

BOOK REVIEWS

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War and Tropical Forests: Conservation in Areas of Armed Conflict

EDITED BY STEVEN V. PRICE

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At least two dozen intractable wars, most of them essentially civil wars (i.e. internal armed conflicts or insurgencies), are always in progress in tropical countries around the world, a grim though widely unappreciated aspect of human society. The embroiled countries can almost invariably be characterized as increasingly impoverished, increasingly overpopulated and ruled by corrupt totalitarian (often military) regimes. They all also suffer from an increasingly imperiled natural environment, a rural environment that usually provides the theatre of operations for those many wars, and which thus suffers from a devastating combination of civil and military insults.

This collection of eight essays has been gleaned from 15 or more presentations to an international conference held in 2000 at the Yale University School of Forestry and Environmental Studies (New Haven, USA). The underlying purpose of this selection is to present some combination of suggestions for mitigating war-related damage to tropical forests, and/or for minimizing postwar environmental damage, and/or for reducing the frequency of those wars. One or more of the papers dwells on warfare in leading, directly or indirectly, to habitat destruction, wildlife losses, unsustainable (and inequitable) resource exploitation, the endangerment and death of those employed in protecting or otherwise conserving the involved environment, and war-generated refugees and associated environmental depredations. Some stress the importance of engaging local communities in protecting tropical forests, especially in maintaining conservation capacity during wartime. Transfrontier 'peace' parks are recommended in one instance as a means of achieving greater harmony between neighbouring states.

The opening chapter, by J.A. McNeely of the World Conservation Union (Gland, Switzerland), offers a wide-ranging and iconoclastic overview of the subject from an environmental conservation perspective, one that addresses both the war and postwar (more properly, interwar) periods. By contrast, the closing chapter, by J.E. Austin and C.E. Bruch of the Environmental Law Institute (Washington, USA), presents a comprehensive analysis of international humanitarian law, both in force and proposed, as it applies to wartime prevention, remediation, punishment or compensation regarding environmental destruction. Fully three of the intermediate chapters deal with Rwanda and the Democratic Republic of Congo. The one by A. Lanjouw of the International Gorilla Conservation Programme (Nairobi, Kenya) is especially noteworthy for its treatment of the difficulties of conservation and humanitarian organizations attempting to continue their efforts in the midst of decades of continuing armed conflict and enormous population displacements, presenting valuable insights into how best to carry on under such circumstances. This analysis is usefully augmented by a survey, by A.J. Plumptre of the Wildlife

Conservation Society (Kampala, Uganda), of what motivates local conservation workers to stay on the job despite wartime dangers. The enumeration of difficulties faced in the Democratic Republic of Congo regarding wildlife conservation, by J. Yamagiwa of Kyoto University (Kyoto, Japan), provides a chastening counterpoint.

The remaining three chapters present case studies from Nicaragua, by D. Kaimowitz of the Center for International Forestry Research (Jakarta, Indonesia) and A. Fauné of Managua; from Colombia, by M.D. Álvarez of Columbia University (New York, USA); and from Indonesia, by C.V. Barber of the World Resources Institute (Washington, USA) and K. Talbott of Conservation International (Washington, USA). The Nicaraguan and Colombian studies each in their own way demonstrate the complexity and ambiguous outcomes associated with civil war, ranging from 'gunpoint' forest conservation to forest overexploitation or even conversion to other land uses. The Indonesian study highlights forest ruination deriving from the corruption of that country's governance structure.

This compendium thus adds to the relatively meagre resources now available to governmental and intergovernmental policy makers, nongovernmental organizations, field workers and academics regarding the crucial environmental component of comprehensive human security. As perhaps its most important lesson, the book makes amply clear the inexorably intertwined nature of environmental security with social security, with neither achievable unless both are achieved. Finally, the book offers a modicum of hope in providing several avenues to mitigate at least partially the growing scourge of an ever more degraded global biosphere.

