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Risk Analysis: A Guide to Principles and Methods for Analyzing Health and Environmental Risks. *By John J Cohrssen and Vincent T Covello U S Department of Commerce, The National Technical Information Service, 1989, 407 pages, $17 50*

Reviewed by Michael E. Wetzstein

Interested in a handbook that explains how to develop an analysis for health and environmental risks? Then this guide by Cohrssen and Covello is it Published by the Council on Environmental Quality, this guide is an accessible reference manual for educators and researchers in the area of risk analysis Cohrssen and Covello write in clear language, understandable to both specialists and nonspecialists

The introductory chapter discusses the justification for risk analysis, clearly distinguishing among the terms risk assessment, analysis, and management With this foundation, Cohrssen and Covello outline a process of analyzing health and environmental risk They identify four interrelated phases (hazard identification, risk assessment, determining the significance of risks, and risk communication) for risk analysis After presenting an overview of risk analysis in chapter two, they devote the remaining chapters to discussing each phase

Chapter two is somewhat redundant, as basic definitions of terms are again defined but in greater detail However, useful graphics highlight the dimensions of risk, the effects on risk perception, and risks addressed by each Federal statute Society's perceptions and Environmental Protection Agency priorities, benefit-cost analysis, and *de minimis* risk are three issues discussed at the end of this chapter

Cohrssen and Covello compare epidemiological studies, *in vivo* animal bioassays, short-term *in vitro* cell and tissue culture tests, and structure-activity relationship analyses as techniques for hazard identification Case studies of Woburn, Massachusetts, water contamination and dioxin chemical compounds illustrate hazard identification The proper interpretation of community health studies and the role they play in hazard identification are also addressed Throughout the guide, detailed definitions of terms are provided For example, a section on carcinogenicity characterization compares the criteria used for identification of carcinogenicity by the U S Environmental Protection Agency, International Agency for Research on Cancer, National Toxicology Program, and the American Conference of Governmental Industrial Hygienists

A major controversy in hazard identification is the use of large doses in carcinogenicity tests Cohrssen and Covello respond by detailing the advantages and disadvantages of various techniques source/release, exposure, and dose-response Cohrssen and Covello describe monitoring and modeling techniques used in these procedures Risk characterization designed to generate estimates from the results of source/release, exposure, and dose-response are also discussed Limited discussion is provided on ecological risk assessment and identifying and evaluating uncertainties in risk estimates However, as in all sections, Cohrssen and Covello provide supplementary information for a student with further interest in this area

In the last chapter, Cohrssen and Covello discuss the problems of risk communication which they define as any purposeful exchange of information In accordance with other phases, a multitude of problems beset the risk analyst Unfortunately, this leaves one with a lot of unanswered questions Analysis of health and environmental risks is relatively new, and theories and techniques are still under development In many sections, Cohrssen and Covello establish the foundation for further research by outlining problems that still complicate any risk analysis Also, the Environmental Protection Agency's cardinal rules of risk communication are listed as a guide for effective communication

Approximately three-fourths of the book is in appendixes Appendix A summarizes test systems and assays commonly used to evaluate whether a chemical, radioactive, or biological agent poses a hazard to human health or the environment As an example, the *Salmonella* Mutagenicity Assay (Ames Test) is discussed in terms of endpoints measured, effects inferred, protocol summary, major sources of uncertainty accuracy, degree of development, and resources required Publications of the International Agency for Research on Cancer, and chemical and physical agents for which there is evidence of carcinogenicity to man, are listed in appendixes B and C Each agent is weighed evidentially, in terms of sufficient evidence to establish a causal relationship, limited evidence for a causal relation, inadequate evidence, and no evidence available for humans and animals

Appendix D describes various mathematical expressions and units of measurement used in risk analysis, and standards and recommended criteria for pollutants are listed in appendix E Regulations for implementing the procedural provisions of the National Environmental Policy Act are reprinted in appendix F A 1985 review by the Office of Science and Technology Policy on the science associated with chemical carcinogens is reprinted in appendix G This review contains an

