

DEFORESTATION AND THE  
ENVIRONMENTAL CRISIS  
IN LATIN AMERICA

*John O. Browder*

*Virginia Polytechnic Institute and State University*

*TROPICAL DEFORESTATION: SMALL FARMERS AND LAND CLEARING IN THE ECUADORIAN AMAZON.* By Thomas K. Rudel, with Bruce Horowitz. (New York: Colombia University Press, 1993. Pp. 234. \$50.00 cloth, \$24.00 paper.)

*"I AM DESTROYING THE LAND!": THE POLITICAL ECOLOGY OF POVERTY AND ENVIRONMENTAL DESTRUCTION IN HONDURAS.* By Susan C. Stonich. (Boulder, Colo.: Westview, 1993. Pp. 189. \$45.00 paper.)

*ENVIRONMENT UNDER FIRE: IMPERIALISM AND THE ECOLOGICAL CRISIS IN CENTRAL AMERICA.* By Daniel Faber. (New York: Monthly Review Press, 1992. Pp. 301. \$36.00 cloth, \$16.00 paper.)

*COLONIZATION AND ENVIRONMENT: LAND SETTLEMENT PROJECTS IN CENTRAL AMERICA.* By Jeffrey R. Jones. (Tokyo: United Nations University Press, 1990. Pp. 155.)

*CHANGING TROPICAL FORESTS: HISTORICAL PERSPECTIVES ON TODAY'S CHALLENGES IN CENTRAL AND SOUTH AMERICA.* Edited by Harold K. Steen and Richard P. Tucker. (Durham, N.C.: Forest History Society, 1992. Pp. 300. \$29.95 cloth, \$16.95 paper.)

*DEVELOPMENT OR DESTRUCTION: THE CONVERSION OF TROPICAL FOREST TO PASTURE IN LATIN AMERICA.* Edited by Theodore E. Downing, Susanna B. Hecht, Henry A. Pearson, and Carmen García-Downing. (Boulder, Colo.: Westview, 1992. Pp. 405. \$60.50 paper.)

The first half of the last decade of the second millennium has probably produced more books on deforestation and the environmental crisis in Latin America than any other five-year period. Latin America figures prominently in the global destruction of the earth's rain forests. Sixteen continental countries of Latin America together contain 57 percent of the world's tropical forests. Tropical deforestation in these countries accounted for 58 percent of the total global reduction in tropical forest area during the 1980s (Brazil alone was responsible for 19 percent).

This review essay will focus on selected English-language books published since 1990 that address the causes of deforestation from var-

ious conceptual perspectives. I have steered away from the veritable outpouring of new popular books, especially on Amazonia (e.g., Cowell 1990; Dwyer 1990; Le Breton 1993; Margolis 1992; Reiss 1992, to name only a few). A separate and growing body of conference proceedings and edited volumes on alternative strategies for the development, management, and conservation of tropical forests also warrants a separate review (e.g., Anderson 1990; Browder 1989; Gómez-Pompa, Whitmore, and Hadley 1991; Redford and Padoch 1992). Similarly, a burgeoning array of Spanish- and Portuguese-language books written by Latin American researchers deserves a critical reading. The books selected for review here all deal with Central America and Amazonia and were written or edited by social scientists to be read by similar audiences. Yet they utilize various methodological approaches and offer diverse explanations of the deforestation process. None of these books were written to serve as classroom texts, but all of them could be used in upper-division undergraduate courses and graduate seminars. My review will be prefaced by an abbreviated synopsis of three major conceptual frameworks that have influenced the direction of research into environmental degradation over the last twenty to thirty years.

#### *Leading Conceptual Frameworks for Analyzing Environmental Degradation*

Efforts to explain the process of environmental degradation have derived largely from three basic perspectives: neo-Malthusianism, neo-classical economics, and political ecology. Neo-Malthusians situate the causes of the environmental crisis in the quantitative imbalance between human population growth rates and rates of renewal in the stock of organic matter necessary for human survival. Neo-Malthusians argue that population growth is the main cause of poverty, which also underlies environmental degradation (Ehrlich 1968; Ehrlich and Ehrlich 1970, 1990). As political theory, the neo-Malthusian perspective is compelling in its sheer simplicity, calling for policies of biological restraint. Unfortunately, however, this approach raises the expectation that merely a marginal adjustment—a statistical decrease in population growth rates—can somehow reverse the course of environmental destruction, and it thus reduces a complex social process to a rather mechanistic form of biological determinism. Because the neo-Malthusian framework requires no substantive consideration of social relations, concentrations of power and wealth may go unscrutinized. For example, Georg Borgstrom concluded twenty years back, “It is neither capitalism, as Marx believed, nor communism, as many Westerners maintain, that fosters poverty and misery. It is the tragic imbalance between population and resources” (Borgstrom 1974, 14; as cited in De Janvry 1981, 142). Given Latin America’s comparatively low rates of population growth and densities (except in some Central Ameri-

can and Caribbean countries), neo-Malthusian perspectives have not enjoyed much preeminence among Latin Americanist researchers.

