



Review: Bridging the Gap Between Rain Forest Regeneration and Management

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REVIEWS

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BRIDGING THE GAP BETWEEN RAIN FOREST REGENERATION AND MANAGEMENT

Gómez-Pompa, A., T. C. Whitmore, and M. Hadley (eds.). 1991. **Rain forest regeneration and management**. Man and the Biosphere Series. Volume 6. The Unesco Press, Paris, France, and The Parthenon Publishing Group, Ltd., Park Ridge, New Jersey. xxiii + 457 p. \$65.00, FF 305.00, ISBN: 0-929858-31-X.

The decade of the tropics has come and gone, leaving in its wake millions of hectares of devastated rain forests and uncountable species lost or threatened with extinction. A positive legacy of the past decade is the realization on the part of conservationists, forest ecologists, foresters, rural development agencies, and concerned world citizens that urgent measures must be taken to develop sustainable management practices for tropical forests. In their far-reaching book, editors A. Gómez-Pompa, T. C. Whitmore, and M. Hadley draw upon experts in both ecological and management spheres to bridge the chasm between ecological studies of rain forest regeneration and past, present, and future endeavors in tropical forest management. Most of the 48 contributors to this volume gathered at an international workshop held at Guri, Venezuela in 1986, cosponsored by the Man and the Biosphere Programme (MAB) of Unesco, the Decade of the Tropics Program of the International Union of Biological Sciences (IUBS), the United Nations Environmental Programme (UNEP), the Instituto Venezolano de Investigaciones Científicas (IVIC), and hosted by the Venezuelan State Hydroelectric Company, CVG Electrificación del Caroní.

The 32 chapters of this volume are divided into two major sections: a collection of seven topical reviews followed by an international smorgasbord of 23 case studies. Review chapters cover subjects from the European concept of tree temperaments (R. A. A. Oldeman and J. van Dijk) to seed ecology (D. H. Janzen and C. Vázquez-Yanes), forest dynamics (T. C. Whitmore) and ecophysiology of regeneration (F. A. Bazzaz), reproductive biology and genetics (K. S. Bawa and S. L. Krugman), nutrient cycling (C. F. Jordan), and the current status of tropical rain forest management (R. C. Schmidt). In their introductory chapter, Gómez-Pompa and F. W. Burley point out clearly the real reason why ecological forest management has not been practiced more widely in the tropics—the pursuit of short-term economic gain, exacerbated by poor resource planning and lack of political commitment to restraining deforestation. But technical problems also remain a major stumbling block to the development of tropical forest management programs. As the reviews and case studies presented in this book amply demonstrate, we still know very little about the autecology, reproductive biology, genetics, seed ecology, and regeneration requirements of most of the world's valuable tree species. The book makes abundantly clear that ecological studies must provide the foundation upon which successful management practices are built.

Relatively little new information is provided by the individual review chapters, many of which have been published

recently by the same authors in similar form elsewhere. These chapters, however, collectively summarize a vast body of literature, much of which is in the form of dissertations and technical reports difficult for researchers around the globe to access. Moreover, each review addresses relevant implications for rain forest management. It would have been nice to see more cross-referencing among chapters: the reader is left to draw linkages among these closely interrelated topics. In fact, the book reads more like an encyclopedia than a current synthesis of rain forest regeneration research. In many ways, the organization of the book is emblematic of the need for closer research collaboration among ecophysiologicals, ecosystem ecologists, population biologists, and silviculturalists.

The bulk of the book consists of case studies of natural rain forest regeneration and a wide range of management practices from tropical areas throughout the world. These case studies are not arranged in any explicit order, although they generally progress from regeneration-oriented to management-oriented accounts. The case studies appear to be arranged at random with respect to geography, which makes it difficult to draw conclusions within similar vegetation types, floristic zones, or land-use practices. At least half of the accounts include studies of natural regeneration following logging and slash-and-burn agriculture, as well as after natural forest disturbances. Several chapters describe long-term successional patterns, making this book a valuable compendium of information on patterns of tropical rain forest succession, particularly with respect to tree regeneration and management potential of regenerating successional stands. Unfortunately, not even a superficial attempt was made to summarize or synthesize these reports with respect to the potential application of regeneration studies for developing natural forest management techniques. Although rich in information that is difficult (at best) to obtain, these chapters are disappointing in their failure to extend their ecological conclusions in the direction of specific management applications. For example, not a single case study is presented that specifically considers applications of natural forest regeneration to reforestation or agroforestry programs.