ARTHUR H. WESTING
Westing Associates in Environment, Security, & Education
134 Fred Houghton Rd
Putney, VT 05346
USA
westing@sover.net

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The Commons in the New Millennium: Challenges and Adaptations

EDITED BY NIVES DOLŠAK AND ELINOR OSTROM

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GB£ 17.95, London, UK/Cambridge MA, USA: The MIT Press,
2003

Over the past decade, the academic community has renewed the long-standing debate on 'common-pool' resource management. *The Commons in the New Millennium* re-engages the issue in light of contemporary politics and policies as we begin the twenty-first century. The articles that comprise this volume share an 'institutionalist' approach that stresses the development and efficacy of institutions that monitor and manage the actions of commons stakeholders through the reproduction of individual and local social capital. Such institutions are held as vital in explaining the functioning of commons property regimes.

The volume is organized in five parts. Part one (Introduction) establishes an outline and theoretical framework that focuses on one

specific type of commons property regime, common-pool resource management. Parts 2–4 present a series of cases, each focusing on a key dimension of the debate, namely boundaries, privatization and capital. After a brief summary and synthesis, part five (Adaptation to Challenges) points out the diverse and adaptive nature of the commons and drafts an agenda for future research.

Part two (Managing Species, Habitats, and Landscapes at Multiple Scales) explores the issues of scale, interconnectedness, and boundaries. Acheson and Brewer (chapter 2) examine the issue of territoriality in the Maine lobster industry. Hanna (chapter 3) addresses institutional design challenges in fisheries management in the USA. Geores (chapter 4) analyses the concept of operational scale as it relates to forest resource management.

Part three (Privatization) addresses the controversy over privatization through an assessment of the advantages and limitations of privatization. Yandle and Dewees (chapter 5) contrast market-based and communal approaches while presenting the successful example of fisheries privatization in New Zealand. Eythórsson (chapter 6) focuses on economic growth, capital concentration and equity, while examining local impacts and political consequences of fisheries privatization in Iceland. Farrel and Morgan (chapter 7) discuss the achievements and limitations of the market-based emission allowance systems in the USA.

Part four (Financial, Social and Political Capital: Managing Common-Pool Resources and Shaping the Macropolitical and Macroeconomic Environment) presents three articles aimed at establishing the relationships between social, financial, and political capital. Anderson, Locker and Nugent (chapter 9) show the economic and social impacts of micro-credits on common-pool resources. Lindayati (chapter 8) describes the relationship between national politics and local resources management. Birner and Wittmer (chapter 10) elaborate a compelling theoretical position on the creation of political capital and its importance.

Dolšák and Ostrom present a readable collection of case studies that offer important insights for academics and policymakers. Unfortunately, they avoid engaging conflictive issues such as global dominance and local resistance. As a result, they undermine more critical approaches by adopting a theoretical approach that overemphasizes the necessity of integrating commons institutions into macro-policy models based on a single market-based development paradigm. However, in an overall assessment, this book makes an important contribution to the literature about common-pool resources management.

GERARDO DAMONTE
Department of Anthropology
Cornell University
Ithaca, NY 14850
USA

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Urban Air Quality. Recent Advances

EDITED BY RANJEET S. SOKHI AND JOHN G. BARTZIS

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The book represents the highlights of the proceedings of the Third International Conference on Urban Air Quality–Measurement, Modelling and Management, held in Loutraki, Greece, during 19–23

March 2001. This professionally laid-out book consists of a table of contents, a brief editorial and 53 peer-reviewed papers from the 130 presented at the conference.

The editorial describes the aim of the conference (and by inference that of this book) as being ‘to stimulate discussion of the latest advances in this area’ (i.e. urban air quality). I consider that the book achieves this aim, covering eight wide-ranging themes relevant to urban air quality, namely (1) urban meteorology, (2) urban air pollution, emissions and measurements, (3) aerosols, (4) roadside air quality, (5) urban air pollution modelling, (6) model evaluation and intercomparison, (7) remote sensing, and (8) air quality management.

As such, the book will have international appeal to doctoral, postdoctoral and senior researchers with interests in many aspects of urban air quality, in particular urban-scale modelling, urban meteorology and aerosols. It is not a ‘light read’ and the absence of an index to aid navigation around such a large volume is regrettable, but its contents are authoritative and research groups in this area should find a copy a useful addition to their library.