Neoclassical economics has provided another important conceptual framework for explaining environmental degradation. Underlying this overall approach is the notion of general equilibrium: in a perfectly competitive economy, markets acting on the collective instincts of rational individuals (who are self-interested and utility-maximizing) determine the "efficient" or "optimal" allocation of resources under certain restrictive conditions. Environmental degradation follows from distortions in the market function when these conditions are not satisfied. These market distortions (meaning market failures) often induce governments to intervene in the marketplace, leading to further distortions (policy failures) that lead rational individuals to degrade the resource base (see Binswanger 1991; Browder 1988; Centeno 1991; Mahar 1989).

Finally, several not entirely unified conceptual perspectives situate environmental degradation within the process of capital accumulation. These approaches are agglomerated for purposes of this discussion under the heading of "political ecology" and "political economy." According to this perspective, the state, in its dynamic alliance with multinational capital and domestic elites, pursues development policies that both directly despoil the environment and immiserate rural peoples, especially indigenous groups and women. At the local level, impoverished farmers, driven onto fragile lands, also degrade the environment to survive. This overarching perspective draws on formulations from neo-Marxist political economy, world-systems, and dependency theories as well as on human ecology to assemble a causal construct that links global accumulation, agricultural modernization, marginalization of the peasantry, and environmental degradation (see Blaikie 1985; Blaikie and Brookfield 1987; Redclift 1984). Political economy may well be the most popular of general frameworks among academics currently writing on Latin America, although it is not without critics (Cleary 1993).

### *The Recent Literature*

Ecuador's closed forests, found mainly in the Amazon Basin, cover 14.2 million hectares. Since the early 1960s, these tropical forest lands have been penetrated by petroleum companies, government-funded roads, and waves of spontaneous migrants from the highlands. Tiny Ecuador boasts an extraordinary degree of endemic biodiversity: more than twenty thousand different plant species (over half of them endemic), compared with seventeen thousand in all of the United States and Canada. Such biodiversity has made Ecuador's high annual rate of deforestation (2.4 percent) particularly alarming to conservationists (its rate is second only to Paraguay's in tropical South America). Yet few books have been pub-

lished thus far on deforestation in Ecuador. *Tropical Deforestation: Small Farmers and Land Clearing in the Ecuadorian Amazon*, written by sociologist Thomas Rudel with attorney Bruce Horowitz, is therefore a welcome addition to a literature dominated by deforestation studies of Brazilian Amazonia.

Rudel and Horowitz present a theory of smallholder deforestation based on “growth coalitions” and “lead institutions” that challenges both neo-Malthusian and “proletarianization” or “immiseration” (political ecology or economy) perspectives. In reality, migrants to the Oriente region are not primarily impoverished Andean peasants but farmers with resources. Their migration to the frontier is more likely to be part of an investment rather than a survival strategy, and their actions in opening the forest are rarely undertaken alone.

Rudel and Horowitz draw some of their inspiration regarding the role of growth coalitions from an unlikely source: analyses of the political economy of urbanization by Harvey Molotch (1976) and by John Logan and Molotch (1987). In this adaptation to the agrarian frontier, according to Rudel and Horowitz, colonists typically rely on “wealthy relatives, urban investors, or government colonization agencies” (p. 25). These growth coalitions collectivize the risks of pioneering and help mobilize resources that individual colonists frequently lack, especially in the absence of lead institutions like oil companies, mineral and logging companies, and regional development agencies. Where lead institutions open up a frontier zone and thus create open access for “free riders,” growth coalitions may be less important.