The remaining case studies describe a wide variety of past and present management projects, ranging from Mayan silvicultural practices to large-scale plantation forestry at Jari in eastern Amazonia, Brazil. For the most part, these accounts are written by experienced tropical silviculturalists, who represent the world's collective hope for developing sustainable management programs for timber production. Although a synthesis of these disparate studies was not even attempted, they clearly demonstrate that management at any scale and intensity proves ineffective when practiced in ignorance of species biology and ecosystem properties. As Hadley points out in his concluding chapter, a difficulty in applying ecological research findings to management programs lies in the vastly different spatial scales at which these two spheres traditionally operate. Ecological studies are generally conducted

at scales less than a few hectares, whereas management decisions affect hundreds or thousands of hectares. Moving from one case study to another, I was led to the sobering realization that relatively little progress has been made in bridging the gap between ecological studies of rain forest regeneration and silvicultural practices. Although one account deals with the management of tropical forests for conservation of birds and bats in NE Queensland and a second study concerns management of the Caroní river basin in Venezuela, the importance of natural forest management in conserving biological diversity and ecosystem services receives little attention. Also missing from this section are case studies of reforestation of degraded pasture, the management of extractive reserves for non-timber products, and enrichment planting in primary and secondary forests. With regard to these alternative forest management practices, I recommend reading *Alternatives to deforestation: steps toward sustainable use of the Amazon rain forest*, edited by A. B. Anderson (see following review).

Rain forest regeneration and management is a book of wide

interest for ecologists and natural resource managers alike. Because of its scope, this volume is an excellent introduction to principles of forest regeneration as well as to the varied options for forest management within tropical regions. The graphs and illustrations are of high quality, although regional maps indicating study areas would be useful. As a reference and bibliographic source on tropical rain forest regeneration, this book is without compare. In assembling these excellent reviews and case studies, the editors have set the stage for increased dialogue among forest ecologists, tropical biologists, silviculturalists, land developers, and policy makers. Now, our urgent task is to get the show on the road before the cast of characters slips through our fingers.

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ANSWERS FOR AMAZONIAN DEFORESTATION?

Anderson, Anthony B. (ed.). 1990. **Alternatives to deforestation: steps toward sustainable use of the Amazon rain forest**. Columbia University Press, New York. xiv + 281 p. \$65.00, ISBN: 0-231-06892-1 (acid-free paper).

Tropical deforestation is currently a well-publicized issue. World attention is certainly merited, given the gargantuan consequences on biological diversity and potential effects on global climate and nutrient cycles. Amidst the biological disaster reports, this volume brings a cautious but welcome message: there are biologically and in some cases socially viable alternatives to tropical deforestation.

Gathered here are 17 papers by 22 authors, the results of a 1988 conference in Belém, Brazil. The focus of the book is Amazonia, but many of the results appear applicable to the Old World tropics as well. The authors are a diverse group of ecologists, foresters, agronomists, and social scientists. A depth of first-hand experience is evident. Ten of the authors are residents of Amazonian countries; many of the others are experienced tropical researchers.

The papers are organized in five sections: Background, Natural Forest Management, Agroforestry, Landscape Recovery, and Implications for Regional Development. In the first paper of the Background section, Anderson commences by outlining the magnitude of the problem. Amazonia is immense: seven million square kilometers, with five million square kilometers of tropical moist and rain forest. The scale of deforestation is likewise staggering—the area already covered by abandoned pasture is almost twice as large as the country I live in! Even more worrisome, the rate of conversion is increasing. Anderson's chapter also lucidly summarizes the major points of the book. (In fact, if you have access to the book, stop reading this review and go read his chapter.) Chris Uhl and five co-

authors next describe the natural and anthropogenic disturbance regimes of Amazonia. They assess the consequences of the scale and frequency of these disturbances on plant regeneration. These two excellent chapters set the biological stage for the rest of the book.

The section on Natural Forest Management opens with Gómez-Pompa and Kaus's description of traditional methods of forest management in Mexico. They suggest that traditional techniques, modified by current ecological knowledge, offer ecologically sound options. Anderson describes the "tolerant" forest management practices of Amerindian descendants in the Amazon estuary. In addition to extraction, highly desirable species are favored and others controlled, while the basic physical structure of the forest is maintained. Peters describes the large and little-studied monodominant stands of native fruit trees in the Peruvian Amazon. His calculations indicate that an industry based on fruit extraction is biologically sustainable. Viana provides an interesting example of applying population biology techniques to a practical forest management question. He suggests that the abundant and relatively long-lived pool of seedlings is the key to maximizing production of a valuable timber species in second growth forest. De Graaf and Poels summarize the extensive Dutch research in rain forest management for timber in Suriname. The CELOS system requires intensive silvicultural intervention, strict forest protection, and a stable long-term socio-political situation. Under these conditions it permits harvesting 20–30 m³ of high-quality timber in each 20-year rotation. Hartshorn describes a different approach to managing natural forest in Peru, which uses strip clear-cuts to mimic natural treefall gaps. Other innovations include management by a local Amerindian forestry cooperative and an emphasis on local processing of timber, posts and poles, and charcoal.