

Editors' Preface

The Scientific Committee on Problems of the Environment (SCOPE) and its parent body ICSU are concerned primarily with scientific problems. It has been recognized from the outset of SCOPE's activities that *environmental science* cannot be effectively pursued except on an interdisciplinary basis involving different scientific specializations from the physical, biological and social sciences. Also involved are economics, law, and a wide range of other areas of special knowledge such as community medicine, environmental psychology, communications and information theory, to name only a few.

It has been SCOPE's objective to bring appropriate groups of specialists together to pool and develop their collective wisdom on topics of concern to the international scientific community and to governmental organizations concerned with the management of problems of the human environment.

An early action of SCOPE in furtherance of this objective was to establish a project entitled 'The Communication of Environmental Information and Societal Assessment and Response' (Project 7). This project has received sustained support and interest from the United Nations Environment Programme, and has involved the direct participation of nearly 100 scientists from more than 60 countries, as well as many others indirectly.

The idea of Project 7 was to begin to examine the science and society interface in terms of the communication of information from scientists to governments and the general public. It was felt that many examples of miscommunication could be readily observed and SCOPE scientists wanted to see how the situation might be improved. Often scientists were conscious of issuing warnings about environmental problems and seeing them ignored or overlooked. On other occasions scientists felt that tentative and uncertain scientific findings or hypotheses were exaggerated out of all proportion by oversimplification or distortion in the news media, leading sometimes to undue alarm on the part of citizens and overhasty reaction by governments.

At an early 'project shaping' meeting held by invitation at the Holcomb Institute, Butler University, Indianapolis, USA (August 1973), it was decided to focus upon the concept of environmental risk as an approach to the problem of communication. This gave a more specific focus to the subsequent work and avoided the danger of being too pre-occupied with the more melodramatic aspects of 'environmental crisis' reporting. The term 'risk' also served as a useful starting point for interdisciplinary communications, and it quickly became apparent that 'risk assessment' could be seen as a newly emerging transdisciplinary field in need of development.

The first phase of the work of Project 7 was therefore designed to create an overview or state-of-the-art report on risk assessment and to work towards a common language usable by all or most scientists and readily understandable by non-scientists. A meeting was held at the Wood's Hole Oceanographic Institute (April 1975) under the title *Comparative Risk Assessment of Environmental Hazards in an International Context*. The major outcome of this meeting is the SCOPE Report 8: *Risk Assessment of Environmental Hazard* prepared by Professor Robert W. Kates. SCOPE 8 serves as an introductory overview of the rapidly growing field of risk assessment. It is also the main point of departure for the present report.

Human response to environmental risk has been, and to a large extent remains, in a disorganized state. Massive expenditures of public funds are accepted in some areas to make very small marginal improvements in safety or risk reduction, while much larger risks are tolerated, accepted or even welcomed in other areas. There is a high degree of inequity and irrationality in the distribution of risks among different activities; among different types of employment; between different regions of countries, and among nations themselves. Scientific attempts to assess and explain environmental risks are complicated by intruding issues of international trade, by legal and jurisdictional differences, by irrational fears, by sectional and conflicting interests, and by short-sighted policies and actions.

We have hopes that this situation can be dramatically improved if the ideas and methods of risk assessment are sorted out, and to some extent codified and agreed upon. This will not remove conflict, or guarantee that no crises will occur. It should ensure a much larger element of rationality in the system however, and a more professional stance on the part of the managers. We believe that this is what is needed, and what is happening, in environmental risk assessment.

The aim of this report is much more modest: Its purpose is to convey some of the things that need to be done and some of the questions that have to be faced in implementing a risk assessment approach. It is not a how-to-do-it manual or handbook. The diversity of risks in the environment and the uneven quality of experience means that much more evidence must be gathered, sifted and critically examined before such an authoritative handbook is possible. This text moves as strongly in that direction as appeared practical to the groups and individuals at the time as they participated in the preparation of the report. It is one step in the direction of the application of risk assessment to environmental management in an orderly manner, based on common understandings and terminology.

In taking this step the report advances upon previous work in two main directions. First, it attempts to bring within the framework of risk assessment a wider range of environmental problems, especially those of accelerating the processes of deforestation, soil erosion, and desertification as well as the risks that have gained much attention in ecotoxicology.

Second, this report advances further into questions of the social evaluation

of risk, and the use of risk assessment in environmental management and national policy.

This study has been made possible by the United Nations Environment Programme which has strongly supported the effort. Dr. Ashok Khosla, Director of the International Referral Service of UNEP, has been especially helpful as liaison officer, as contributor of ideas and suggestions, and as participant in meetings and informal discussions.

A major debt is also owed to the Hungarian Academy of Sciences which invited SCOPE to hold a seminar at the Research Institute for Biology, Tihany, Hungary. Their hospitality at Tihany was generous, and the facilities and support provided for the meeting in June 1977 contributed in large measure to its success. None of us who were at Tihany is likely to forget the enthusiastic support we received from our Hungarian colleagues, and our thanks are especially due to Dr. Istvan Lang, Deputy Secretary-General of the Hungarian Academy of Sciences for making the arrangements. Thirty-nine scientists from 23 countries participated in the Tihany seminar. They prepared background papers, and in a series of small working groups put together many of the ideas contained in this report. A complete list of participants and background papers is given in Appendix A. The group also worked upon an early draft of this report which had been prepared by ourselves as editors.

After Tihany the report was substantially revised and extended in the light of the discussions and reports prepared. It was not possible of course to use all the material and ideas generated, and the editorial task, of what we hope is judicious selection, has been a difficult one. The report has benefited from contributions from the following:

M. Arshad Ali Beg	Pakistan	Istvan Lang	Hungary
Guyla Bora	Hungary	T.R. Lee	UK
Rorke Bryan	Canada	Joanne Linnerooth	IIASA-IAEA
Phyllis Daly	USA	Lennart J. Lundqvist	Sweden
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Y. Fukushima	Japan	Prom Panitchpakdi	Thailand
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E. Hadac	Czechoslovakia	Jan Pinowski	Poland
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This revised report was re-examined by a small editorial group convened at the Institute for Environmental Studies, University of Toronto, in April 1978. This group consisted of Phyllis Daly (USA), Roger Kasperson (USA), Ashok Khosla (UNEP), Assefa Mehretu (Ethiopia), Timothy O'Riordan (UK), Jorge Rabinovich (Venezuela), and the editors.

The final draft of the report was circulated for comment in June 1978 to all the participants in the Tihany meeting, to the editorial group of April 1978, and to a number of other interested scientists. We wish to acknowledge review comments and suggestions from the following: Shalom Eilati, F.R. Farmer, Frank Fenner, R.E. Munn, Edward E. Pochin, Tim O'Riordan, E. Somers and Russell Train.

Nevertheless the editors and not the reviewers or the contributors must accept responsibility for any errors of fact or judgement which remain. Nor do the views expressed necessarily reflect those of the United Nations Environment Programme or the Hungarian Academy of Sciences.

While the present report owes much to the inputs of many people, and represents a wide canvass of scientific opinion, it makes no claim to be a definitive statement. It is a step in an evolving pattern of scientific collaboration in learning to deal in a more effective manner with the kaleidoscopic problems of environmental risk.

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