STUART HARRAD
Division of Environmental Health and Risk Management
Public Health Building
School of Geography, Earth and Environmental Sciences
University of Birmingham
Birmingham, B15 2TT
UK

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Resource Selection by Animals: Statistical Design and Analysis for Field Studies

BY BRYAN F. J. MANLY, LYMAN L. MCDONALD,
DANA L. THOMAS, TRENT L. MCDONALD
AND WALLACE P. ERICKSON

xiii + 219 pp., 24 figs, 55 tables, 24 × 16 × 2 cm, Second Edition, ISBN 1 4020 0677 2 hardcover, GB£ 53.50/€ 85.00/US\$ 78.00, Dordrecht, the Netherlands: Kluwer Academic Publishers, 2002

This book contains a concise review of sampling designs and statistical analysis procedures for resource selection studies. This includes models for species distributions, habitat characterization, and diet choice. Principal focus is on the concept of a resource selection function (RSF) defined to be any function proportional to the probability of use of a resource unit. Many of the examples presented in the book are for wildlife, but the methods have broader applications and parallel literature exists in plant ecology with surprisingly little cross-referencing (see Guisan & Zimmerman 2000).

Sampling protocols and study design take central focus in the organization of the book, with chapters devoted to various analysis methods, geographical information systems (GIS), risk assessment and population size estimation. The introductory chapters contain an excellent overview outlining the general statistical frameworks of RSF and placing RSF in the context of other habitat selection methods. Five statisticians wrote this book, which is reflected in its terse style and abundant equations. Nevertheless, I found the text to be easy to read and the book will be accessible to any ecologist or student with background in elementary statistics. Software is readily available for performing the analyses.

RSFs have important applications in ecology because they provide a statistical link between habitats and populations. Graduate students will find ripe opportunity for applications in landscape ecology and

conservation because RSFs offer a structure for putting ecology on a map; GIS can be used to create maps of the relative probability of use. Yet, a RSF is simply a statistical characterization of resource use, and the connection with ecological theory is urgently in need of development. We lack a unified theory of habitat selection, and Manly *et al.* do not provide the conceptual context that will lead to the development of such a theory. The book contains no reference to the ideal free distribution or isodars, and only cursory mention of optimal foraging theory. The effects of density dependence on RSF are brushed off as a controversial topic. Development of theory for habitat ecology is ripe for the picking, however, and this book lays out the statistical methods by which we can rigorously evaluate theory.

Logistic regression has become the statistical tool of choice for RSF studies, and developments have appeared in the few months since the publication of this book. Thus, *k*-fold cross validation methods can be used to evaluate how well an RSF predicts the distribution of animals (Boyce *et al.* 2002). This validation method can be used to assess how well RSFs predict in other places, at other times, or at different scales. Also, *k*-fold cross validation can be used to confirm that the assumed model yields a function that is truly proportional to the probability of use.

Manly *et al.* review discrete-choice models that are the same as conditional fixed effects, or matched case-control logistic regression (Compton *et al.* 2002). Such matched case-control designs permit focus on resource units that are truly available. Case-control designs are least likely to be biased if use is relatively rare across the landscape, but unbiased odds ratios can be obtained even for 'contaminated' sampling schemes (Lancaster & Imbens 1996). As with any statistical analysis, caution must be exercised to ensure that the data and study design meet assumptions inherent in the methods.

Several topics are given insufficient attention in this book. Autocorrelation is inherent in spatially structured data, but new methods, such as variance inflation, are not mentioned. Power analysis should be an integral component of study design, and would be a useful topic for a subsequent edition of this volume. Although Manly *et al.* have included a brief chapter on applications using GIS, this is a complex topic for which the reader will need to seek additional assistance elsewhere. The index is brief and inadequate.

Despite these shortcomings, Manly *et al.* have provided an important contribution to the ecological literature that is resulting in a new generation of research in habitat ecology. Abundant applications exist in conservation, environmental assessment, natural resource planning and basic ecology.

