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Irrigation and River Basin Management: Options for Governance and Institutions

Author: Green, Colin

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Books

Desastres de Origen Natural en Colombia 1979–2004

Edited by M. Hermelin. Medellín, Colombia: Sello Editorial EAFIT, 2005. 247 pp. US$27, includes airmail postage. ISBN 958-8173-89-2.

The 1985 eruption of the Colombian volcano Nevado del Ruíz was a wake-up call for the need to understand and communicate the risk of natural disasters in Colombia and other mountainous countries. The eruption and subsequent lahar caused more than 20,000 lives to be lost. The geographical and historical contexts, socioeconomic and environmental effects, and painful lessons about the importance of disaster preparedness and effective crisis management are discussed in one of 18 chapters of this informative volume, which chronicles and examines disasters caused by natural events in the 25 years from 1979 to 2004 in Colombia.

The (Spanish) language of the book is appropriate for lay readers and decision-makers, while the level of detail will be welcomed by geologists, disaster-managers, and advanced students. The volume makes a particularly important contribution to the sparse Spanish-language scientific literature on natural disasters in Andean countries and was written for the Colombian public and others curious about Colombia's natural disasters—with the admonition (p 51) that a society that does not know the history of its risks and disasters is condemned to suffer more each time. Colombia's high volcanic mountains, steep slopes, coasts, and dynamic rivers have caused a rich assortment of disasters of natural origin—earthquakes, volcanic eruptions, landslides, floods, tsunamis, and coastal erosion. Yet neither the events nor the insights gained from them are unique to Colombia, and a book of this quality thus merits global attention and distribution.

The volume presents papers written by scholars from the Observatorio Sísmico del Suroccidente (Seismic Observatory of the Southwest), the Universidad del Valle (Cali), and the Environmental Geology Group of the Department of Seismic Engineering of the EAFIT University. Between Hermelin's introduction and epilogue, almost all chapters focus on one event or group of events. Chapters are remarkably even in quality and length and follow a basic template that includes a description of the geographic location; an overview of geological and historical contexts; important geological, social, and managerial details; and an assessment of socioeconomic and environmental impacts. Each chapter begins with abstracts in Spanish and English and ends with a bibliography. Some authors include sections giving information about causes and characteristics of a type of event, and others provide additional detail about event management or event analysis. Each chapter is illustrated with at least one map and one photograph.

Most chapters successfully integrate physical and social aspects of a disaster. For example, Chapter 3, by A. Sarria, presents and analyzes the 1983 disaster caused by the magnitude 5.5 earthquake in the World Heritage city of Popayán, which left 283 dead and hundreds of others injured and affected. Damage was exacerbated by the adobe and clay roof construction of homes and other buildings, and by the age of the housing in the city. Termites had weakened the wood supporting old buildings, and perforations through many old walls to add plumbing and electricity had reduced structural strength. The tragic outcome of these conditions in Popayán could recur in many other Latin American cities with similar construction and histories. The chapter includes maps of fault patterns at regional and local scales around the city and summarizes the geological analysis. Post-event geological research completed the first detailed seismic micro-zonation study in Colombia, but further instrumentation and monitoring will be needed to validate models developed in the study.

Chapter 5, in which C. Garcia presents the 1987 landslide into a neighborhood of Medellín, describes the combined factors of mountainous terrain, weak rocks, heavy precipitation, and human vulnerability that led to around 500 deaths. The affected neighborhood had grown, not through city planning, but due to an influx of poor people who had migrated from rural areas; the failed mass was lubricated by water from a canal built with no technical control. Unfortunately, but predictably, some persons displaced by the landslide relocated in similarly unstable sites. In his epilogue, Hermelin reviews the relationship of risk to vulnerability and focuses attention on the problems of population growth and the growth of cities in spite of their physical constraints, problems important, but not unique, to Colombia.

