

Book Reviews

Assessment and Management of Environmental Risks Cost-Efficient Methods

Igor Linkov and Jose Palma-Oliveira, eds. NATO Science Series.

This edited volume of articles focuses on the value of risk assessment for policy solutions to environmental problems. It succeeds, through a series of case studies, in illustrating various available methodologies and the implications of the subsequent results. Finally, it serves to update social scientists as to the current state of environmental risk assessment, and thereby provides a useful platform for continued productive work in the field.

The collection of articles emphasizes the need for practical application of environmental risk assessment and for further research. Articles consider the application of risk analysis theory to situations constrained by cost, where political situations vary, and where decisions are constrained by other practicalities. The contributors differ, however, in their recognition of the complexities and realistic constraints that otherwise plague the social sciences. Suter, for example, questions the availability of “full-blown risk assessment” for those countries that possess “weak institutions and very basic problems to identify priorities.” Constantinescu *et al.* in a discussion of nuclear power plant conflicts acknowledge that the problems faced by developing countries are extremely complex. In doing so, Constantinescu *et al.* offer insight into both the role of cultural evaluation and the effects of policy on individuals, as essential components in risk analysis given practical constraints.

The articles differ not only in their conclusions, but in the panoply of risk assessment methodologies that they imply are relevant. Shatkin *et al.* identify three methodologies that dominate environmental risk assessment: risk management options, risk-related uncertainties, and the value model. Although use of these three methodologies can be found throughout the volume, Salgueiro makes a compelling argument for the third when employing economic valuation techniques for insurance assessment of pollution risks. Quantifying policy alternatives in monetary terms using his simple, yet approachable, methodology should appeal to economists and oth-

ers who seek practical applications of risk assessment analysis.

Some authors seem implicitly to assume that a highly quantitative risk/uncertainty approach is more scientific, and thus more justified. Makarynskyy *et al.*, for example, seem to discount any notion of subjectivity in their analysis. Similarly, many authors approach risk assessment and modeling as if it were orthogonal to the sociopolitical science of applying conclusions to policy decisions. Other contributors, however, such as Valverde, acknowledge that risk analysis, even when highly quantitative with true policy implications, remains a “social” science. Those authors who suggest that risk assessment and the policy decision-making processes build upon one another prove more convincing. Shatkin *et al.*, for example, emphasize this point and suggest that all risk analysis should be policy oriented and done with explicit attention to its ultimate use.

Melding the risk and policy components is arguably necessitated by the fact that quantitative modeling relies on subjectivity in the same manner that policy relies on qualitative and quantitative analysis: all quantitative modeling requires assumptions. Additionally, modeling necessarily simplifies reality in order to render it manageable. Even the most sophisticated Monte Carlo simulations and QUAL2E models contain “scores of uncertain parameters” (Goossens *et al.*, p. 411) representing simplifications. Some models presented in this volume oversimplify analysis and, in one example, do not account for the interaction between two pollutants. Much to his credit, MacDonell discusses the importance of including such interactions and the combined risk of components. By understanding the assumptions implicit in the models, one can critically determine how results should inform policy.

One clear theme resulting from this volume is that no model, however complex, can provide clairvoyance. Environmental risk analysis, and the resulting conclusions for policy decisions, can only be as good as the data on which the modeling relies. Because not all potential risks have been discovered, and because measurement tools continually improve (e.g., by measuring the presence of two different pollutants in samples of soil, air, or water and their joint risk), the science of risk analysis will always suffer some level of

uncertainty. Under such circumstances, such uncertainty can be addressed only through qualitative and subjective analysis.

Thus, as Valverde observes, the proper use of risk analysis tools requires people who understand the subjective nature of the process of analysis. This book's most important message is that employing risk analysis for policy solutions to environmental problems is a complex process and is best pursued through collaboration between those collecting data and those analyzing data. The book appropriately demonstrates where the science is leading and where progress is still required.

Finally, as with most, this edited volume is anchored by a handful of truly exceptional articles; however, several fall short of the standards set by those articles. The volume would have benefited from greater editorial attention. I would suggest that readers review the table of contents and choose articles of possible interest. The exceptional articles are reason alone to review the volume: they offer insight and a deep level of understanding on the complexity of risk analysis.

—Nisha Mody

The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings
European Environment Agency. Earthscan Publications, London, 2002. ISBN 18-5383-893-4

Issued under the auspices of the European Environment Agency (EEA), *Late Lessons from Early Warnings* uses a series of 14 case studies—in the main examining the action of synthetic chemicals on human health and the environment—to argue that products and processes that at one time appeared essentially benign were later proven to be harmful.

In particular, the authors suggest that had indications as to possible problems been heeded in a precautionary manner at the earliest opportunity, society would have been spared ensuing costs and difficulties. They conclude with a call to learn 12 “late lessons” to guide scientific and regulatory policy in the future. These include the need to act more swiftly, to incorporate “lay and local knowledge” as well as “wider social interests and values” into the decision-making process, and for scientists to show “more humility.”

According to the EEA News Release of 10 January 2002, “The report should help to improve mutual understanding between Europe and the

United States on the use of the precautionary principle in policy-making.” Certainly, it already appears to be having an impact on such discussions and this looks set to increase further now that the report has been republished as a book by Earthscan Publications. However, whether something is actually true simply because it is well presented and repeated often enough, or because society acts as though it were real, is the key point for consideration.