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MARK S. BOYCE
 Department of Biological Sciences
 University of Alberta
 Edmonton, Alberta T6G 2E9
 Canada

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The Trade in Wildlife. Regulation for Conservation

EDITED BY SARA OLDFIELD

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 paperback, GB£ 17.95/US\$ 29.95, London, UK: Earthscan
 Publications Ltd, 2003

The book derives from a seminar held in Cambridge in 2001. The seminar was facilitated by what is now Resource Africa and TRAFFIC International, and involved a number of other organizations involved with the globally important issues arising out of wildlife trade.

Trade in wildlife is one of the principal threats to the continued existence of many species. One of the more successful conservation conventions, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), is involved exclusively and in a very focused way with the regulation of international wildlife trade, and necessarily forms a central focus of the book. The readership will therefore encompass the vast array of non-governmental organizations who congregate at CITES, drawn from conservation, hunting, user-group and animal welfare constituencies. Further, the book should be of interest to CITES management authorities around the world, in addition to government policymakers involved in trade and/or the environment and those policymakers in government and in the World Trade Organization (WTO) who are involved in trade and environment issues. Obviously the book is also of interest to academic researchers and students studying and analysing a policy-oriented conservation subject.

The contents emphasize the analysis of the proportion to which trade should be regulated or carefully managed within programmes creating local community incentives. Case studies are included to support this. Other subjects covered include descriptions of domestic regulation in some areas of the world, CITES compliance and enforcement, the domestic arrangements within the European Union and a useful set of lessons from other traded products, such as ozone-depleting substances, timber, fisheries, drugs and antiquities. There is also an examination of the trade and use of bushmeat, which is well written and relevant, but seems somewhat incidental in the wider context.

Necessarily, because the book derives from a seminar, it is not intended to deal with its subject in the sequential and proportionate way of a monograph. Thus the case studies and the national examples are, to an extent, arbitrary choices based on the interests of the speakers.

The material and the arguments are well presented and authoritative. It might be disappointing to some that the book ultimately is a little restrained, in that it does not put forward a radical proposal to rectify the problems with CITES. This is all the more surprising, since the book graphically describes the damage that can be done by the deployment of a blunt trade instrument, for example in the case of the Australian parrot species, and is certainly not restrained in its assessment of the root cause of wildlife trade failures. Marshall Murphree writes in chapter five: 'A frank examination of our record must conclude that there is an epistemic environmental establishment located at an international scale distanced from the levels where most of the operational decisions on sustainability are made.'

However, the useful, and very clearly expressed conclusion is that the findings may be a basis for further work and perhaps the conference (and book) sequel should deal with the next detailed design stage.

Some matters, which might have been anticipated in a volume of this nature, are not examined. Thus, the whole area of conflict between trade and environment, rumbling on within the WTO, is not mentioned, nor is there an attempt to discern how CITES and the WTO can work together within the overall global regulation matrix. Finally, there is no discussion of the welfare aspects of trade in live animals; a subject that regularly preoccupies CITES resolutions.

The volume is well presented and is a thought-provoking paperback to add to the CITES-related collections. A follow-up is needed to take the matter forward to practical resolution.

STUART R. HARROP

Durrell Institute of Conservation and Ecology

Department of Anthropology

University of Kent

Canterbury, Kent, CT2 7NS

UK

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The Economics of Marine Resources and Conservation Policy. The Pacific Halibut Case Study with Commentary

EDITED BY JAMES A. CRUTCHFIELD AND ARNOLD ZELLNER

xii + 226 pp., 28.5 × 22 × 1.5 cm, ISBN 0 226 12194 1 clothbound, US\$ 60.00/GB£ 42.00, Chicago, USA: The University of Chicago Press, 2003

When Crutchfield and Zellner's (1962) monograph on the Pacific halibut fishery was published by what is now the National Marine Fisheries Service in the USA Department of Commerce, but was the Bureau of Commercial Fisheries in the Department of Interior, there was no 200-mile fishery conservation zone and no Magnuson-Stevens Fishery Conservation and Management Act. The latest data used in the report were from 1957. Understanding of the economics of fisheries management in general and the Pacific halibut fishery in particular has advanced to the point where a report from this era might be of only historical significance. However, a re-reading of this classic fisheries economics text proves the wisdom of those who decided to reprint this work as providing valuable lessons to the application of economic analysis to fisheries management in our times.