The book has 20 authors, authorities from various backgrounds, but is remarkably coherent and consistent. Certain themes are reinforced in multiple chapters. The reader is reminded that naturally caused disasters frequently involve more than one process: eruptions generate lahars; earthquakes trigger landslides; and rain induces mass-movements as well as flooding. These relationships must be anticipated for effective disaster mitigation. Another recurring theme is the importance of recognizing the geological and geomorphic history of locations in disaster planning. Recent disastrous events had historic precursors: Nevado del Ruíz erupted in 1845; the 1979 tsunami on Colombia's Pacific coast

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was the second such event in the twentieth century; and the city of Popayán had to be rebuilt after a major earthquake in 1736.

Written assessments of natural disasters are extremely valuable for the vicarious experience they provide, the realities they impart, and the lessons they can teach about disaster management and mitigation from the perspective of intelligent hindsight. The most powerful recurring theme of this volume is the importance of conveying the science of disaster-producing natural events and the implications of the science to citizens and their leaders. The book takes a very successful step toward that goal and is a welcome addition to the literature of natural disasters.

Carol Harden
Department of Geography, University of Tennessee, Knoxville, TN 37996-0925, USA.
charden@utk.edu

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Irrigation and River Basin Management: Options for Governance and Institutions

Edited by M. Svendsen. Wallingford, United Kingdom: CABI, 2005. xii + 258 pp. US$100, £55. ISBN 978-0-85199-672-1.

The International Water Management Institute (IWMI) is one of the great intellectual powerhouses of thought about water management. This book is an edited volume very largely written by researchers associated with IWMI, and hence is representative of the state of the art of thought about Integrated Water Management (IWM). However, it has the contradictions of an edited volume which is largely derived from papers—in this case, papers discussing management in individual river basins, presented at a workshop on IWM in 2000. The first of these contradictions is that the logic behind the choice of the basins is not entirely obvious; for example, there is no contribution on Australia or Spain. Both are arid countries. The evolution of the Council of Australian Governments (COAG) water reform process in Australia makes it perhaps the most interesting country for IWM in the world, and Spain has produced some of the historically most important examples of institutional evolution.

The case studies in the book are from France, Mexico, South Africa, Turkey, Vietnam, and the USA. One chapter is on the Imperial Valley in California, which is perhaps better seen as a failure rather than as a success: a triumph of subsidy over sustainability. The second contradiction in the volume is that there is a dominant "house" view which is not debated or argued. There is, for example, an implicit expectation that markets and prices are the best means of coordinating action. In the more recent literature, the different functions of pricing in terms of cost recovery, resource allocation, and in changing behavior have been differentiated, and a rather limited role for prices for the latter two purposes has been identified (Cornish et al 2004; Molle and Berkoff 2007). Equally, there is an absence of any sense of history. We have been managing water for millennia; there should be some lessons to learn from the past.

What we see from this book is that Integrated Water Management is currently still a vision rather than a blueprint. Asit Biswas (2004) travels the world asking to be shown a paradigmatic example of IWM, and claims that no one has ever offered an example of even a partial success. The important questions all remain to be answered: Can we do it at all? What do we mean by success if we can do it? And, what is the best means to deliver it? A conceptual weakness here is that whilst "Governance" is part of the book's subtitle, only a very limited definition of the term is provided in the opening chapter and it is then largely abandoned as a concept. The discussion of institutions is also mainly in terms of what institutional theory would label as organizations rather than as institutions: what North (1990) defined as the "players of the game," whereas institutions are the "rules of the game." Thus, the book fails to go into any detail on some of the more crucial and difficult issues of institutional design (IHDP 1998). The result is a discussion of work in progress rather than a recipe book of how to do it. Hence, the greatest interest may lie in what these case studies tell us about common problems.