The editors are alert to possible problems, choosing to highlight for themselves the limitations of having only explored “false negatives” (assumed harmless—found harmful), as well as rather self-consciously describing their authors as “active participants” and noting in passing the need to avoid “the luxury of hindsight.” Nevertheless, there is a distinction to be made between drawing our attention to these issues and acting upon them.

One methodological problem of merely examining “false negatives”—if that is indeed what all these cases are—is that the many instances of concern expressed in the past that turned out to have no consequence in the present are inevitably ignored.¹ If science or society were truly to act at the first suggestion of any problem, it is unlikely that we would have witnessed much technological or social development.

The report identifies, for instance, how “the possible therapeutic value” of X-rays derived in part from “the increasing number of reports of radiation injury.”² This suggests not only that it is impossible to seek to mitigate against all error, but that to do so is to preclude our ability to learn. If we are not to act until we know, then we preclude action altogether, for knowledge is itself necessarily reliant on action in the first place.

Far from abusing the advantages of hindsight, many of the authors appear simply to have projected modern day sensitivities into the past. The fact that many of the instances of fatalities recorded in this volume—which it is argued should have acted as “early warnings”—occurred during the first half of the last century seems to gloss over the historical reality of those times. Certainly, there were many inexcusably

¹Point made by Professor Ortwin Renn to Dr. Malcolm MacGarvin, one of the report's authors, at the workshop, The Application of the Precautionary Principle in the European Union, held May 9–10, 2001 at the Centre of Technology Assessment in Baden-Württemberg, Germany.

²European Environment Agency. (2001). *Late lessons from early warnings: The precautionary principle 1896–2000* (p. 31). Environmental issue report No. 22, ISBN 92-9167-323-4. Luxembourg: Office for Official Publications of the European Communities.

dangerous activities practiced but this ignores the fact that the precautionary principle itself is very much a product of our times.³ One can also not help but wonder whether the statistics cited could have had much of an impact in a period that witnessed a Depression and two World Wars.

Constant references to chaos, complexity, intractability, irreversibility, and interdependence would seem to be used as a means for confusing and confounding issues, rather than clarifying or providing insight. Similarly, the cliché that absence of evidence is not the same as evidence of absence, ignores the fact that absence of evidence is precisely the only evidence we can ever expect to accumulate for the absence of harm.

For a collection of essays preaching the virtues of humility, it is striking that few of the authors leave much room for doubt as to their own conclusions and that these should all agree with one another. The conclusions are somewhat predictable, having been flagged up in the title and rehearsed on many previous occasions.⁴ It appears almost as if the outcomes were agreed *a priori* and that the studies and data were used in reverse as a means for confirming these.

Much of what is described as “lay or local knowledge” is better categorized as personal opinion or popular understanding. This should not be aggrandized by being labeled as public “values,” but be open to being challenged, interrogated, and altered in the same way as the science they decry. Indeed, if it were agreed to put these views on a par with scientific

knowledge, the scope for identifying “false positives” (assumed harmful—found harmless) would be vast.

Of course, science has never been value free, but presenting it as the outcome of competing sectional interests tends to highlight quantity and perception over quality and transformation. Far from being egalitarian, real exclusion begins when prejudice or opinion are taken to be a sound basis for decision making.

Finally, it is ironic for a publication that calls for greater participation and transparency in scientific decision-making processes that so many of the authors and reviewers should have come from a similar background and yet be reluctant to identify this in their biographies. Maybe this explains why the comment by the chair of the report’s editorial team that “over-precaution can also be expensive, in terms of lost opportunities for innovation and lost lines of scientific enquiry” appears nowhere within the report.

For all that, the report contains some useful empirical evidence. Unfortunately, rather than being an intellectual milestone, it merely reflects many of the confusions and equivocations now common among political, corporate, and even scientific institutions.⁵ The report’s initiator, David Gee, has issued a “challenge” for others to identify “false positives” that are “robust enough” under close scrutiny. It will be imperative to take up this offer as soon as possible and to be bold rather than humble in doing so.

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³The European Commission “Communication from the Commission on the Precautionary Principle,” COM (2000) 1, first appeared in February 2000. However, most authors (for example, Timothy O’Riordan & James Cameron. (1994). *Interpreting the precautionary principle*. London: Cameron, or Ragnar Löfstedt & David Vogel. (2001). The changing character of consumer and environmental regulation: A comparison of Europe and the United States. *Risk Analysis*, 21(3), 399–405) only trace its origins back to the early 1970s.

⁴See, for example, O’Riordan & Cameron. (1994). *Interpreting the precautionary principle*. London: Cameron, or Stern & Fineberg (Eds.). (1996). *Understanding risk: Informing decisions in a democratic society*. Washington, DC: National Academy Press, or Stirling. (1999). *On science and precaution in the management of technological risk*. Sussex: SPRU, University of Sussex.

⁵See, for example, Royal Commission on Environmental Pollution. (1998). *21st report: Setting environmental standards*. Cm 4053. London, or House of Lords. (2000). *Science and society*. Select Committee on Science and Technology, Session 1999–2000, Third Report, HL Paper 38. London.