

kiwi in New Zealand. Another notable contribution is an extensive review by Blaustein et al. on amphibian declines, which synthesizes a number of recent experimental results on a range of species and suggests future directions for research into interactions among multiple stressors.

The second section concentrates on biological invasions, with the focus turning largely to plants. This part of the book is much shorter, but includes a chapter by Richardson et al. about methods for analyzing historical data from "natural" experiments on tree introductions and a contribution by Hoddle on the use of biological control in managing invasions. For followers of the invasions literature, a number of the ideas and issues touched on here will be familiar. In addition, Corbin et al. review recent experimental studies on management of invasive plants and restoration of native plant communities in California grasslands, and their results will interest managers and researchers working in this system. They found that the outcomes of strategies such as grazing and burning vary substantially in different contexts and manipulations that suppress invasive species often fail to promote recovery of native species when carried out in isolation from additional restoration efforts such as seeding.

The final part of the book focuses explicitly on policy, with three case studies on desert tortoise management in California, approaches to integrating conservation research and management in Australia, and the management of national parks in Africa, respectively. The overview chapter in this section articulates two compelling reasons for connecting policy with the theme of experimental approaches in conservation: (1) management itself is often experimental and (2) one of the most important challenges in conservation is actually translating scientific information and experimental results into management practices. In my view, the contributions succeed more in ad-

ressing the second of these issues than the first. All too often in the conservation literature, we cite ideas such as adaptive management without clearly defining what this means or how to actually implement management as a set of informative experiments. For the most part, the chapters in this section could do more to meet this challenge. Nevertheless, the papers provide some interesting examples of the problems that can arise when trying to integrate science into management, as well as ideas about strategies for overcoming them.

This book tackles such a broad range of topics that inevitably it will leave many readers feeling partly unsatisfied. For example, I thought it unfortunate that the first two sections were so taxonomically segregated, with all the threatened species chapters focused on animals and almost all the invasive species work on plants. In addition, the latter two sections both have only one-third as many chapters as the first. The book succeeds admirably, though, in achieving its stated goals: providing a broad sampling of case studies that serve as models for connecting experimental research in organismic biology to conservation and speaking effectively to the interests of both conservation researchers and practitioners.

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Guerrillas in the Midst

Guerra, Sociedad y Medio Ambiente [War, Society, and the Environment]. Cárdenas, M., and M. Rodríguez, editors. 2004. Foro Nacional Ambiental, Bogotá, Colombia. 545 pp. \$20.00. ISBN 958-8101-17-4. Separate chapters available free online at <http://library.fes.de/pdf-files/bueros/kolumbien/01993/01993inf.htm>.

Resumen de Revisión: Pocos estudios sobre conservación de biodiversidad y recursos naturales en regiones de conflicto interno ofrecen un contexto global e histórico adecuado. El libro *Guerra, Sociedad y Medio Ambiente* coloca la historia socioeconómica colombiana y el conflicto armado al centro de las discusiones sobre el medio ambiente. Los primeros capítulos presentan marcos generales sobre la relación entre los grupos armados y el medio ambiente, y dos capítulos intermedios evalúan el desarrollo de políticas ambientales en medio de la guerra. La segunda mitad del libro está dedicada a las materias primas, petróleo y cultivos ilícitos, y a las carreteras y su papel en la fragmentación de bosques. Según los autores hace falta más democracia participativa y transparencia para que los recursos naturales de Colombia no continúen alimentando el conflicto armado. En el fondo, la destrucción del medio ambiente es el resultado de conflictos de interés entre poderes desiguales. La protección de los recursos naturales dependerá del apoyo, voluntad y respeto de las comunidades locales, pero nada se logra si estas últimas no tienen voz ni voto. Esto hace que la democracia sea indispensable para la conservación en Colombia y en todo el mundo.

