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Polar and Alpine Tundra. Ecosystems of the World 3

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UNEP-WCMC Web Site: Mountains and Mountain Forests

The World Conservation Monitoring Centre has recently launched a revamped web site to reflect its new status as part of the UN Environment Programme (UNEP). The UNEP-WCMC site (http://www.unep-wcmc.org) includes many useful pages on the conservation status of the world's species and ecosystems. Among these is an extensive set of pages dealing with forest ecosystems and issues, which presents several new data sets, including the newly derived Global Maps of Mountains and Mountain Forests (http://www.unep-wcmc.org/habitats/mountains).

The mountains map, which was developed with support from the Swiss Agency for Development and Cooperation (SDC) to support the mountain agenda at the CSD, is the first global map at 1 km to use consistent objective definitions of mountain classes based on altitude, slope, and local relief. It clearly portrays both the large mountains of the world that are usually mapped and the smaller and older mountains that are difficult to identify using objective criteria. At the same time, it avoids the inclusion of midelevation plateaus. The mountains map has been used to identify the world's mountain forests from UNEP-WCMC's global forest cover data set.

Both maps are presented on the web site in regional subsets with statistics on both mountain and mountain forest areas. The important role of mountain forests is discussed. Anticipated developments include an analysis of gaps in the global protection of mountain forests.

A related section (http://www.unep-wcmc.org/forest/cloudforest/english/homepage.htm) presents the Tropical Montane Cloud Forest Initiative, a joint effort including UNEP-WCMC, IUCN, WWF, and the UNESCO International Hydrological Programme. The Initiative seeks to make connections and share knowledge among researchers and resource managers working in these important forests. The web site includes a rolling timeline of recent developments in cloud forest research and conservation, maps of cloud forests on a regional basis, and minutes of meetings of the initiative's steering group.

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Books

Polar and Alpine Tundra. Ecosystems of the World 3

Edited by F. E. Wielgolaski. Elsevier, Amsterdam and New York, 1997. x + 920 pp. $497.00. ISBN 0-444-88265-0.

This is a remarkable work in many ways, bringing together global experts to produce a state-of-the-art volume on the world's tundra ecosystems. It considers the majority of the world's regions that are without trees because of high altitude and/or latitude. In his introduction, Wielgolaski discusses the various classification schemes but does not arrive at a more consistent definition. Following this introduction, he presents a very short chapter on adaptation in plants, which is followed by a somewhat longer introduction to the adaptations of insects and other terrestrial arthropods to the alpine environment, by Sømme. The following 11 chapters, totaling 318 pages, consider a significant proportion of the world's high-mountain ecosystems and are followed by a further 7 chapters (414 pages) that present high-latitude ecosystems, some of which are partly or mainly mountainous.

The regions covered in the 11 chapters are Fennoscandia, Iceland, the Alps, the Carpathians, the Central Himalaya, the high mountains of the former USSR, and tropical and southern Africa, the alpine zones of North America and New Zealand, and the South American *páramo*. The editor states in his preface that it was not easy to find authors for some alpine areas, principally because of the lack of research in them. Nevertheless, it is unfortunate that some areas where some considerable research has been conducted are not included—notably Australia, the Iberian peninsula (Pyrenees), Japan, Malaysia (Kinabalu), and Papua New Guinea—and the chapter on the Andes focuses on the Venezuelan *páramos,* and particularly their fauna, largely neglecting research done in other parts of Latin America. A similar comment can be made for the chapter on the Himalaya, which addresses only vegetation in the central part of the chain.

Within the 11 chapters on alpine ecosystems, there is considerable variation in the presentation; in some chapters, the general physical context—topography, geology, soils, climate—is presented, while in others, the authors go straight to detailed descriptions of vegetation and fauna. These inconsistencies may result, to some extent, from lack of information or long-term records, but this is not always the case and presumably derives from the lack of a consistent brief to the authors from the editor and/or the research interests of the authors. Similarly, inconsistencies can be seen in the chapters on high-latitude ecosystems, of which one, on the arctic ecosystems of North America (by Bliss), could be a book in its own right.

With regard to the interests of many of the readers of this journal, it is also notable that the role of human beings in influencing the

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ecology of these ecosystems is only briefly mentioned in some chapters in spite of the extensive use of many alpine ecosystems by people and their grazing animals.

The editor is to be commended on the significant effort involved in coordinating the production of this monumental work, which has excellent systematic and general indexes. However, to justify its price, which puts it beyond the purchasing power of almost all scientists and very many libraries, a greater investment would have been worthwhile in ensuring both greater consistency across the chapters, perhaps involving authors from different disciplines on the preparation of each chapter, and a more comprehensive geographical overview that would truly justify the inclusion of the book in a series entitled "Ecosystems of the World."