One universal problem that emerges is the management of the groundwater resource. Here, rules have not caught up with technology. Until cheap kinetic energy was available, the physical limitations on the amount of water that could be extracted meant that groundwater could be left as an open-access resource. The subsequent development of cheap kinetic energy resulted almost universally in overexploitation of groundwater. For the same reasons, groundwater has typically been left out of the analysis; the whole logic of catchment management is instead based upon runoff. Yet, the global groundwater resource is estimated to be around 70 times the global annual precipitation. Somewhat similarly, precipitation is seen as an open-access resource as well: each landowner has a free right to either capture that precipitation or to dispose of the runoff. Yet rivers are other people's runoff, and so the chapter on the Oliphants basin in South Africa reports that commercial forestry is regarded as a streamflow reduction activity and, hence, subject to the provisions of the National Water Act.

Overall, this is a book which is well worth reading even though it

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does not provide any general answers. The general answer at present may be that it is extremely difficult to deliver IWM and that, since there is no paradigmatic model of IWM to follow, perhaps the only way we can learn is from case studies. In this sense, failure may have as much to teach us as success.

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Colin Green
Flood Hazard Research Centre, Middlesex University, Queensway, Enfield EN3 4SA, United Kingdom.
C.Green@mdx.ac.uk

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Micronutrients in South and South East Asia

Edited by Peter Andersen, Junoo K. Tuladhar, Krishna B. Karki, and Surya L. Maskey. Kathmandu, Nepal: ICIMOD, 2005. xxii + 239 pp. Free download at http://books.icimod.org. Hardcopy: US$20 (developed countries), US$15 (developing countries), US$10 (ICIMOD member countries). ISBN 92-9115-210-2.

This publication is the outcome of an international workshop held in September 2004 in Kathmandu. The 3 excellent keynote presentations made by Professors R.S. Gibson, R.M. Welch, and K.B. Karki et al form the highlights of the volume. They are complemented by 23 research and review papers by invited scientists, largely from South Asia, addressing a wide range of micronutrient constraints related to sustainable crop production and human nutrition, as well as means and methods to alleviate these problems. I am particularly delighted to note that this publication advocates a paradigm shift in the field of micronutrient research from management for crop production to unfolding the role of micronutrients in human nutrition. Considering the emerging complicity of suboptimal micronutrient contents in raw and processed food items, discussions on the role of micronutrients in human nutrition are very refreshing and timely. I sincerely congratulate the organizers, editors, and scientists for their meaningful and useful contributions.

Gibson clearly shows that the potential impact of iron and zinc deficiencies on human health is far more severe than that of protein malnutrition, which is commonly believed to be more harmful. While changes in cooking and modifications in local diets could help to significantly improve food micronutrient value, dietary interventions such as supplementation, food fortification and bioenrichment remain necessary to alleviate deficiencies in diverse socioeconomic groups.

The paper by Welch depicts a dramatic decline in micronutrient intake over the years in the diets of the average population in developing nations in general, and in South Asia in particular. This state of affairs is a matter of serious concern. Welch's in-depth analysis vividly demonstrates that the productivity of pulses has been continuously declining due to widespread suboptimal availability of boron, zinc, and molybdenum in soils. These deficiencies, in turn, seriously impair the intake of iron and zinc by people living on rice-and-pulse-based diets. Welch recommends addressing these problems by adding micronutrients from external sources, selecting and breeding micronutrient-efficient cultivars, using genetically modified plants, and diversifying cropping systems. His suggestion of integrating conventional breeding with biotechnology to develop micronutrient-efficient cultivars is of topical relevance and of great practical utility for marginalized small-scale farmers, and thus for the majority of farmers in South and South East Asia.