Although most conservationists would agree that war or peace matters to their endeavors, few have investigated the subject as central to stemming the loss of biodiversity and ecosystem services. In the meantime, dozens of internal armed conflicts rage from Congo to Indonesia, seldom reaching the international spotlight. We can expect at least some of these wars to integrate into regional and global power struggles, and thus escalate in magnitude and visibility, as the national security agenda in the United States crystallizes into foreign policy and brings the considerable resources of that nation to bear. And yet most biological conservation studies in areas of armed conflict offer minimal historical or global context, and then mostly as an afterthought. *Guerra, Sociedad y Medio Ambiente*, edited by Martha Cárdenas and Manuel Rodríguez, is unique in framing environmental conservation and degradation solidly within Colombia's socioeconomic circumstance and its armed conflict. This book is the result of discussions at the *Foro Nacional Ambiental* (National Environment Forum), an open medium aiming to mainstream environmentalism within Colombian development policies. As such, its 10 chapters embody as many academic disciplines and range from the mostly empirical (e.g., Rodríguez on community reforestation programs) to the mostly conceptual (e.g., Fontaine on the sociology of environmental degradation arising from oil extraction).

The first three chapters (Rangel, Fajardo, and Andrade) provide a general introduction by analyzing the complex interactions between the biophysical environment and the creation and maintenance of armed guerrillas and counterinsurgencies throughout the country. This is where we learn that a single Colombian pipeline has spilled enough oil to fill the Exxon Valdez several times over courtesy of a thousand guerrilla attacks; that the war has forcibly closed dozens of field

stations, making resource management educated guesswork; and that the countryside is increasingly depopulated, but not better off for it because smallholder plots are consolidated at gunpoint into unproductive cattle ranches. Armed groups have become agents and enablers of legal and illegal resource exploitation in the forested frontier, building roads and burning forests as they see fit and probably transforming their vast and remote dominions into megafauna-free forests. Fajardo blames this recent history on the state's commitment to economic liberalization and its unwillingness to strengthen the smallholder economy. An all-encompassing agrarian policy to maximize productivity, social justice, and food security is the proposed remedy. The current state of affairs, a mix of official market fundamentalism and de facto survival of the most heavily armed, is an obvious humanitarian and environmental failure. But Fajardo's vision must give us pause: Who decides where, when, and how to produce? What is the role of individual initiative in this central planner's dream?

For Andrade the answer lies in greater governance and accountability within the current system—accountability because the state seems to attend to external demands more readily than to the needs of communities within, and governance to restore the rule of law to the lawless hinterland. But this model quickly breaks down when confronted with what Andrade rightly calls a globalized environment. Colombia exports most of the legal and illegal commodities carved out of its lush forests. These markets are shaped by policies articulated and enforced globally (e.g., war on drugs, war on terror, and free trade for agricultural and manufactured products). Their tangible consequences are local. This is probably why half the book is devoted to commodities and the roads that take them to the world. Oil and illegal drugs receive two chapters each (Avellaneda and

Fontaine for the former, Ortiz and Vargas for the latter), and Castaño offers what might be the first article to relate fragmentation by roads with culture rather than only with economics.

Avellaneda describes the social and environmental costs of oil exploitation in Colombia in disturbing detail. In general, a multinational corporation in collusion with the state opens virgin land for exploration leading to a rush of colonization that displaces or exterminates local and/or indigenous people and destroys the forest. Over decades of extraction the company amasses inordinate profits, pays local workers a pittance, and lines the pockets of authorities that look the other way when the company dumps waste into the soil and waterways. Devastation and the consolidation of land for cattle ranching follow in their wake. This process has repeated itself for more than 100 years, unraveling the social fabric of countless *campesino* communities, along with the Kofán, Inga, Barí, and U'wa, and ravaging formerly productive fisheries from Amazonia to the Caribbean.

These graphic case studies contrast with the abstraction inherent to theoretical sociology in the following chapter. For Fontaine, conflicts between different stakeholders in oil exploitation in Colombia and Ecuador are both expressions of the power asymmetry that separates the state and corporations from indigenous tribes and campesinos, and examples of clashing interests (economic or not) mediated by cultural identity. As it stands, the chapter succeeds in outlining a structural framework for understanding the conflict over oil, but proceeds no further. The analysis would be more valuable if it identified strategies out of the confusing dynamics of social and environmental conflicts and thus suggested specific action.