The empirical analysis presented in *Tropical Deforestation* uses qualitative narrative life histories as well as quantitative survey-based regression analysis. Rudel and Horowitz’s research focuses on the contemporary settlement area of the Upano-Palora plain in the province of Morona Santiago. The evidence presented is largely anecdotal (a third of the bibliographic references in one chapter cite “anonymous interviews”), but it makes a plausible case insofar as the growth coalition–lead institution model seeks to explain only the mechanics of the settlement process rather than its underlying causes. For example, Rudel and Horowitz recount how during the initial “trailblazing” period of the 1960s, a group of colonists working collaboratively (a “growth coalition”), aided by the Ecuadorian national colonization agency, the Centro de Reconversión Económica de Azuay, Canar y Morona Santiago, or CREA (a “lead institution”), succeeded in establishing a beachhead settlement on uncleared (but not unclaimed) forest land on the east bank of the Upano River. Once on the other side, the colonists supported themselves by clearing the forest for a large *hacendado* (another lead institution) while consolidating their original settlement, which they named Sinai.

Rudel and Horowitz also examine differential rates of deforestation

tion and land use by two socioethnic groups (colonists and the acculturated indigenous Shuar) by means of a multiple regression analysis. This quantitative analysis shows how colonists had the advantage of greater access to credit, larger cattle herds, and consequently higher rates of forest destruction (they cleared twice as much forest area as the Shuar). Subsequent new roads encouraged the Shuar to shift toward raising cash crops—coffee and narangilla (*Solanum quitoense*). Rudel and Horowitz believe that these activities are more sustainable and culturally compatible with the Shuar's traditional interest in home gardens than the destructive cattle production prevailing among the colonists. Because the Shuar's adaptation to the new road was labor-intensive, their impact on deforestation was less severe than that of the cattle-oriented colonists. Rudel and Horowitz therefore argue that "ethnicity explains more variation in deforestation than does the use of credit" (p. 118), although this conclusion is not clearly supported by their own analysis (p. 119). This part of the quantitative analysis actually digresses somewhat from the authors' conceptual model. While Rudel and Horowitz assert that colonists and Shuar alike formed coalitions, the degree to which their coalition strategies differed and explained deforestation in the study area is left unclear. Rudel and Horowitz admit the shortcomings of their analysis: "The small size of our sample of individual landowners makes our conclusions about individual factors that encourage the clearing of forest remnants somewhat tentative" (p. 131).

Rudel and Horowitz have nevertheless produced a readable academic book on deforestation based on a narrow slice of life in Ecuador's Oriente. *Tropical Deforestation* makes two important contributions. First, it points to the social chemistry of the frontier and the importance of keeping local social groups at the forefront of the design and analysis of environmental change research. Second, Rudel and Horowitz remind readers that the frontier has a dynamic all its own, separate from the machinations of the global economy: "The recent experience of these colonization groups contradicts the claim that tropical deforestation is an inexorable process. At best it occurs in fits and starts" (p. 156). While this reminder of the importance of locality and variation is meritorious, a bigger picture undeniably exists. Larger forces are driving both migrants and lead institutions into the frontier. Unfortunately, Rudel and Horowitz do not elaborate on the broader social, economic, and political forces stimulating colonization in the Ecuadorian Oriente or how the micro-level patterns they identified are linked to the macro-level context. As a result, their theory provides only a partial explanation of the process of deforestation in the Ecuadorian Oriente.

A decidedly different approach to understanding environmental degradation is adopted by anthropologist Susan Stonich in "*I Am Destroying the Land!*": *The Political Ecology of Poverty and Environmental Destruc-*

*tion in Honduras*. Like Rudel and Horowitz, Stonich rejects a neo-Malthusian explanation of environmental degradation. But unlike them, she chooses a political ecology framework and locates the causes of poverty and the environmental crisis at the state level (due to misguided national development policies) and at the global level of international donor and lending agencies. Stonich explains at the outset, "The ecological crisis in Central America cannot be understood in isolation from the structural processes that are determining the way natural resources are used" (p. 13). Hence arises her conclusion, "The agricultural export-led growth strategy led to the concentration of land and other forms of wealth in the hands of a small minority and to the progressive impoverishment of much of the rural population" (p. 170). Stonich's account seeks to link social, economic, and ecological changes in San Esteban and Oroquina, two small Honduran highland communities in the department of Choluteca, to capitalist transformation of agriculture in the coastal lowlands after World War II. She integrates qualitative and quantitative methods of analysis to create a hierarchical "systemic" framework that starts with macro-level forces and works downward to more localized units of analysis (households, in this instance).