Karki and his colleagues present a well-structured inventory of micronutrients across the ecological regions of Nepal. They specifically emphasize the need to include boron and molybdenum in the fertilizer schedule, especially for vegetables and in areas supporting high-intensity cropping. According to the findings, Nepalese soils generally have sufficient manganese and iron contents. However, soil categorization in the study is based exclusively on soil test data and is therefore often misleading—particularly with respect to iron. In order to strengthen soil-test-plant response correlation, it is necessary to include in the regression equations the role of key soil properties that influence iron availability from soils. Alternatively, the need for iron treatment may be corroborated by the active iron content of the plants. It is not clear why boron and molybdenum are included in the list of DTPA extractable micronutrients (Table 3; p 26). In Table 4 (p 26), the critical limit of boron is given as 2 ppm in soils—a value that appears unusually high if hot water was used as an extractant. Although the extractant is not mentioned in the study, boron availability across a wide range of soils and crop growing environments is normally assessed by hot water extraction.

The 3 papers from Session 1 focus on various human diseases and disorders related to trace element deficiencies. The authors

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present some promising results of zinc supplementation preventing childhood pneumonia and diarrhea, which are the 2 most common causes of death among children in developing countries. Results regarding the promotion of orange-flesh sweet potato in eastern India to combat vitamin A deficiency are highly useful from a practical standpoint. Another case study on selenium supplementation for goats shows that this leads to increased fertility rates, shorter birth intervals and reduced kid mortality. These findings, too, are of great socioeconomic value, given that the livelihoods of many non-farm holders depend on the survival and productivity of small ruminants such as goats.

The 3 papers from Session 2 deal with the delineation of micronutrient status in the cultivated soils of Nepal and Haryana, India. Findings show that the worst deficiency in these soils is that of zinc, followed by boron. The authors recommend taking immediate steps to alleviate these deficiencies. This is indispensable for the sustainable development of agriculture, and important with a view to minimizing adverse health effects on rural communities and their livestock support systems which primarily depend on agricultural produce for their dietary needs. I would recommend generating more crop response data to validate the delineation of micronutrient deficiencies based upon soil test values alone.

The 8 papers from Session 3 cover various facets of the scientific, socioeconomic and political aspects of soil nutrient management. The paper by P. Andersen provides a new orientation for agricultural extension systems, advocating an appropriate blending of scientific and farmers' indigenous knowledge for the effective transfer of technologies. This section is informative and rather comprehensive, containing many experiential and experimental findings. However, some typological mistakes have crept into the text: eg, Mega-gram (Mg) is written as mg (pp 79–85).

The 6 papers from the last session address issues related to micronutrient management vis-à-vis crop productivity and produce quality. There are some very promising results on micronutrient treatment to alleviate deficiencies. Supplementation through seed enrichment by soaking in a micronutrient solution seems to be an economically favorable option for resource-poor farmers. However, in order to make seed-soaking a general recommendation, further verification under diverse crop growing environments is needed.

On the whole, all papers are of topical relevance and practical utility. The invited papers by authorities in their own fields, who present results from across the globe, constitute the heart and soul of the publication. The contributions from Nepal are unique in the sense that these provide information on the status of micronutrient research in a country where research until recently was in its infancy. Findings on micronutrients in soils and crops from India, Pakistan and Bangladesh could usefully be extrapolated for tackling micronutrient problems in Nepal. The incorporation of "South East" in the title of the book is somewhat intriguing, as the papers pertain principally to South Asia. Overall, these proceedings are a very useful compilation with nearly flawless editing. The subject matter and simple language are the book's innate strengths. I recommend it not only to agricultural scientists engaged in micronutrient research, but also to teachers, social scientists, farmers and other stakeholders.

Jagdish Chand Katyal
Vice Chancellor, CCS Haryana Agricultural University, Hisar 125004, Haryana, India.
jc_katyal@rediffmail.com

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Earth Repair: A Transatlantic History of Environmental Restoration

By Marcus Hall. Charlottesville, VA: University of Virginia Press, 2005. xvi + 310 pp. US$35. ISBN 0-8139-2341-7.