This is exactly what Castaño does in his essay on roads, forests, and social conflict. After evaluating the condition of roads in the nation (poor overall), Castaño explains in detail

the project to integrate to the legal economy the marginal areas where armed conflict and illicit crops thrive. The *Vías para la Paz* project, one of the social components of the much criticized *Plan Colombia* is currently, paving roads in Putumayo (on the East Andes/Amazonia interface), southwestern Colombia (linking the West Andes and parts of the south Central Andes to ports on the Pacific), and the Serranía de San Lucas and adjacent lowlands. If these names are familiar it is because these are regions of high priority for the conservation of birds (Álvarez 2002) and the ecosystems that support them. How to curb the destruction of these sensitive forests when fragmentation has always followed road construction? The basic principles to ameliorate conflict between conservation and development, as formulated at a workshop organized in part by the parks system (then headed by Castaño), and the recommendations that follow can be summarized in one word: democracy.

Three points deserve to be highlighted. First, conservation is more than preservation; a strategy for parks is already in place, but a wider management agenda remains to be formulated in consultation with as many (particularly local) stakeholders as possible. Second, the conflict over land tenure is a structural cause of both violence and deforestation. Progressive taxation and the redistribution of lands seized from drug traffickers, in combination with collective tenure for traditional communities, should be the instruments of a new agrarian reform. Third, conflict, not negotiation, has been normalized in daily life. Only more participation and transparency in decision making will reverse this condition.

If government-built roads and legally regulated oil companies have been accessories to so much environmental degradation, what then of illegal drugs? In each of their chapters, Ortiz and Vargas examine the damage caused not so much by illicit crops per se but by the aerial fumigation with glyphosate that the gov-

ernment uses in its hitherto elusive attempt to eradicate them. Neither author believes aerial spraying is environmentally innocuous (Cavelier & Etter 1995), and both marshal quantitative data from all regions of Colombia to show just how appalling a failure fumigation has been. Together, these chapters read as empirical verification of ideas introduced by the authors in an earlier volume (Castañeda et al. 2001). Vargas counters the report of 16% reduction in coca cultivation between 2002 and 2003 (Green 2004) with figures to show that fumigated areas bleed refugees and that the number of *departamentos* where illicit crops are grown has in fact increased. This means that illicit crops and, eventually, aerial spraying, are reaching new virgin lands and probably ecosystems as yet untouched.

Contents of the interviews conducted by Ortiz hint at the obstacles to eradication. Campesinos confess that coca money allowed them to put their children through school. Local authorities wonder why alternative development plans were imposed from above and not concerted with deference to their location, resources, or management capacity. The conclusion is evident: a society where the opportunity cost of basic education is so high that marginalized campesinos can access it only with illegal money is in a kind of trouble that cannot be solved with herbicide. Thus Ortiz exposes the marginalization that drives the growth of illicit crops in the Andes and around the world. In a strange twist, and detracting from otherwise sound arguments, we are informed that illegal drugs are only so because of a failure in semiotics. If only we ascribed a different meaning to these substances, then no harm would come from their production, commerce, or consumption. I doubt this. Although the current strategy seems hopeless, no amount of revisionism can erase the long trail of blood and environmental destruction inherent to the international drug trade.

In a book including as many perspectives as this, a silver lining is in-

evitable. Two chapters (Correa and Rodríguez) are devoted to advances in the implementation of environmental policy. Correa examines *Parques con la Gente* (Parks with the People), a translation into public environmental policy of the democratizing impulse that gave Colombia its 1991 constitution and the necessary framework for protecting and managing the fourth of the country (>45 million hectares) that officially encompasses national parks and other protected areas, both public and private, and the territories devolved to indigenous and black communities. The main goal is to strengthen the national protected area system by fostering the participation of society in planning and managing for conservation from the bottom up. As with every other aspect of public policy in Colombia, war is a constant risk that the policy acknowledges and internalizes. The construction of viable dialog in the midst of conflict could go a long way toward resolving the real grievances underlying the struggle for land. The policy is too new to evaluate on the ground, but among its chief weaknesses are the imminent clash with omnipotent national security mandates and the lack of independent financing.

