

## Agro-Ecology and Conservation: A Developing Relationship

**To Feed the Earth: Agro-Ecology for Sustainable Development.** Michael Dover and Lee M. Talbot. 1987. World Resources Institute, Washington, D.C. 88 pp. \$10.00.

Conservation and agriculture are so tightly linked that it is surprising, at times, how little conservation biologists and agronomists know about each other's disciplines. Habitat destruction, led by agriculture, is the driving force behind most conservation issues today. By fostering the design of agricultural systems that provide high yields without leading to site degradation, conservation biologists could do much to alleviate the pressure of human populations on virgin lands. This short, readable, well-edited book is an introduction to agricultural ecology and the role that sustainable agriculture can play in maintaining environmental quality.

After introducing the issues and describing environmental constraints in the first two chapters, the authors review fundamental concepts of ecology in the third. Conservation biologists with reasonable backgrounds in ecology will learn little from the authors' outmoded views of succession, their rehashes of diversity-stability relationships, and their resurrection of  $r$  and  $K$  strategies. Agronomists and policy-makers would do better to get their introduction to ecology from a better source than this.

The fourth chapter, on applications of ecology to agriculture, is about twice as long as any of the

others, and it was here that I had hoped to find substantive contributions. Much space is devoted to touting the virtues of polycultures and agroforestry, yet most of the evidence presented for the agronomic and ecological success of such systems is anecdotal. There is also a disturbing lack of any attempt to identify the mechanisms that might lead to the desirable properties described. Thus, the tenor is one of opinion and perspective, rather than fact and substance. I suspect that this reflects the immaturity of the subdiscipline rather than lack of rigor on the part of the distinguished authors. Agricultural ecology is, in some ways, analogous to conservation biology: both fields are going through a phase of self-identification. The distinction between what their practitioners intuitively feel is correct and what they know to be fact is not yet clear.

Chapter 5 is a brief essay that puts agricultural ecology in a historical perspective. It shows how agricultural ecology relates to current and future research and to development schemes, both national and international. If this chapter had appeared earlier in the book, perhaps my skepticism concerning the lack of scientific underpinnings for agricultural ecology would have been warded off.

The last chapter, which is an attempt to define an action plan for sustainable agriculture, contains about equal proportions of manure, platitudes, and nuggets. Some of the brighter nuggets take the form of

recommendations: e.g., farm tools appropriate for mixed-cropping systems should be developed, ecology should be incorporated into agricultural curricula, and development projects should be carefully matched to appropriate ecological zones.

About half the literature citations are journal articles, about a quarter are books (including several out-of-date texts), and the remainder are gray literature—reports, oral presentations, and the like. It is unfortunate that some of the recent works containing substantive contributions to agricultural ecology were not cited: e.g., volumes edited by Huxley (1983), Cannell and Jackson (1985), and Marten (1986), as well as several books on herbivory. The book would also have benefitted from a critical, agronomically oriented prepublication review.

*To Feed the Earth* does summarize many topics of interest to those concerned with the development of sustainable ecosystems. Conservation biologists, however, will be put off by its lack of rigor. This book's best use will probably be as consciousness-raising fodder for Washington-based policy-makers.

### Literature Cited

Cannell, M. G. R., and J. E. Jackson, editors. 1985. Attributes of trees as crop plants. Institute of Terrestrial Ecology, Natural Environment Research Council, Huntingdon, United Kingdom.

Huxley, P. A., editor. 1983. Plant research and agroforestry. I.C.R.A.F., Nairobi, Kenya.

Marten, G. G., editor. 1986. *Traditional Agriculture in Southeast Asia*. Westview Press, Inc., Boulder, Colorado, USA.

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## Evaluating Conservation Criteria

**Wildlife Conservation Evaluation.** Usher, M. B., ed. 1986. Chapman and Hall, London, England. 394 pp. \$27.50.

An accelerated pace of academic and popular developments in conservation biology in this decade has generated the need for a highly readable, short, albeit rigorous review of main ecological ideas, used in defining goals and methods of conservation practice. This book admirably meets such a need. It is elegant, well organized, interesting, up-to-date, and focused largely on the applications. It is relatively free of jargon and clichés that so frequently imply more theoretical knowledge than we possess.

The introductory chapter by Usher clearly describes the scope and contents of this book; a great deal of emphasis is correctly placed on the term *evaluation*, which requires defining *attributes* (descriptive properties of a site or land parcel); *criteria* (include derived variables such as rarity, species diversity, or representativeness, and other items, viz., vulnerability, history, or scientific value); and *values* (various ways of assigning relative importance to the information on criteria). Clearly, selection of sites or areas for various kinds and levels of protection and management is based on the choices of criteria and the methods for rank-ordering values. Various contributors to this book review examples of past or current conservation efforts in terms of various choices, their rationale and their success or failure. Overall, the book attempts an excel-

lent comparative analysis of such systematic and quantitative approaches, to be sure, largely based on species- or community-level databases and only casually on some elementary ecological arguments about the survivorship versus extinction of species.

After the introductory three chapters, the book is organized very well into a set of five chapters dealing separately with conservation in the Tropics, the United States, Great Britain, the Netherlands and Scotland, as five different geographical units of differing size and status of development (judged by human population pressure or disturbance). The next set of four chapters deal with specific habitats or groups of organisms. In these four chapters, discussions of the plant and two animal groups (birds, invertebrates) are given equal emphasis, as are discussions of the natural or climax community bias and the treatment of forests, woodlands and agricultural systems. Thus, comparative analyses run a gamut of various historical, political, as well as ecological backgrounds. Chapters by Ratcliffe, van der Ploeg, Idle, and Kirby are particularly lucid in describing various evaluation problems and successes.

The chapter summaries clearly inform the reader about the importance attached to rarity, species richness, naturalness and area, with varying emphasis on representativeness or endangerment. Various authors offer a range of comments on the definition of rarity: from unequivocal or straightforward to highly transient in importance and oriented toward community type. *Representativeness*, emphasized in many programs (e.g., California, following The Nature Conservancy guidelines), is defined as average or ordinary and perhaps too strongly discounted in many examples reviewed in this book. Van der Ploeg, among others, emphasizes a dynamic view, perhaps influenced by the perspective in the Netherlands

where community types are fewer and relatively far more threatened or successional.

The Tropics is a rather large topic for a single chapter, and unfortunately is not adequately treated by McNeil. While McNeil essentially lists a series of reserves in this chapter, his comment that citizens in tropical countries are less conscious or active in conservation may be challenged. One must also be careful to refrain from a sort of academic-linguistic *neo-colonialism* based on the current roster of international publishing successes.

Chapter 1 by Margules provides an excellent summary of the most widely used (and popular) criteria and common practices of conservation. A sequential scheme (shown in Table 13.4, p. 311) of five steps used in evaluation and selection, makes both common and technical sense (see also p. 144 for two examples given by Ratcliffe on evaluation procedures in flower shows and selection of candidates). A cardinal rule of almost all areas of applied biology also works here—applications provide new knowledge and experience that should then improve applications. Field biology at the species and community levels must be fostered strongly; population biologists may find rather little here although there are clearly many inputs needed from them as well. Interesting commentaries on the empirical nature of conservation decisions are offered in each of the 14 chapters. Many authors are from the United Kingdom, so the book is slanted heavily toward examples in the Western Hemisphere, especially so with relatively weaker chapters on the Tropics and on agricultural communities. However, this book is a gold mine for practitioners looking for the discussions of criteria, comparative uses, dynamic view of community classification, and information on various programs.

Re-reading the introductory and concluding chapters by Usher and Margules, respectively, after reading