particular application and consider the wider conclusions to be drawn from the approach set out in this volume (Chapter 10).

We hope that readers will find this book interesting and enjoyable and that it might contribute to what we believe would be a timely infusion of realism into economic analyses.