The years following World War II were a turning point in the history of global economic incorporation of southern lowland Honduras. International funds promoted development of transport infrastructure. New access to global markets and rising commodity prices spawned economic booms in cotton and cattle. Citing a formidable array of secondary sources, Stonich's discussion of this process is compelling. Peasant evictions and land consolidation accompanied by growing poverty and reduced nutritional security among the rural population became the hallmarks of the region's transformation into modern export agriculture. More recent promotion of nontraditional export crops accelerated these changes.

The core of Stonich's analysis is presented in the chapters entitled "Local Responses to Agrarian Transformation" and "Strategies for Survival." In "Local Responses," she describes land use and cropping pattern changes between 1952 and 1974, as determined from secondary sources at the regional (*municipio*) level. The data indicate large increases in pasture formation and cattle production, increasing concentration of farmland, decreasing production of food crops, and increasing population densities, changes predicted by political ecology theory. Stonich then examines changes in population dependency ratios and nutritional adequacy by comparing data from her own field surveys for San Esteban and Oroquina (carried out in 1983) with nationwide secondary source data (obtained in 1974 and 1988). Differences in forms of land tenure and access to land between the two communities in 1982–1983 are also examined, although no longitudinal changes are noted.

Based on Stonich's comparisons, readers would conclude that the southern highlands are worse off demographically and nutritionally than the rest of Honduras, a conclusion supported by Jeffrey Jones's book (to be reviewed here subsequently). But patterns of access to land and of economic activity (especially animal husbandry) differ between her study sites and are not altogether consistent with those observed at the regional level, a point Stonich acknowledges (p. 107). In other words, important local variances exist within the overall patterns depicted that go largely unexplained. Even more distressing is the lack of evidence linking deteriorating social and environmental conditions in the highlands to the regional development strategy of export production in the lowlands. For example, while Stonich substantiates dramatic population increases in both highland study sites between 1971 and 1988 (p. 99), she does not report what proportion of the recent settlers she interviewed there in 1989 and 1990 were displaced peasants from specific lowland communities that had undergone agricultural transformation to capitalism.

These shortcomings in causal argument, however, do not detract from other important parts of *"I Am Destroying the Land!"* Stonich excels in the chapter on household survival strategies, which offers a robust yet exquisite analysis. Weaving together life histories into her survey data on 163 households in the two communities, Stonich vividly illustrates the innovative and adaptive survival strategies that rural households adopt to cope with changing conditions of poverty. The rural population of southern Honduras is by no means a homogeneous socioeconomic class, and Stonich skillfully conveys the patterns of social differentiation occurring in the region. The basic conclusion of this elegant ethnography is that small marginal farmers have been forced by worsening economic conditions to diversify their survival strategies while intensifying their use of resources, especially household members and agricultural land.

Although Stonich's study does not entirely succeed in validating a political-ecological interpretation of environmental degradation in Central America, it makes a meritorious effort and illustrates many of the methodological challenges likely to be encountered in meeting the rigorous demands of such analysis. This book will be useful in graduate courses on social research methodology as well as in the curriculum on international development.

A political-economic perspective also provides the conceptual inspiration for *Environment under Fire: Imperialism and the Ecological Crisis in Central America* by Daniel Faber. He sets forth his goal in the introduction: "I hope to explain, in a theoretically sophisticated and empirically detailed fashion, the roots of Central America's current social and ecological crisis—a crisis grounded in decades of U.S.-promoted development policies that have favored production for export over production for local needs, the intensive exploitation of natural resources for profit over the

sustainable use of these assets, and the interests of wealthy landowners and U.S.-based multinational corporations and banks over the interests of the popular classes that make up the majority of Central Americans" (p. 7). This volume culminates eight years of research, organizing, and writing on issues of U.S. foreign policy and the social and ecological crisis in Central America, and some readers may find its activist tone refreshing.

*Environment under Fire* is clearly a polemical book with a single mission: to dramatize the international political dimensions of the environmental crisis in Central America and its connections with rural poverty and the dominant export-oriented agricultural development model. The book is directed to a popular English-speaking North American audience yet pretends to academic legitimacy with its extensive references to scholarly sources. The study is nonetheless based entirely on secondary sources. Faber's strident conviction, while compelling, will not convince critical readers of the validity of the political-economic explanation he seeks to advance.

In contrast, in *Colonization and Environment: Land Settlement Projects in Central America*, Jeffrey Jones rebukes straightforwardly the simplifying tendency to blame multinational capital and U.S. geopolitics: "[T]here has been a tendency to characterize deforestation as a struggle between multi-national fast-food chains and conservationists [in which] [p]oor farmers are seen to be merely camouflage in a process dominated by wealthy, large-scale landowners tied to international markets" (p. 3). Jones's central argument is that the driving force behind deforestation and the widespread expansion of the livestock (cattle) sector is the need to establish long-term land tenure, not the pursuit of short-term profits.