Can democracy really bring about the conservation and sustainable development of natural resources, even biodiversity? The results of the *Plan Verde* (Green Plan) community reforestation project, as presented and analyzed by Rodríguez, suggest it can. The project used money from the World Bank and the Inter-American Development Bank to reforest water catchments in depressed campesino communities through regional conservation authorities (*Corporaciones Autónomas Regionales* [CARs]). Each CAR prioritized areas to be reforested and then channeled 80% of the resources to plant and maintain forests over 3 years to the local community, which contributed labor. About 87,000 ha out of the 100,000 stated as a goal were reforested. The project planted more than 200 species, 80% native to Colombia,

in more than 2000 catchments. Intangible benefits included the development or strengthening of community agroforestry and the sense of commitment from campesinos, probably enhanced by increased property values at the project sites.

Rodríguez acknowledges the limits of this approach in conserving biodiversity and devotes some thoughts as to how similar strategies could apply to other ecosystems or to natural regeneration. Because it provided rural employment and involved local authorities, most armed groups acquiesced in the projects. There are, of course, projects that could not be completed because of the territorial disputes between armed groups, and Rodríguez wonders if the CAR might not have excluded some areas from consideration for security reasons. It is also possible that armed groups extorted Plan Verde money from the community. If so, this would probably go unreported. That impoverished campesinos were willing to change the long-term use of part of their land, from field to forest, in exchange for what were doubtlessly modest incentives should be heartening to conservationists. The fact that they did so almost in the crossfire is nothing short of heroic. What Colombia's armed conflict makes starkly clear is that a bloody conflict of interest between unequal powers is at the core of much environmental destruction. Only the commitment of empowered locals protects the land in the long run. This, more than any other reason, makes democracy critical to conservation in Colombia and everywhere else.

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Farmers and the Forest: Can Agroforestry Actually Conserve Biodiversity?

Agroforestry and Biodiversity Conservation in Tropical Landscapes. Schroth, G., G. A. B. da Fonseca, C. A. Harvey, C. Gascon, H. L. Vasconcelos, and A-M. N. Izac, editors. 2004. Island Press, Washington, D.C. 576 pp. \$45.00 (paperback). ISBN 1-55963-357-3.

Agroforestry and Biodiversity Conservation in Tropical Landscapes aims to evaluate the common claim that agroforestry serves to promote biodiversity conservation in tropical mosaic landscapes. It is written for students and practitioners of agriculture, forestry, and related disciplines. The editors and authors range widely in disciplinary expertise, including tropical agriculture, conservation biology, resource economics, and forestry. They hold positions in universities, nongovernmental organizations, and research institutes.

The central goal of the book is to explore three hypotheses regarding the role of agroforestry in biodiversity conservation: (1) agroforestry helps reduce pressure to deforest additional land, (2) agroforestry provides habitat and resources for some native plant and animal species, and

(3) the conservation value of the forest fragments is greater if they are embedded in a landscape dominated by agroforestry rather than in a surrounding matrix of intensive agriculture and pasture.

Agroforestry and Biodiversity Conservation in Tropical Landscapes is arranged in five parts and considers each of these hypotheses in a multidisciplinary context. Part I introduces major concepts of tropical conservation biology and landscape ecology and notes the potential and limits of agroforestry to ameliorate the impacts of threats such as habitat fragmentation and deforestation. Part II, on socioeconomic aspects, includes chapters on economic valuation methods, a critique of the ability of agroforestry to reduce deforestation, a case study of cacao production, and an introduction to conservation concessions. Part III focuses on landscape-level biodiversity conservation in a range of agroforestry practices, including shifting agriculture and structurally complex agroforests such as rustic coffee plantations, living fences, and isolated trees in pastures.

Parts IV and V are somewhat eclectic groups of chapters. Part IV, entitled "Biodiversity as Burden and Natural Capital," addresses a range of issues, including local perspectives toward protected areas, hunting, invasive species, and disease dynamics in agroforestry systems. Part V describes examples intended to complement the biological and economic evidence presented in the previous sections of the book. Chapters range from an uncritical description of a conservation project in the Brazilian Atlantic Forest to a thoughtful review of the silvopastoral and conservation benefits of *Acacia pennatula* in Nicaragua. The final chapter revisits the book's three original hypotheses in light of the evidence presented within, concluding that whether each hypothesis holds true is highly context specific. In this chapter and throughout the book the authors note knowledge gaps and