rial provided by a number of economists in the region and other experts from FAO and elsewhere" (p. ix). The result, which is the publication under review, was well worth the wait.

This manual is organized into eight chapters: "Introduction," "Data Sources and Collection," "Simple Data Analysis," "Whole-Farm Planning," "Partial Budget Analysis," "Input-Output Budget Analysis," "Production Function Estimation and Analysis," and "Risky Decision Analysis." Farm management research is defined in the introductory chapter as "applied research, undertaken specifically for the purpose of resolving a particular problem," . . . "and has either or both of two broad aims: (1) to provide information which will assist farmers in their farm management so that they are better able to achieve their goals whatever they be; (2) to provide government with information on farmers and their management so as to assist in the better formulation of government policy and development planning" (p. 3). "Four elements are crucial in conducting effective farm management research. They are: (i) an adequate knowledge of theory; (ii) relevant practical knowledge and experience; (iii) an effective research strategy and adequate research resources; (iv) satisfactory research administration" (p. 3). The remainder of the introductory chapter deals with a review of comparative advantage, diminishing returns, substitution, cost analysis, opportunity cost, enterprise choice, and goal tradeoff; a brief discussion of research methodology, both in the sense of philosophy of social science and in how to set up hypotheses and objectives; and discussions of the need for and approaches to farm management research on small farms, including a conceptual framework and a discussion of conceptual models, including a farming systems model.

While the first chapter is general and conceptual, the remaining seven are specific, empirical "research techniques" or "how-to" chapters. Each chapter begins with the most simple, least computationally demanding technique and proceeds on to successively more demanding techniques. For example, the chapter on partial budget analysis proceeds from partial profit budgets, to gross margin budgets, partial cash-flow budgets, parametric budgets, and risk budgeting. The whole-farm planning chapter starts with activity budgets, covers simplified, linear, and risk programming and systems simulations, and concludes with an investment appraisal for a whole farm development budget. The risky decision analysis chapter is a bit of an exception, as it starts out with utility functions and decision trees.

This manual is already meeting its intended purpose and finding its intended audience. In its second printing, it is being translated into Spanish, and other translations are being discussed. Its heaviest use will likely be by the many diploma or bachelor's degree holders who staff the ministries of agriculture, irrigation, land development, planning, etc., in developing countries, whose training was not particularly strong, and who need a handbook or manual of this sort. The master's and doctoral degree holders who have been out of school for some time will also find it a useful source of ideas on alternative analytical techniques. Even newly returned Ph.D's will find it useful, for few will have studied all of the techniques included in the manual.

This manual is not an end-all. It might better be entitled, "A listing and brief review of selected farm management research techniques." Most readers who have previously studied the techniques described will be able, with careful study, to use them in analysis. Readers encountering a technique for the first time probably will need to do further study of a more comprehensive textbook treatment. Advanced undergraduates and beginning graduate students in developed countries will also find it a useful supplemental text. Because of the clarity and terseness of exposition, this manual is also likely to be a useful reference for members of multidisciplinary research teams whose disciplines are other than agricultural economics. All in all, another valuable contribution from the pens and minds of Dillon and Hardaker.

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Halvorsen, Robert, and Michael G. Ruby. *Benefit-Cost Analysis of Air-Pollution Control.* Lexington MA: Lexington Books, D.C. Heath Co., 1981, xv + 264 pp., $26.95.

More than a decade after Earth Day, keen interest in solving environmental problems still exists. Yet, there is a growing awareness that both the degree of pollution control and the form of environmental management deserve closer scrutiny. The realization that cleaner air is costly motivates the demand for careful analysis of current and proposed environmental policy. In a setting where the Clean Air Act is up for renewal and benefit-cost analysis is required for all new regulations, Halvorsen and Ruby make a timely contribution.

