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## Environmental Quality Analysis, by Alan Kneese & Blair Bower

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## BOOK REVIEWS

### *Environmental Quality Analysis*

By

ALLAN KNEESE & BLAIR BOWER

Baltimore:

Johns Hopkins Press for Resources for the Future. 1972

Pp. ix, 408, price \$12.00

This volume contains ten papers that report research undertaken at or sponsored by Resources for the Future and which were presented at a Washington conference in 1970. Most of the papers in the volume are conceptual and theoretical and many use sophisticated economic concepts and mathematical formulae. Although the volume contains considerable empirical research, much of it is illustrative of potential applications rather than the central focus of the research. This book is intended for serious scholars and not for laymen or policy makers.

The book is divided into three parts. Part one contains three papers on the environment and economic growth. Ralph d'Arge presents the only paper in the volume on economic growth in the sense of macro-neoclassical growth models. He shows how resource use and material discharges to the environment can be fitted into growth models. Robert Ayres presents a detailed mathematical model of the process of materials extraction, transformation, consumption and discharge in a complex, multi-product economy. John Krutilla, Charles Cicchetti, Myrick Freeman and Clifford Russell write on the economics of irreplaceable assets. The best research in this area has been concerned with the social choice between present and future uses of a depletable resource. The present authors attack the more difficult issue of the social choice between development and non-development of a natural resource that has value in both states. They apply their theoretical model to the issue of developing Hells Canyon.

Part two presents four papers on environmental management programs. Clifford Russell and Walter Spofford present a complex model for managing a regional economy so as to account properly for disutility from pollution as well as for utility from goods consumption. They illustrate the solution of their model with some data for air and water pollution from production in an imaginary region. Max Langham, Joseph Headley and Frank Edwards analyze the benefits and costs of alternative ways of decreasing the use of persistent pesticides in U.S. agriculture. Lester Lave summarizes and criticizes recent research on the damages to human health from various forms

of air pollution. Myrick Freeman analyzes the distribution of benefits from environmental quality by income class.

Part three contains three papers, all by non-economists, on political and legal institutions for improving environmental quality. Edwin Haefele, a political scientist, analyzes the relationship between the constitution of public choice institutions and the kinds of environmental policies they are likely to choose. Joseph Sax, a lawyer, analyzes alternative legal strategies for improving environmental quality. Delbert Miller, a sociologist, reports a survey taken among community leaders in the northeast as to the kinds of people who are regarded as influential in environmental matters.

The papers in this volume cover an enormous range of topics and approaches. Inevitably, their quality varies considerably. But, much more than in many conference volumes, each paper reports on a substantial piece of scholarly research. One cannot help but come away from this volume with the feeling that social science research on environmental problems has come of age in the sense that a body of techniques and data have been developed that have been, and are being, applied successfully to a variety of environmental problems.

I conclude with a few comments on papers that struck me as among the more interesting in the volume.

It is not clear to me just what the purpose of the Russell-Spofford production and residuals management model is. They maximize a social welfare function with respect to amounts of commodities produced and amounts of materials discharged. This would be an appropriate formulation in a centrally planned economy in which all production decisions were under the control of a central authority. But in a market economy most decisions are made privately and influenced by rules or choices of public agencies. In analyzing public choice in market economies, it is now conventional to distinguish in the model those variables that are instruments of public choice and those that are set privately. No such distinction appears in the Russell-Spofford paper. They may plan to modify or extend it in that direction, but no such plans are indicated in the present paper.

On the basis of a survey of various scholars' research on the health effects of air pollution, Lave estimates that a 50 percent reduction in the particulates and sulfates in the air over a typical U.S. metropolitan area would add four or five years to the life expectancy of the newborn in the metropolitan area. Although the evidence on which this conclusion is based is epidemiological and statistical, he believes that the numbers are almost certainly right. This conclusion implies that air pollution is among our most serious social problems. It seems

urgent that the conclusions be confirmed or refuted by the research of other scholars.

Haefele's paper is certainly among the most provocative in the volume. He suggests an elected river basin commission with broad powers to plan and execute water quality policies in the Potomac basin and, presumably, in other basins as well. He presents powerful reasons for advocating such a public body, although the proposal flies in the face of the trend toward appointed interstate commissions. It will be interesting to see whether Haefele's analysis is persuasive to other political scientists.

EDWIN S. MILLS°