Environmental Indices


Environmental indices are measures of environmental quality that incorporate a number of individual components. A simple index of air quality, for instance, could be obtained by averaging the daily high concentrations of five air pollutants, each being expressed as a percentage of its national air quality standard. A chief advantage of calculating indices is an enhanced ability to communicate summarized data in a format suitable for decision making and education (trends over time, for example, or comparisons among geographic areas). An inherent disadvantage is a loss of information to be disseminated.

Simple environmental indices—as is the case for simple economic indices—must be interpreted with caution, while refined ones might convey more than their users want or need to know. The challenge, of course, is to devise indices that overcome as many of the objectional features as possible yet retain as many of the attributes that underlie the rationale for using them at all.

The book's author sets out to familiarize policymakers, other users of environmental data, and members of the general public with the design and limitations of all existing environmental indices. After a thorough introduction to the role and structure of indices, he devoted about 100 and about 110 pages, respectively, to air and water pollution indices. Almost all the information in these two chapters can be located easily in the technical literature, but having it available in a single publication is convenient. The conclusions to these chapters, however, are disappointingly nonconclusive.

Little attention is paid to other indices of the physical environment (e.g., noise and solid wastes). Regrettably, the existence of biological indicators that integrate all environmental factors affecting life is acknowledged only in passing.

Since more than half the pages of text contain mathematical notations—some of which are rather complex—a better description of the book's probable audience is scientists and engineers who need to understand indices in order to explain them to others. Readers who fit this description will find the book helpful, as will persons with some technical training who wish to understand what the newcomer means by saying, "The air quality index today is 78 and that means 'good'."

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Disposal and Decontamination of Pesticides

Edited by Maurice V. Kennedy, Department of Biochemistry, Mississippi State University, ACS Symposium Series 73. American Chemical Society, Washington, D.C. 138 pages. $20.00.

This book is based on papers presented at a symposium sponsored by the Division of Pesticide Chemistry at the Meeting of the American Chemical Society, Chicago, Illinois, 29 Aug.–2 Sept. 1977. The preface states that the objective of the symposium was to present "several methods that have been either successful or show a great deal of promise in the destruction of these compounds." The book reflects this objective; however, a reader looking for a comprehensive treatise on the subject of pesticide treatment and waste disposal will be disappointed.

The 10 chapters in this volume deal with several different methods for the treatment and disposal of pesticide wastes. Three chapters discuss photochemical destruction of pesticides—one looks at the general chemistry of photochemical reactions and the limitations of these methods and surveys past work on photochemistry of selected pesticides, the other two chapters deal specifically with photochemical destruction of chlorodioxins and halogenated xanthene dyes.

Other treatment and disposal methods presented include (i) catalytic hydredochlorination, (ii) the microwave plasma process, (iii) thermal degradation, (iv) molten salt combustion, (v) disposal pits, and (vi) dielrin elimination from animal tissues. Generally, the chemistry of each method and the decomposition reactions are presented. Results of case studies are included and treatment costs are calculated for the microwave plasma method process.

Land treatment and chemical landfills as disposal methods are not included, which greatly narrows the scope of this book. One chapter reviews the literature on pesticide disposal research including such methods as high temperature incineration, wet oxidation, chlorolysis, ozone/ultraviolet irradiation, and biodegradation. Omitted, however, are such methods as (ii) ultraviolet-chlorination of aqueous pesticide brine waste, (ii) dark chlorination of aqueous pesticide brine waste, (ii) carbon sorption of aqueous pesticide waste with non-thermal regeneration, (iv) resin adsorption of aqueous pesticide waste with alcohol regeneration, and (v) coupled metal reduction of dilute aqueous chlorinated pesticide wastes.

Two other chapters—split-bound insecticide residues and chlorine-mercury interactions in mercury derivatives of chlorinated hydrocarbons—although well written and informative, seemed to be far afield from the other eight chapters. Generally the book is informative, well indexed, and well presented.

Environmental managers, engineers, and technologists charged with the responsibility of the decontamination, detoxification, treatment, and disposal of not only pesticides but other toxic and hazardous wastes will find this book useful.

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The Climate Mandate


The Climate Mandate relates climate change and weather variability to human affairs and world food supply. Although written in a style that one expects to find in a popular book, it is highly authoritative. It lacks the documentation, references, and footnotes characteristic of text books, but the authors never leave you wondering about the authority for what they write. The authors have dug deep into the literature and have put together a historical perspective of climate change and an excellent overview of recent climatic events of world-wide interest, particularly as they relate to food supply.


The authors emphasize that recent world population expansion has occurred during a period of generally favorable climate and a period of extraordinary growth in agricultural production technology. This leaves the world food supply in a precarious position in the event of increased weather variability or any unfavorable shifts in climate. Population growth threatens to be faster than growth in technology.

There is an excellent discussion of the trend toward recognizing that the great plains droughts are somewhat cyclical in nature. Their review of the evidence associated with the solar cycle is especially good.

The authors have been closely associated with research in weather modification. Their discussion of the physics of weather modification is easy to follow and is most enlightening. Yet no claims are made that weather modification will solve our problems of an unfavorable shift in climate.

If one is prone to subscribe to a long-range weather forecasting service, the reading of Chapter 5 is recommended. The authors write "One big communication problem lies in the fact that, when meteorologists or climatologists start talking about the future, it is sometimes difficult to tell whether they are presenting a forecast, an outlook, an intelligent guess, or a conjecture that they find provocative even though it is not supported by any very convincing evidence." They go along with the American Meteorological Society concept that forecasts beyond a month have minimal value at the present time.

This book is recommended as a valuable resource for the education of a climatologist. It should have wide appeal for readers who have a curiosity about climate and why climate changes.

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