*Colonization and Environment* is based on a study entitled "Resource Use of Frontiers and Pioneer Settlements." It was commissioned in the mid-1980s by the United Nations University in Tokyo to evaluate which combination of economic, political, and cultural factors bearing on frontier settlement are likely to result in successful colonization projects. Jones examines colonization, planned as well as spontaneous, in Costa Rica, Honduras, Nicaragua, Panama, and Guatemala. Although each country presents distinctive biophysical and social conditions, all have undertaken planned colonization projects with disappointing results that are roughly similar.

The more intriguing findings emerging from *Colonization and Environment* suggest that most official colonization projects in Central America have become breeding grounds for land speculation, which Jones views as serving a useful social purpose in promoting household mobility. But the central problems of sustainability and environmental conservation remain. Jones is optimistic on this matter as well, citing the adaptability of highland or Pacific coastal colonists in the interior tropical lowlands: "Farmers of Central America's lowland frontiers are endlessly



creative in their testing of new crops and production strategies, and surprisingly undaunted by failure. . . . The image of the 'traditional' Latin American farmer unwilling to innovate bears little resemblance to the reality of lowland settlement in Central America" (p. 130). Jones calls for strategies that promote markets for "ecologically appropriate crops" (those harvested from the forest or grown in sustainable agroforest "consorcias") and advocates establishing a tropical timber exporters' organization. This book is a refreshing challenge to those who view deforestation from one of the three dominant perspectives outlined here, although Jones seems to draw selectively on neoclassical economic ideas.

*Colonization and Environment* represents a prodigious effort but is not without problems. First, the body of the book reads like a technical report, a catalogue of colonization case studies rather than a critical analysis aimed at understanding the dynamics of success and failure or questioning the necessity of colonization in the first place. Jones restricts his major interpretative commentary to the introductory and concluding sections. This organizational separation gives rise to a few pesty contradictions that might have been avoided had Jones seeded each chapter more carefully with appropriate interpretation. For example, Jones observes, "The major conclusion to be drawn from the experiences of Central American colonization activities is that they have been highly successful, especially in terms of country objectives" (p. 120). Yet he is also critical: "Unfortunately, directed settlements in Central America have not been notably successful in either providing especially favourable economic conditions or in avoiding environmental problems" (p. 126). These inconsistencies in Jones's comments obscure his own theoretical position, which he claims is informed by ideas drawn from Esther Boserup.

Part of Jones's conceptual ambiguity may be traced to the use of undefined analytical categories, such as "traditional farmers" and "genuine colonists." The elaboration of a typology of colonists (whether speculators or farmers) might have sharpened the analysis of who has really benefited from these economically and environmentally costly colonization experiences.

Central to Jones's analysis is the role played by administrative politics in creating the conditions that encourage deforestation. In one case study after another, Jones describes how overlapping jurisdictions or conflicting missions of government agencies partially responsible for colonization ended up fostering deforestation by small farmers. Herein lie some potentially powerful ideas, perhaps even an "administrative politics" approach to environmental degradation. Regrettably, Jones does not introduce such an approach, even though his empirical synthesis conceivably would support one.

*Colonization and Environment* is nevertheless commendable as a systematic and timely comparative review of selected government coloni-

zation projects, a succinct condensation of extensive secondary source materials that other researchers can build on in pursuing more detailed case studies. The volume is solidly organized into consistent topical sections within each country chapter, a structure that will facilitate comparisons.

The twenty-three papers edited by Harold Steen and Richard Tucker for *Changing Tropical Forests: Historical Perspectives on Today's Challenges in Central and South America* were originally presented in a conference held in San José, Costa Rica, cosponsored by the Forest History Society and the Union of Forestry Research Organization. The papers are a mélange of historical studies organized around geographic regions that include Mexico, Central America, and Amazonia. The volume begins with keynote papers by Costa Rican scientist Gerardo Budowski and the late U.S. historian Warren Dean. As might be expected, the papers range widely in subject matter (from microfossils to the global forest industry), in time frame (pre-Columbian to present-day), and in geographic scale (from local to global).