To provide context to the original work, the publishers have included additional material. First, there is a modern introduction to the monograph by Crutchfield and Zellner, which provides their view of how the original work fits into the arena of economics and fishery policy. This is followed by the original report with its 40 appendices of detailed tables and data. A final section, entitled 'Commentary', is a collection of four short essays, three by eminent resource economists and one by a former director of the International Pacific Halibut Commission (IPHC). These papers are not so much commentary as expansions on the original Crutchfield and Zellner work. The first essay, by David Zilberman, is closest to a commentary, describing how the halibut work was groundbreaking, not due to new concepts, but due to the 'integration of conceptual modeling, data presentation and analysis, econometric techniques, and policy analysis'. Anthony Scott's essay explores the halibut port-pricing model, which is discussed in chapters 6 (theoretical) and 7 (empirical) of the report. He laments the fact that fisheries economics has focused so heavily on production models, and ignored the intricacies and potential importance of price determination in fisheries management. James Wilen and Frances Homan pick up on this theme of the importance

of modelling price determination, and expand on Homan and Wilen (1997) to develop a somewhat more intricate and complete model that enables understanding of the role that season-length plays in a fishery with both a fresh and frozen component and an important storage sector. Finally, Donald McCaughan, former IPHC director, updates the reader on changes in the halibut fishery. One of the major changes that impacted the halibut fishery was the expansion of the Pacific groundfish fishery and the importance that halibut by-catch in that fishery has played in modern management. The other major change was the introduction and evolution of an individual vessel quota system, an approach that Crutchfield and Zellner thought theoretically appealing, but unlikely to be implemented.

The heart of this volume is the original Crutchfield and Zellner (1962) monograph. The report is divided into three parts. The first, Basic theory of regulation and its application to halibut fishery, is as well-written and as accessible to non-economists as any discussion on the fundamentals of fishery economics. The fact that it is based around an actual fishery with real data adds to the argument that economic analysis must be part and parcel of fisheries management and policy, even when the objectives appear on the surface to be primarily biological. Part 2, Economic effects of the halibut program, features the two aforementioned chapters on port price determination. Unless you are specifically interested in this type of modelling, you may find these chapters more tedious than the others, as the authors explore in detail the development of each variable in their price model and a year-by-year comparison of parameter estimates from the econometric modelling. For the non-economist, the summaries of these chapters and the discussions of the implications of management actions on prices should suffice. The last two chapters in part 2 describe a unique survey of vessel owners using tax returns combined with a survey of fishers, to develop a comprehensive description of the economic status of the fishery and fishers that feature in the first two chapters of part 3, Conclusions from analysis and implications for public policy. Crutchfield and Zellner knew they were arguing for a change in what the halibut resource was being managed for. In the last two chapters, they lay the groundwork for this argument, first by laying out the criteria by which policy success has to be judged, and then in the final chapter recommending specific policy actions intended to meet these goals.

For an economist, writing a book review does not differ from conducting a benefit-cost analysis. We should read the books and journal articles that benefit us the most in terms of our professional output. It is hard to think of many modern articles or books on fisheries management that explain so well the fundamentals components of the theory and marry these to empirical analysis.

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DOUGLAS LIPTON

Department of Agricultural and Resource Economics

Symons Hall

University of Maryland

College Park, MD 20742

USA

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Ecoagriculture. Strategies to Feed the World and Save Wild Biodiversity

BY JEFFREY A. MCNEELY AND SARA J. SCHERR

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This book makes the argument that maintaining healthy wild species populations can be compatible on a large scale with agricultural intensification needed to meet growing food and livelihood demands in the developing world. The book also contains an ambitious agenda: agricultural systems must be transformed to support wild species while simultaneously improving productivity and reducing poverty. The strategy to achieve the above goals has been termed ecoagriculture, defined as an approach that brings together agricultural development and conservation of wild biodiversity, as well as provision of ecosystem services, as explicit objectives in the same landscapes. The authors argue that ecoagriculture has potential in the biodiversity hotspots of the developing world where most of the poor concentrate and have little choice but to exploit wild habitats for survival. They further argue that if food is to be accessible to the rural poor, then much of it needs to be produced where they live, and ecoagriculture allows this, while increasing nutrition and income and also reducing biodiversity loss and ecosystem degradation.