A look into major journal databases quickly reveals that restoration ecology and rehabilitation studies are emerging research fields. They are largely based on a synthesis of ecological theory and environmental management procedures. Restoration ecology is commonly understood as "the study of how to repair anthropogenic damage to the integrity of ecological systems" (Cairns and Heckman 1996). But what do scientists, engineers, or politicians mean when using the terms "repair," "degraded" or "natural"? How much "restoration" is needed on land that has been heavily sculptured by humans over decades to centuries? Is landscape restoration as debatable as the restoration of an ancient piece of art restored using techniques that were not available when it was created? These are only few examples of a fundamental historical and philosophical debate that should be an essential component of a modern discourse on restoration ecology. This is the starting point of Marcus Hall's fascinating book, which can be considered a timely contribution to this debate. In *Earth Repair* he takes the reader on a journey through a fantastic collection of historic restoration literature by North American and European environmentalists, scientists, civil engineers, and politicians. Hall's writing is fresh, vivid, subtle, and sharp. It profits from the fact that he—like many of the characters in his book—is a traveler between the new and the old worlds.

The book starts with readings, excerpts, and a thorough analysis of George Perkins Marsh's exten-

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sive descriptions (eg Marsh 1864) of how Europe's formerly forested wild nature had degraded due to overgrazing and badly adapted land techniques. The descriptions highlight the different (historical?) attitudes of Americans and Europeans towards land cultivation. Hall writes: "Marsh saw degradation, but his European hosts saw degeneration—the spontaneous, entropic decay of gardened land. When Italians drained malarial wetlands, when the French seeded shifting sand dunes or when the Swiss reforested avalanche-prone mountainsides, they saw themselves improving the land by combating natural forces through human means. But Marsh saw them repairing a once-pristine, once-wild land that humans had long ago degraded. Marsh's American background with its growing reverence for wild places helped to provide him with a new perspective on the root cause of environmental damage" (p 30).

Two consecutive chapters deal with land restoration in the Italian Piedmont's southern province of Cuneo and Utah's Wasatch Mountains. Hall gives a detailed analysis of the environmental problems in these areas after 1850, and elaborates on the various "improvements" conducted by Italian engineers to stabilize the slopes in Cuneo. The latter had been cleared of forests and overgrazed, leading to massive flooding, for instance in the Stura Valley. From 1869, the Cuneese began reforesting, and in the 1880s the streambeds were reinforced with rock and masonry check dams. The main aim of restoration measures in this period was, however not to "renature" the area but to "regarden" it and bring back human order and life to the land (the population was 3 to 10 times greater in 1860 than in 1980). Again, it was the writings of Marsh and other environmentalists that influenced the passage of Italy's forest law of 1877.

The restoration of Cuneo's Alps is an example of how people came to agree with Marsh that the land was being degraded by human abuse and not by nature itself. However, after 1950, shifts in economies caused the region to depopulate, releasing larger parts to "rewilding." Due to the long history of land cultivation and place attachment of Italians and Europeans in general, there was an ambiguous attitude towards this newly created wilderness. The latter, however, "would become a North American specialty" (p 58), as exemplified in the chapter on "rewilding" Utah's Wasatch Mountains where a 10,000-year-old history of Native American land use with periodic human use of fire was altered when the first Mormon agriculturists developed early irrigation techniques and started to heavily graze the land. Soon, overgrazing degraded the land and led to frequent flooding. Numerous attempts followed (and many of them failed) to revegetate the land with native seeds and restore the historic floristic and faunistic conditions. This and other experiences were the main drivers of the Wildlife Restoration Act passed by the US Congress in 1937.

A major promoter of this "rewilding" paradigm was—among others—Aldo Leopold. He is the main character in the very well written chapter on "Ecology and Memory." Here, Hall proves his gift as a writer, elaborating on the 2 extremes of restoration: the gardening versus the wilding. In the chapter on "Cross-cultural restoration," Hall evaluates these views by proposing a restoration model that is driven by the individualistic human preference for an ideal landscape on a continuous gradient from garden to untouched and wasteland. With this model, he succeeds in reconciling the 3 major views of restoration: maintenance gardening; reparative gardening; and reparative naturalizing.