The purpose of the book is to clarify the principles underlying practical benefit-cost analysis. The approach taken in the first part of the book is to provide a succinct review of relevant theory with an explanation of recent (literally through 1981) developments. This background provides a basis for a practical discussion of reasonable approaches to take in actually measuring benefits and costs. In other words, guidance is given on how to carry out the analysis efficiently. Chapter 2 briefly reviews the theoretical foundations of benefit-cost analysis beginning with the concept of maximizing social welfare and finishing with the usual conclusion that, since transfers can involve substantial costs,

analysts should go beyond identifying potential Pareto improvement to consider distributional effects. The subsequent chapter concerns the aggregation of benefits and costs over individuals and deals directly with distributional effects. If one finds unconvincing Harberger's arguments for treating all consumer and producer surpluses equally, then the authors suggest using the Rawlsian "social welfare dominance" criterion developed by Willig and Bailey or evaluation of net benefits in terms of Feldstein's "uniform distributed dollar" which involves explicit distributional weights. Such efforts to provide information on distributional consequences are to be applauded; however, with air pollution control the greater analytical service may be the correct identification and measurement of short-run and long-run net benefits for various groups, since oft-neglected adjustments can occur through changes in property values and wage rates.

Aggregation of benefits and costs over time is covered in chapter 4, which provides a concise statement of the case for using the net present value criterion over other decision rules. Uncertainty, a favorite topic of critics of benefit-cost analysis, is covered in chapter 5, which not only reviews decision making under uncertainty, but describes approximation errors in using expected (monetary) value decision rules in lieu of expected utility rules. If policy outcomes are independent of and small relative to other income sources, then the errors are small. The final chapter in this part summarizes the theory of valuing priced and unpriced commodities and specifies the conditions under which the various approximation formulas for estimating the change in total consumer and producer surpluses are useful. The entire first part of the book is written in the spirit of providing a strong theoretical basis for analysis and exploring carefully the size of the errors made in applying measures with known shortcomings where more theoretically correct measures are costly or impossible to use.

Application of the theory to air pollution control is the subject of the second part of the book. There are chapters on quantifying air pollution effects, estimating health benefits, estimating vegetation and ecosystem benefits, estimating material benefits, estimating aesthetic benefits, and procedures and data for evaluating control costs. Benefit estimation is recognized as the most challenging aspect of the analysis and book space is allocated accordingly. For economists this part will serve as a handbook for understanding the estimation of dose-response relationships and costs involved in employing specific control processes which engineers find feasible. Particularly useful are the summaries of macroepidemiological studies of air pollution and mortality and of order-of-magnitude cost functions for "tail end" control equipment. The discussion of valuing health improvements based on individual willingness to pay gives, in a nutshell, frontier knowlege in this area. A bit of caution is appropriate here, in that the recommended "values of lifesaving" are high compared to estimates of which this reviewer is aware. The review of contingent and housing market estimates of aesthetic benefits is correct, up to date, and nicely paves the way for current research on the benefits of improved visibility in the eastern United States.

A hunch about this book is that the theoretical review is sufficiently high in quality to add nicely to first-year graduate courses in public finance and more applied courses, but is too brief to serve noneconomists well. Economists will find quite readable part 2, on the physical environment and may find it to be a handy reference on such matters. Unluckily, this book ends abruptly with chapter 13 and does not have anything comparable to the introductory chapter. It does not conclude with a brief discussion of current environmental regulation, the role which benefit-cost analysis can play in the policy process, or the nature of changes that one can expect from judicious use of modern benefit-cost analysis. Nonetheless, environmental economists and practitioners will find this product of practical scholarship an excellent reference.

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Healy, Robert G., and James L. Short. *The Market for Rural Land: Trends, Issues, and Policies.* Washington DC: The Conservation Foundation, 1981, xviii + 306 pp., $12.50.

The use, ownership, distribution, and exchange of land, especially land in rural areas, are topical issues. The trends, issues, and policies that affect the market for rural land in the United States are the subject of this book. The authors draw on numerous secondary sources of data and information and focus on six case studies of the land market in rural areas.

The book is an excellent summary of a complex subject. It is well-organized and easily read. The discussion is both timely and relevant. The analysis, which is descriptive, uses up-to-date data. Throughout the book, economic and noneconomic topics are presented in an understandable manner.

Chapter 1 provides an introduction to the book. Rural land is defined as the 1.3 billion acres of privately owned land in the exurbs and the countryside of the United States. Three major trends in the rural land market are identified: increasing prices, changing composition and numbers of land owners, and changing size of land parcels. These trends are discussed throughout the book.

A detailed discussion of the demand and supply of rural land is provided in chapters 2 and 3. In the initial part of chapter 4, the ways land ownership is transferred, the financing of land purchases, and the economic characteristics of land are discussed. The latter part of the chapter presents productivity and