Dean's keynote paper serves as the thematic lightning rod for the volume in challenging the alleged liberal attitudes underlying social science conceptualizations of environmental change as too deterministic. Dean's argument asserts, "Conceiving of the environmental dimension of the human condition as a side-effect of other, supposedly more decisive activities, such as the class struggle, capital accumulation, the spread of imperialism, the triumph of science and technology, or the subjection of women, is to trivialize a historical reality of immensely greater, enduring consequence" (pp. 12–13). According to Dean, human interaction with the environment should be the central subject of human history, unencumbered by social theory of any persuasion. Most of the papers written by historians in this collection implicitly reflect Dean's deconstructionist sentiment. As a result, fervent advocates of political ecology or neo-Malthusian perspectives will find little comfort in this volume as a whole.

Yet *Changing Tropical Forests* lacks neither substance nor controversy. Indigenous history and forest conservation form a theme prominent in six contributions. A healthy tension among perspectives emerges. For example, in "Exploitation of Natural Resources in Colonial Central America: Indian and Spanish Approaches," historian Murdo MacLeod criticizes cultural determinists who often describe Europe's invasion of a "pristine" Mesoamerica from a normative position, imposing blame on Europeans for subsequent social and environmental problems. "[M]any parts of Mesoamerica, notably the Mayan area before the European invasions, experienced their own Malthusian cycles, with recurrent eras of soil exhaustion, overpopulation, systemic crises and other consequent abuses of the natural environment" (p. 31). In contrast, Leslie Sponsel's essay on the environmental history of Amazonia and Rhena Hoffmann's

“La importancia ecológica y económica de las tecnologías tradicionales” both argue that unlike indigenous impacts, forest disturbances by modern growth-oriented societies have rapidly and radically altered the forest ecosystem beyond the forest’s capacity to cope. Anthropologist William Balée argues in his contribution that indigenous impacts on the environment actually increased biological and ecological diversity.

Historical patterns of deforestation cannot easily be pigeonholed into currently prevalent social theories if historians are doing their job with any ingenuity. We have relied mainly on environmental historians to remind everyone that the ecological crisis in Latin America has a much longer history. Considerable deforestation—enough to lead to resource depletion and periodic social collapse—occurred before the conquest (per MacLeod’s essay), during the colonial period (per Larissa Brown’s essay on urban growth and deforestation in late-colonial Rio), during the period following independence (per Herman Konrad’s contribution on the Mexican Porfiriato), and in the twentieth century prior to World War II (per Richard Tucker’s study of forest depletion in Central America before 1941).

*Changing Tropical Forests* is a topical kaleidoscope that studiously avoids converging on a single conceptual framework. Steen and Tucker have pulled together a fascinating collection of papers, most of them short and well-written, to illustrate the immense range of interests among environmental historians and other scholars from allied fields who have allegedly freed themselves from conventional theory. Dean’s provocative thesis that the relationship between humans and the environment should become the core subject of the study of history is a proposition that will likely gnaw on the minds of historians for years to come.

As several books reviewed here indicate, pastures are rapidly becoming the most prevalent use of land in the Latin American agricultural landscape. The conversion of tropical forest to pasture occurs on large corporate ranches and small resource-poor farms as well. Pasture establishes land tenure and generates income. Yet despite its prevalence, the forces driving the growth of Latin America’s livestock sector remain enigmatic. *Development or Destruction: The Conversion of Tropical Forest to Pasture in Latin America* contains twenty-four edited papers presented at the first technical workshop on the conversion of tropical forest to pasture in Latin America, which was sponsored by the U.S. Man in the Biosphere Program and held in October 1988 in Oaxaca, Mexico. One would expect to find some answers to the livestock enigma in just such a book.

But on opening the cover, readers will discover immediately that the contents are not as clearly focused on pasture and cattle as the title implies. Only six of the twenty-four essays deal significantly with the livestock sector. Other topics covered range from sustainable forest extraction and debt-for-nature swaps, to the timber industry, rubber tap-

ping, and the environmental impacts of deforestation in general. The lack of thematic focus, a reliance on obsolete data in many contributions, and the exorbitant price (\$60.50) are the book's major shortcomings. While much of the data consulted in *Development or Destruction* is already outdated, several essays make interesting contributions, especially those in the section entitled "Production Alternatives." It contains contributions on sustaining pasture-based production systems by Adilson Serrão and José Toledo, on a silvo-pastoral strategy proposed by Charles Venator, Jürgen Glaeser, and Reynaldo Soto, and on integrated production systems as analyzed by Javier Trujillo-Arriaga.