In order to demonstrate the potential of the ecoagriculture approach, McNeely and Scherr provide 36 ecoagriculture case studies from around the world (seven from the northern hemisphere) that enhance wild biodiversity. The studies revolve around the application of six different strategies focusing on the creation of wild biodiversity reserves and habitat networks, while increasing productivity through management of soil, water and vegetation resources and minimizing agricultural pollution. Case studies range from establishing buffer zones between reserves and farm areas, to reducing pollution by minimizing pesticide use poisonous to wildlife. According to the authors the impacts of most of these strategies are substantial, as evinced by the scale of adoption of the innovations (in some cases reaching up to 800 000 ha) and the positive impacts on biodiversity and sustainability. The authors conclude that mainstreaming the practice of ecoagriculture will require the support and participation of financial and research institutions, and farmers' organizations, as well as the right set of policies and market incentives.

Clearly, this book can be grouped among a series of others that have recently appeared, which raise key questions about the historical challenge the agricultural research and development community faces: how to assume responsibility for the welfare of millions of resource-poor farmers living in marginal agroecosystems while preserving the natural resource base. In fact, McNeely and Scherr agree with many analysts that in order to enhance food security in the developing world, the additional food production will have to come from agricultural systems located in countries in which the additional people will live, and especially where the majority of the poor people are concentrated. This means that such agricultural strategy must be applicable to a patchwork of thousands of small farmers under the highly heterogeneous and diverse conditions in which smallholders live. This raises the first problem with McNeely and Scherr's ecoagriculture approach: making space for wildlife in agricultural landscapes. How can a conservation strategy for large mammals and birds that requires extensive territories for effective reproduction be compatible with an agricultural development agenda

focused on small farmers that barely have sufficient plots of land to grow their crops? In many parts of the developing world, the issue for poor farmers is access to productive land. So, it is difficult within areas of land distribution inequity, to visualize large protected areas for large animals to thrive. The example given in the book of a large (3300 ha) corporate Costa Rican orange plantation that leaves areas of dry tropical forest within or adjacent to the farm can hardly be considered as an example benefiting poor farmers. However, the Del Oro Company obtained substantial added value in the market. In many circumstances, those very large farms that may be amicable to biodiversity are the ones that need to undergo a process of land reform to reduce social inequities; such reduction is an important prerequisite to any meaningful conservation project.

The benefits of promoting a biodiverse farm must be derived in two ways: it must lead to the preservation of wild animals and plants (an aspect over-emphasized in the book), but it must also promote agricultural processes important to farmers such as productivity and resilience, an aspect little explored in the book, except in the cases of intercropping in China, the shade coffee in Latin America and the agroforests of Indonesia. The experimental evidence suggests that biodiversity can be used for improved pest and soil management in agroecosystems. Several studies have shown that it is possible to stabilize the insect communities of agroecosystems or enhance soil quality, by designing biodiverse cropping systems that support populations of natural enemies of insect pests or components of soil biota that play key roles in the enhancement of soil health (Altieri 1994; Altieri & Nicholls 2003). The key is to identify the type of biodiversity that it is desirable to maintain or enhance in order to maintain ecological services important to farmers and then to determine the best practices that will encourage the desired biodiversity components. The role of farmers and researchers should be to encourage those agricultural practices that increase the abundance and diversity of above- and below-ground organisms, which in turn provide key ecological services to agroecosystems. This is at the heart of agroecology, a science that underlies much of the basis of ecoagriculture, but insufficiently recognized in the book. In fact, when explaining the genesis of the ecoagriculture approach, the authors missed the opportunity to review the many advances in agroecology, which from its inception has proclaimed the promotion of an agriculture that is both socially equitable but also ecologically sound (Altieri 2002). Agroecological research has led to the identification of the best biodiversity designs and management practices that enhance or regenerate the kind of biodiversity that can subsidize the sustenance of agroecosystems by providing ecological services such as biological pest control, nutrient cycling, water and soil conservation (Gliessman 1998). The ecoagriculture challenge builds upon old preoccupations of agroecologists and therefore a new term to embrace them is not really needed.