Hall's well-written comparative analysis of Old World and New World restoration concepts is a must for environmental scientists and restoration ecologists who are frequently confronted with defending the goals of their restoration projects to politicians and the public. It reminds us that restoration is much more than a value-free improvement of the functioning of a degraded system. Restoration is a cultural and democratic act, embedded in a specific historical and cultural context and driven by individualistic preferences of the population.

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Felix Kienast
Swiss Federal Research Institute WSL, 8903 Birmensdorf, Switzerland.
felix.kienast@wsl.ch

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Land Use Changes in Tropical Watersheds: Evidence, Causes and Remedies

Edited by I. Coxhead and G.E. Shively. Wallingford, United Kingdom: CABI, 2005. xi + 191 pp. £49.50, US$90. ISBN 0-85199-912-3.

The highlands of the tropics are changing rapidly. Since 1900, a huge expansion in temperate vegetable production has occurred, driven partly by international demands of large supermarket chains and partly by the increasing availability of refrigerators in the rapidly-growing tropical cities and changes in shopping habits and diet among the expanding tropical middle classes. From Peru to Kenya and the Philippines, tropical highland slopes have been cleared to provide new areas for beans, lettuces, and

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similar crops. Often, these clearances lead to severe erosion. They always lead to great changes in family organization and agricultural practices. In many areas—especially areas with road access—traditional shifting cultivation has been abandoned, and fields are cultivated continuously, instead of being left fallow for periods of 3 to 8 years.

The drivers behind these processes of change are economic, the most important being access to new markets and new opportunities to earn cash incomes. The uplands are becoming more tightly linked to the remainder of the country, and government policies for lowland agriculture have repercussions in the uplands. This book explores the impacts of these factors through an analysis that focuses on the Manapuli watershed in northern Mindanao in the Philippines and examines biophysical evidence of degradation in the watershed, economic and institutional factors, and potential remedies. The research was conducted in a participatory manner together with the local community from 1992 to 2004. The authors point out that a host of community-based watershed management programs have been carried out in South East Asia since 1980, funded by a variety of aid agencies and not always learning lessons from each other. The book contains some important lessons that ought to be picked up by others working to improve the management of tropical uplands.

The authors recognize the need for interdisciplinary approaches, particularly those that combine economics, soil science, hydrology, sociology and anthropology. Perhaps they should have considered the idea of Integrated River Basin Management more fully. Alternatively they might consider the "human ecology of watersheds" as an appropriate term. However, there is also a need to examine the political ecology of these upland management systems, closely analyzing the overlapping roles of the institutions involved.

The local context of upland environmental change in the Manapuli watershed was large-scale deforestation by loggers extracting timber, followed by agricultural activity. Between 1974 and 1994, primary forest cover was reduced from half to less than one-third of the local land area, being replaced by maize-based farming systems. Migrants, including some from northern Luzon, acquired land from indigenous people, and ownership claims were made through officially invalid means such as land tax declarations. After 1994, forest clearance slowed, but agricultural intensification continued to be driven by opportunities in domestic and international markets. Water quality monitoring showed that sediment losses from gentler, but intensively-used lower slopes were often higher than from steep slopes. Although sediment concentrations were measured during high flows, the monitoring procedures did not enable accurate calculations to derive mean annual sediment yields that could be compared with those found elsewhere in South East Asia. However, the participatory community water quality data collection was successful and provided a good opportunity to help the community understand the environmental impact of agricultural practices. Some good modeling work, although based on the USDA WEPP model rather than the approach developed by Calvin Rose and his team for South East Asia (eg Ciesolka et al 1995), reinforced the high rate of soil loss in the lower parts of the watershed where agriculture is most intense.