Is any consensus emerging among those researching the region's livestock sector about its growth? In "Logics of Livestock and Deforestation," Susanna Hecht dismisses the "Malthusian specter" of population growth. She also criticizes the neoclassical perspective emphasizing "policy failure" because it "views development processes as largely mechanistic, and under-emphasizes the fact that regional development processes which are incorporated into livestock development take on a life of their own and interact with a number of dynamics within the local and macro-economy. The irony of course is that deforestation rates have increased as subsidies to the sector have declined" (pp. 19–20). Hecht further challenges technological optimists who argue that destructive pasture management is largely the outcome of poor existing technologies. Production is only one of the logics shaping the region's livestock economy, in her view, and "technological solutions are likely to have little impact on deforestation patterns, a pattern borne out by the low levels of adoption of improved technologies" (p. 22). Finally, Hecht distances herself from explanations of deforestation that focus on international causes. Reiterating the central theme of the book she coauthored with Alexander Cockburn, *Fate of the Forest* (1989), Hecht argues, "It is important to understand that the Amazon is not a first world colony, and that the destiny of the region will be shaped through local and national politics to a greater degree than international pressure" (p. 23). Rather, Hecht adopts the popular notion that local social movements employing methods of peaceful resistance to those who would destroy the forest are the answer to deforestation.

Hecht's perspective is not shared by all of the volume's contributors, however. David Barkin's "Rural Development Effects" follows more closely the political-economic critique. In his opinion, "The massive conversion of forest lands to livestock grazing is part of a broader transformation of agriculture from the production of basic food crops towards commercial crops for export or animal feed" (p. 235). Hecht's and Barkin's differing views may reflect fundamental differences in the dominant patterns of the areas they have chosen to study (Brazil for Hecht and Mexico for Barkin). Carlos Sere and Lovell Jarvis's "Livestock Economy

and Forest Destruction" strikes out in yet another direction. They are optimistic about improved agricultural technologies (with cattle-raising as one element), which could lead to stabilized land systems that cause less ecological damage. Thus *Development or Destruction* reflects the considerable divergence of opinion characterizing the debate over the livestock sector in Latin America, which parallels the larger discourse on deforestation.

### *Final Reflections*

Social scientists writing on development issues in Latin America have traditionally adopted either neoclassical economic or political-economic templates for their analyses. The current body of literature on the environmental crisis, however, exhibits a healthy interest in alternative explanations. These innovations share two basic characteristics. First, they tend to emphasize local variations over global patterns. Deforestation is not driven by a single monolithic global force (such as U.S. imperialism or international capitalism). It is instead a process shaped and manifested in a multitude of unpredictable ways by the interplay of diverse local cultures, institutions, and histories in different places. Second, many innovative researchers are turning more to qualitative ethnographic methods of inquiry (like those employed by Rudel and Horowitz and by Stonich) to deepen their understanding of subtle issues that elude conventional survey methods.

Three methodological aspects of social science research on environmental change have proved to be particularly troublesome and are reflected in some of these books. First, studying the process of change takes time and requires repeated observations. Time-series methods are essential, whether ethnographic or quantitative in nature. But researchers have limited field-research opportunities and often go out to collect data at one point knowing that to follow change over time, they must rely on historical information or secondary source data often collected at a different time and on a different scale. This common predicament threatens the validity of research findings and highlights the importance of long-term research designs (covering ten to twenty years) with standardized units of analysis and frequent observations. The National Science Foundation and other donors supporting basic social research on environmental change must find ways to provide longer-term support to researchers of worthy projects who are willing to devote the major part of their professional careers to accompanying the changes in their study site or sites over time.

Second, the obvious trade-off in pursuing a long-term approach to social research is that the character of the units of analysis often changes. It can change even in the short term. For instance, if one tries to apply Rudel and Horowitz's approach, a rural workers' union in the Brazilian

Amazon may function as a “growth coalition” most of the time in distributing seedlings to promote reforestation among its membership. But during election years, it becomes a local branch unit of a national political party (a “lead institution”) that distributes chain saws to get votes. “Peasants,” “small farmers,” “cattle ranchers,” and “speculators” are all vague analytical concepts. We need to be much more careful about how we define our units of analysis, social as well as biophysical, and how we evaluate their changing character over time.