The examples of soil and vegetation resource management given in the book, such as the promotion of biocontrol in cassava in Africa, IPM of rice in Vietnam and improved vegetable technology in Honduran slopes, are examples of slight modifications of conventional monoculture agriculture that at best indirectly lead to biodiversity conservation. They do not offer farmers alternatives to redesigning their systems so that they can rely on the functional biodiversity of their farms for pest control and soil fertility, thus making them independent from external inputs and institutions. In fact, the authors do not rule out the role of transgenic crops as a major strategy to achieve enhanced agricultural biodiversity, ignoring the potential negative effects on ecosystem integrity through genetic pollution of local varieties and non-target impacts of some transgenic

crops (i.e. toxins of BT maize). They argue that biotechnology may be wildlife friendly by increasing crop yields and thus avoiding conversion of natural ecosystems into agriculture. This view reflects the vision of the Future Harvest Foundation (and many of the CGIAR centres) that co-sponsored the publication of the book. The views of non-governmental organizations (NGOs) and other scientists at the forefront of a pro-poor research agenda and critical of the CGIAR stance on biotech have been left out. If the book is to serve as a basis for those working with poor farmers, omissions of this type are not useful because most advocates of a pro-poor agricultural strategy raise important questions that environmentalists usually ignore. These include issues relating to land distribution, indigenous peoples' and farmers' rights, the impacts of globalization on food security, biotechnology and community property rights. Major changes must be made in policies, institutions, and research and development to make sure that agroecological alternatives are adopted by thousands of farmers, made equitably and broadly accessible, and multiplied so that their full benefit for sustainable food security and biodiversity conservation can be realized. The book discusses policies, institutions and market incentives for ecoagriculture, but fails to highlight the tremendous divergence in political thinking about how to go about changing the existing system. Again, the literature cited is biased, as it relies mostly on CGIAR (notably IFPRI), Food and Agricultural Organization of the United Nations, World Bank and World Resources Institute publications, which describe the world food and biodiversity crisis and how to solve it from a very conventional viewpoint. There is a whole body of literature presenting a different scenario, exploring diverse root causes to the crisis, and alternative solutions that challenge the prevailing economic and political order (Lappe *et al.* 1998). In fact, the crisis is so grave, that business as usual or the green revolution will not be effective because such proposals do not confront head-on the root causes of poverty and inequity and therefore are bound to perpetuate these problems.

The book ends with a call for the creation of mechanisms that encourage environmentalists, agriculturists and advocates for the poor to work together to mobilize resources to meet three challenges: leadership for new partnerships, research and investment. Although this is an important step, partnerships must include the main actors: local farmers, indigenous peoples and civil society organizations, including NGOs. Local people must be empowered to become agents of their own development and encouraged to come up with ways to organize themselves so as to articulate a research agenda that is meaningful and representative of their vision. The site-specificity of agroecological work requires an exceptionally large body of knowledge that no single research institution can generate and manage on its own. This is one reason why the inclusion of local communities at all stages of projects (including design, experimentation, technology development, evaluation and dissemination) is a key element in successful rural development. The inventive self-reliance of rural populations is a resource that must be urgently and effectively mobilized, with all other institutions serving a facilitating role in promoting farmer-to-farmer exchanges and other types of local initiatives.

The authors are convinced that mainstreaming an ecoagriculture approach will be possible by drawing together elements of modern agriculture, new ecological insights and the knowledge of local people. There is no discussion in the book that the dominant model of industrial agriculture is totally incompatible with the goals pursued by ecoagriculture. Large-scale monocultures, agroexport-oriented plantations, innovations subjected to corporate IPR regimes,

promotion of transgenic crops, unpredictable ecological effects and cosmetic reductions in insecticide use that leave the rest of the agrochemical package untouched, are all examples of agricultural features that offer little to small farmers, although in some cases they may benefit wild biodiversity. Again, the tension between socially-just development and conservation arises. Few of the 36 cases presented in the book provide guidance on this key issue.