In terms of reducing soil loss, the authors recommend growing of trees and crops in an intercropping system: "As long as economic incentives exist for the cultivation of high value vegetable and maize crops in tropical highlands, the promotion of intercropping between trees and annual crops and the development of better land management practices under perennial/annual crop cropping systems will be essential to enhance the long-term sustainability of such farming systems in the Philippines and elsewhere." Simulation of the impacts of changes in land management showed that restrictions on vegetable growing would reduce farm incomes by about 15% over 10 years, but would reduce downstream sediment loads by up to 37%. Soil conservation methods would be more effective but would require a government subsidy of about 390 pesos/ha/year. Payment for environmental services was also examined as a possible solution. However, there are problems of designing such a system around poor, small-scale farmers.

Overall, the book takes a predominantly economic approach, using general models of farmer behavior. It does not look in detail at how individual farmers behave. In neighboring Sabah, for example, attitudes to the land and its management often vary greatly among farmers in the same valley, depending as much on individual family circumstances as on the size of their land holding. As in so much work on watersheds and agriculture, the development of an integrated approach where all the necessary disciplinary backgrounds are represented at an approximately equal level has proved difficult. This book contains a good example of how to work within a community to examine the environmental consequences of upland agriculture and to look at the financial and policy instruments that might be employed to alleviate the problem. However, it does not really bring out how the farmers themselves actually think about these problems, and it fails to discover how they make their individual decisions.

Perhaps all expatriate researchers engaging with South East Asian rural resource problems are hidebound by their national educational and institutional back-

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grounds and experience of working methods. More and more we need South East Asian or ASEAN institutions to bring the expertise together and to really share experiences in a major way. This book is another step in improving our understanding and ought to be read by anyone interested in tropical upland watershed management.

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Ian Douglas
School of Environment and Development, University of Manchester, PO Box 88, Manchester, M60 1QD, United Kingdom.
iandouglas66@yahoo.com

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The Changing Village Environment in Southeast Asia: Applied Anthropology and Environmental Reclamation in the Northern Philippines

By Ben J. Wallace. London, United Kingdom: Routledge, 2006. xi + 130 pp. US$120. ISBN 0-415-36484-1.

For several decades, South East Asian countries have experienced project interventions that seek to support local livelihoods as a means to reduce deforestation. The Philippines are no exception. Since the fall of Ferdinand Marcos in 1986, and even before then, the state, NGOs, and private-sector companies have designed programs and projects seeking to curb swidden cultivation. The most effective way forward was for "agroforestry" projects to introduce permanent tree crops, among other species of economic and ecological value. The underlying assumption was that, as farmers plant and harvest tree crops and acquire new sources of income, semi-permanent production would stabilize or replace swiddens (shifting cultivation) and curb deforestation. Achieving the dual objective of forest conservation and poverty reduction further depended upon local acceptance and support of project objectives, which, in turn, led to collective action and sustainable outcomes. This agenda effectively became part of the new populist discourse of integrated conservation and development, and, more recently, community-based conservation.

However, local adoption of agroforestry programs for livelihood support and afforestation is no easy feat. Most literature documents very few successful cases over the long term. *The Changing Village Environment in Southeast Asia* represents one successful case of an agroforestry project carried out through networks of trust and reciprocity. These successful outcomes included local control and ownership of agroforestry initiatives in support of livelihoods and forest conservation.

Unfortunately, the book represents an oversimplified account of the author's own claims (as director) of the *Ugat ng Buhay* (Good Roots) project's success in redressing a pending environmental crisis in the Luzon province of *Ilocos Norte*. While the book offers insightful ethnographic detail on the ways of life and livelihoods of Ilocano and "traditional Yapayao," we hear more "perspective" on what made the Good Roots project so successful in using afforestation for livelihood support, than how local and regional realities influenced factors driving deforestation in the case study areas.