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extensive list of references for further development of risk analysis guidelines

The last appendix reprints the Environmental Protection Agency's risk assessment guidelines related to carcinogen mutagenicity, chemical mixtures, suspect developmental toxicants, and estimating exposures As a source for quick reference, following the appendixes is a list of acronyms, abbreviations, and a glossary of risk analysis terms

This guide provides an excellent foundation for any student interested in learning how risk analysis is currently undertaken It is written in a clear nontechnical language requiring little or no scientific background In a classroom setting, the guide would complement lectures in basic theory by providing students with an understanding of the practical problem of implementing this theory Courses in the social sciences (including economics and psychology), physical sciences, and biological sciences related to health and environmental risks will significantly benefit from this guide However, in a multidisciplinary curriculum directed toward environmental studies, this guide would serve as an integral part of a capstone course

In public service, where educating the citizen is an integral part of governing, Cohrssen and Covello have provided clear and concise reasons for many current techniques employed for risk analysis They establish a foundation for communicating with concerned citizens the current and future policies and programs of governing agencies

Agricultural Risk Management. *By Beverly Fleisher Boulder, CO Lynn Reinner Publishers, Inc , 1990, 149 pages, $25 (hardcover)*

Risk colors all decisions This is particularly true in the agricultural sector, which is susceptible not only to changes in market conditions, but also to environmental and governmental policy uncertainty Agricultural decisionmakers employ a broad range of techniques to manage this agricultural risk An understanding of how these risk management techniques are interrelated can aid in the development of an effective agricultural policy addressing the risky nature of agriculture

In contrast to other books on risk management that discuss management techniques within a narrow range of decisions, Fleisher attempts to integrate alternative risk management techniques with the whole set of agricultural decisions Her objective is not to provide an exhaustive and rigorous treatment of each risk management technique Instead she maps out a general understanding of alternative risk management techniques accompanied by a discussion of their interrelationships A list of relevant literature closes each chapter

Fleisher's book is intended for nonspecialists in risk and risk management Fleisher guides the reader through agricultural risk, decisionmakers' responses, risk management techniques, and how government programs affect risk and risk management She stresses the interaction of decisionmakers and government policies with risk management, and she discusses the possibility of substituting privately sponsored risk management programs for current government programs The book is an excellent supplement for classes in agricultural policy, finance, and marketing, requiring just basic knowledge of economics and finance as a background to understanding the material presented This is not a definitive work For example, Fleisher fails to address environmental considerations associated with risk management, and food safety and water contamination issues are not investigated Current public concern with these issues warrants a discussion of risk management options in these areas

Some technical terms (for example, "noise in price signals") creep into the text that require an explanation for a nonspecialist Many of these phrases have alternative definitions, and thus can be confusing to the reader Fleisher does offer an excellent discussion of alternative definitions of risk and uncertainty However, this discussion is relegated to chapter two, leaving a student to wonder what is meant by risk and uncertainty throughout the first chapter A number of examples illustrate the various concepts of risk, like calculating the expected value and outcome of a lottery Examples of some less obvious results would be useful too For instance, illustrating how a risky decision that complements other producers' activities will actually reduce overall risk would provide a student greater understanding of risk management

Fleisher makes an analogy to murder mysteries, citing the temptation to skip to the end to solve the mystery Unfortunately, in this book, Fleisher provides no such solution, and the reader is left with the unsolved mystery of determining the "best" risk management policy This is not so much the book's shortcoming as a failure of economic theory to provide a definitive set of policies to improve society Each theory provides only the tools and procedures sufficient to solve the mystery It is up to the student, in each case (mystery), to employ the relevant theory and determine the "best" policy (solve the mystery)

Overall, this is an excellent book on agricultural risk management Fleisher supplies a very sound and readable discussion of how alternative risk management decisions are integrated I recommend this book not only to nonspecialists but to specialists as a clear and concise discussion of agricultural risk management

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