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MIGUEL A. ALTIERI
 University of California, Berkeley
 ESPM-Division of Insect Biology
 201 Wellman-3112
 Berkeley, CA 94720-3112
 USA

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Environment and Statecraft. The Strategy of Environmental Treaty-Making

BY SCOTT BARRETT

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Why did the Montreal Protocol on ozone depletion succeed while the Kyoto Protocol on climate change appears to have failed? The aim of Scott Barrett's book is to develop a general theory of why some international environmental treaties succeed and others fail. Using basic game theory, he examines how international environmental treaties can restructure incentives to promote both participation and compliance. Unlike national environmental policies, which can be enforced by the state, international regimes must be 'self-enforcing' (p. 18). Barrett identifies three characteristics of a self-enforcing treaty ('individually rational', 'collectively rational' and 'fair', pp. xiii–xiv) before considering how different treaty instruments (for example targets, technology standards and trade restrictions) can work in particular circumstances to ensure that self-interested states have sufficient incentives to cooperate.

He develops his general theory of environmental treaty design through fascinating studies of particular treaties, including treaties as diverse as the North Pacific Fur Seal Treaty of 1911 (an exemplary success), the International Convention for the Prevention of Pollution of the Sea by Oil of 1954 (an illustrative failure because of its weak enforcement mechanisms) and the Helsinki Protocol on Reductions of Sulphur Emissions or their Transboundary Fluxes

of 1985 (a failure because it ‘merely codified what most of the parties were planning to do anyway’, p. 10). However, the focal case studies are the Montreal and Kyoto Protocols. Barrett argues that the decision to model the Kyoto Protocol on Montreal was a mistake because ‘it turns out that [the two] problems are very different’ (p. 360). The initial disadvantage for climate change negotiations is that the costs of climate mitigation far exceed the costs of substitution for CFCs while (according to economists’ calculations) the benefits do not. The result is that it is more difficult to restructure incentives to promote cooperation on climate change policy.

Even so, the climate change negotiators might have done better. Barrett argues that ‘Kyoto has not restructured the [climate] game’ because emissions targets without any effective enforcement mechanisms do not alter anyone’s incentives (p. 383). Where Montreal has effective trade restrictions on CFCs, Kyoto has only the indefinitely delayed punishment of a tighter emission limit in the next control period. If we are to make progress, we need a treaty with which states will comply and that changes their cost-benefit calculations in the long-term. Barrett’s suggestion is that international attention should be shifted from targets and timetables to collaborative research and development, and the introduction and gradual tightening of technology standards. In short, we should adopt a long-term, technology-centred approach that changes incentives by reducing the costs of cooperation and increasing the costs of non-cooperation.

Barrett provides a powerful theoretical framework for thinking about why some international environmental treaties succeed and others fail. A game theoretical approach may not be to everyone’s taste but Barrett makes it accessible to non-specialists. His use of intuitive examples (notably, games with red and black cards) as metaphorical

illustrations of some of the basic ideas is helpful, and he makes things easier for political scientists and international relations theorists by restricting both the amount and the complexity of the mathematics. The book is clearly structured and the theoretical framework is systematically developed chapter-by-chapter. Moreover, the theory is constantly interwoven with very detailed discussions of a huge range of case studies. There is even a comprehensive 30-page appendix offering an at-a-glance analysis of almost 300 multilateral environmental agreements that are either in force or could still enter into force.

This is an impressive book that should be of interest not only to those interested in the application of game theory to international relations but also to anyone interested in understanding how international cooperation can be promoted. The general conclusion that negotiators should think more about means (enforcement mechanisms and ways of strategically manipulating incentives over time) rather than ends (the environmental targets) may not appeal to idealistic environmentalists but it is good practical advice in a world dominated by economic thinking. Barrett expresses the hope that his book will be read by ‘present and especially future generations of negotiators’ (p. xvi). I hope it will, because he is undoubtedly right that ‘practitioners need to think deeply about these problems. They are hard, and it is no good to pretend otherwise’ (p. 358).

DEREK BELL
School of Geography, Politics and Sociology
Newcastle University
Newcastle-upon-Tyne
NE1 7RU, UK