Chapter 1 begins with a poignant reminder of how the conditions of poverty can produce the devastating consequences of deforestation in upland areas and how projects like Good Roots can overcome the causes and consequences of deforestation. We learn why the 4 communities (3 Ilocano and 1 Yapayao) were chosen for study and how interdisciplinary research is more likely to achieve multiple, "functionally interrelated" objectives with sustainable outcomes (p 3). The project supposedly stands out from others because it is a local initiative financed by the multinational petroleum company, Caltex Inc (The Philippines). Chapters 2 and 3 offer the reader valuable ethnographic detail on the social life and modes of production of each of the Ilocano and Yapayao communities in the study area. Chapters 4 and 5 shift in emphasis, turning to accounts of how species composition and consumption levels vary according to livelihood activities and the types of forest, ie to the cultural exploitation of forests according to the volume available and consumed by 4 activities (swidden, charcoal-making, fuelwood use, and minor construction). Chapter 6 then sketches out the basis of the project's sustained success including, for example, tapping both formal and informal leaders, and using species relevant to local culture and physiography. The concluding chapter recounts local thoughts on the project's overall success and where else it could be implemented.

The study's substance lies in its detailed ethnographic account of the ways of life and modes of production of each social group, as well as assessments of the distribution and harvesting of tree species in primary and secondary forests. We learn how much (in number of trees and cubic meters) is lost due to swidden cultivation, charcoal production, illegal logging, and minor construction activities, and, more broadly, annual levels of forest loss. The methods used to glean these data will inform future afforestation efforts according to the relative impact of forest-based livelihoods.

Structurally, apart from the impressive ethnographic and empir-

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ical data, the chapters have little coherence and flow, with concepts and themes not directly supporting one another as the book unfolds. Wallace fails to draw directly on the ethnographic detail in chapters 2 and 3 to define how, when and why the 4 livelihood practices unfold within and between each of the 4 communities. Conceptually, the basis of what constitutes sustainable human–environment relations follows functionalist interpretations of nature and culture. The fact that introductory chapters suggest rather explicitly that it is in a farmer's "nature" to replace "unstable" swiddens with "stable" agroforestry systems, leads one to question whether the poor will ever find "balance with nature." Given Wallace's interpretation of nature and culture as being in equilibrium, it is hardly surprising that discussions of how politics affects environmental change are largely absent. How, for example, might past and present political and economic changes, be they local or regional, affect local interpretations of "sustainable" forest use?

For these reasons, the accounts of the cultural exploitation of forest environments in Chapter 5 could have paid greater attention to how the social and economic dimensions of forest access and use relate to the cultures within and between each of the social groups. By examining intra-household relations and the integrated nature of livelihood activities, for example, we would have learned more about the relative importance of each type of livelihood. Failure to examine in detail the internal and external political economic dynamics of each group leaves the reader feeling as if the 4 communities were relatively homogenous and overly eager to participate in the project. How might within-group differentiation affect investments in livelihood strategies and levels of project participation?

More troubling is the constant reference to project success in the introductory and concluding chapters. While it is very clear that the project was implemented in a collaborative manner with trust and an "*esprit de corps*," we know nothing of the author/director's own experiences of and influence on the project—there is little to no reflexive account. We also know nothing of whether the corporation, Caltex–Chevron Texaco, had any stake in the area beforehand. Further detail on the company's history in the area would have made the author's case of private sector benevolence more convincing.

This book will prove useful to students attempting to differentiate and redress the relative impacts of livelihood activities on upland forests in the Philippines. We learn that the success of community-based conservation is contingent upon long-term consultation building local rapport and trust, and that once local users find direct value in such interventions, they themselves may carry it forward. Unfortunately, essentialist interpretations of culture and collective action, broad assumptions of swidden cultivation, and clichéd accounts of human–environment relations overshadow the strengths of the book.

Wolfram Dressler
School of Social Sciences, University of Queensland, St Lucia Queensland 4072, Australia.
w.dressler@uq.edu.au

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