Finally, a tenacious problem for political ecologists is how to develop their analyses at the mid-range level (made up of the state and national and regional actors). This is an obscure domain often closed to outside researchers, the realm that eludes generalizations made on the basis of observations at the micro (local) or macro (global) levels. For example, a question might arise as to how researchers know that a specific policy immiserated the rural population and enriched the urban elites, promoted soil erosion but placated the International Monetary Fund. This kind of question cannot be answered by examining the world from exclusively local or global perspectives. Although it is gratifying and socially fashionable for researchers to survey the accessible victims of development—farmers at the grass roots—the real questions looming ahead, especially for political ecologists, can best be answered by research strategies that get to the key players at the meso-level—bankers, heads of corporations, and government officials.

Most of the books reviewed here go some distance in advancing social science research on the environmental crisis in Latin America. They also demonstrate that researchers publishing in English are willing to innovate, albeit imperfectly, beyond the tired old paradigms of the past.

## REFERENCES

- ANDERSON, ANTHONY B., ED.  
1990 *Alternatives to Deforestation: Steps toward Sustainable Use of the Amazon Rain Forest*. New York: Columbia University Press.
- BINSWANGER, HANS P.  
1991 “Brazilian Policies That Encourage Deforestation in the Amazon.” *World Development* 19, no. 7:821–29.
- BLAIKIE, PIERS  
1985 *The Political Economy of Soil Erosion in Developing Countries*. London: Longman.
- BLAIKIE, PIERS, AND HAROLD BROOKFIELD  
1987 *Land Degradation and Society*. London: Methuen.
- BORGSTROM, GEORG  
1974 *The Food and People Dilemma*. North Scituate, Mass.: Duxbury.
- BROWDER, JOHN O.  
1988 “Public Policy and Deforestation in the Brazilian Amazon.” In *Public Policy and the Misuse of Forest Resources*, edited by Malcolm Gillis and Robert Repetto, 247–98. Cambridge: Cambridge University Press.
- BROWDER, JOHN O., ED.  
1989 *Fragile Lands of Latin America: Strategies for Sustainable Development*. Boulder, Colo.: Westview.

- CENTENO, JULIO CESAR**  
 1991 *The Latin American Forest Crisis*. World Wildlife Fund Discussion Paper. Washington, D.C.: World Wildlife Fund.
- CLEARY, DAVID**  
 1993 "After the Frontier: Problems with Political Economy in the Modern Brazilian Amazon." *Journal of Latin American Studies* 25, pt. 2 (May):331–49.
- COWELL, ADRIAN**  
 1990 *The Decade of Destruction: The Crusade to Save the Amazon Rainforest*. New York: Henry Holt.
- DE JANVRY, ALAIN**  
 1981 *The Agrarian Question and Reformism in Latin America*. Baltimore, Md.: Johns Hopkins University Press.
- DWYER, AUGUSTA**  
 1990 *Into the Amazon: The Struggle for the Rainforest*. San Francisco, Calif.: Sierra Club.
- ERHLICH, PAUL R.**  
 1968 *The Population Bomb*. New York: Simon and Schuster.
- ERHLICH, PAUL R., AND ANN H. ERHLICH**  
 1970 *Population, Resources, Environment: Issues in Human Ecology*. San Francisco: W. H. Freeman.  
 1990 *The Population Explosion*. New York: Simon and Schuster.
- GOMEZ-POMPA, A., T. C. WHITMORE, AND M. HADLEY**  
 1991 *Rain Forest Regeneration and Management*. Man and the Biosphere Series no. 6. Paris: UNESCO and Parthenon.
- LE BRETON, BINKA**  
 1993 *Voices for the Amazon*. West Hartford, Conn.: Kumarian.
- LOGAN, JOHN R., AND HARVEY MOLOTCH**  
 1987 *Urban Fortunes: The Political Economy of Place*. Berkeley and Los Angeles: University of California Press.
- MAHAR, DENNIS J.**  
 1989 *Government Policies and Deforestation in Brazil's Amazon Region*. Washington, D.C.: World Bank, World Wildlife Fund, and the Conservation Foundation.
- MARGOLIS, MAC**  
 1992 *The Last New World: The Conquest of the Amazon Frontier*. New York and London: W. W. Norton.
- MOLOTCH, HARVEY**  
 1976 "The City as a Growth Machine: Toward a Political Economy of Place." *American Journal of Sociology* 82, no. 2:309–32.
- REDCLIFT, MICHAEL**  
 1984 *Development and Environmental Crisis*. New York: Methuen.
- REDFORD, KENT H., AND CHRISTINE PADOCH**  
 1992 *Conservation of Neotropical Forests: Working from Traditional Resource Use*. New York: Columbia University Press.
- REISS, BOB**  
 1992 *The Road to Extrema*. New York: Summit.