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Managing Agrobiodiversity: Farmers' Changing Perspectives and Institutional Responses in the Hindu Kush-Himalayan Region

Edited by Tej Partap and B. Sthapit. ICIMOD, Kathmandu, 1998. 439 pp. ISBN 92-9115-841-0.

There are important reasons why agrobiodiversity is currently a trendy topic. On one hand there is the prospect of dramatic transformation in world agriculture through the technology of genetic modification of material preserved in gene banks. On the other hand is the argument against the spread of intensive monoculture in agricultural practice, favoring instead a view of sustainability through multiple cropping systems with land races maintained by the local knowledge of farming communities. *Managing Agrobiodiversity* offers food for thought on the pros and cons of ex situ and in situ approaches.

Produced in conjunction with the International Plant Genetic Resources Institute, this book brings together research from the Hindu Kush-Himalaya region on the state of its agrobiodiversity. Forty short chapters are divided into 7 parts covering themes concerned with the relationship between agrobiodiversity and cultural diversity, processes of market transformation acting on subsistence cropping, and management issues for conservation of the variety of domesticated plants and animals.

The editors remark on the lack of information regarding loss, replacement, or replenishment of agrobiodiversity, and the book's principal value is in giving an impressive variety of case studies and perspectives. Inevitably there are disagreements of interpretation between some of the chapters (such as on the questionable sustainability of commercial fruit production in Himachal Pradesh), but some key themes emerge. More agrobiodiversity is found in rain-fed than irrigated agriculture, and in attempts to transform subsistence agriculture through introductions of new varieties, there has been little attention paid to the consequent genetic erosion or the potential value of local crops. Even where germplasm is being collected, as in China's modern gene banks, a very small proportion is mountain-derived (Chapter 25). Similarly with livestock, B.R. and D. P. Rasali (Chapter 27) argue that the characterization of "nondescript breeds with low production potential" has prevented investigation of their production performance under optimal conditions. The benefit of thinking across simple local/exotic distinctions can be seen in an example of fruit growing given by Tej Partap (Chapter 7) referring to the practice in Swat, Pakistan, of avoiding soil-borne disease through a double grafting of apple cultivars onto local sorbus and hawthorn rootstock.

Such examples of innovation and the instances of circumspect incorporation of certain new crops give a sense of dynamism to local practice. The discussion of assessment criteria for new rice varieties by villagers in Nepal, addressing qualities of taste, cooking, marketability, threshing, and storability is a case in point (Chapter 30 by B.R. Sthapit and K.D. Joshi). This leads me, though, to question the editors' framing of their comment that "a reversal to the old pattern of subsistence farming" (p 8) will not suffice in meeting the needs of the present day. Just what and when was the old pattern? Are we talking about the present generation's memories of their grandparents' accounts of the old days, or should "traditional" refer to pre-New World crop introductions of potato, chili, and maize? Many chapters invoke the idea of a relatively static baseline past, but the presence of these last crops in such a scenario of tradition reveals that notion to be misplaced. "Traditional" is a movable feast and refers to nothing as such but an image of a different moment. Detailed studies of Himalayan agronomic history (eg, Dobremez 1986) show that, even in out-of-the-way valleys, change has been continuously in process. "Tradition" is first and foremost a rhetoric of superior modernity. As Mr Jardhari of the Save the Seed Movement in Tehri-Garhwal says (Chapter 33), farmers have been brainwashed into thinking of practices like the *baranaja* (12 types of seed) cropping system for meeting domestic needs rather than commercial profit as "backward."

The editors themselves proclaim that "the research and development institutions of the HKH countries convey the impression that local land races are always inferior and a symbol of subsistence farming" (p 13). Exotic breeds and

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cultivars have been promoted with little appreciation of their biodiversity effect. The case of the Himalayan honeybee receives attention by U. Partap and L. R. Verma (Chapter 31). In terms of honey yields, the introduced European *Apis mellifera* indeed produces more, but the advantage of the now endangered local *Apis cerana* is its tolerance to cold, its not requiring winter sugar feeding, and its significantly earlier seasonal pollination activity on which many fruit trees and vegetables depend. This example clearly shows the need to see beyond simple economic specialization, whether of honey or orchards, and be conscious of the interlinkages and dynamics of diverse species communities.

At the heart of the whole issue of agrobiodiversity is a relationship of mutuality between people and species. Sthapit and Joshi refer to "biological and social processes of crop evolution" (p 313) in arguing against a total reliance on gene banks for conservation. Not only are there important reasons to doubt the ability of gene banks to maintain or keep available genetic capital, but it should be said that genes are only half the story. The other half is the anthropogenic developmental environment in which organisms grow, interact, and reproduce. I found the contributions of the book on this unique relational environment not fully satisfying. P. K. Shrestha (Chapter 14) makes significant points about systematic gender blindness in seed sector activities in Nepal, ignoring farmers' needs and growing environments. Ramakrishnan et al (Chapter 2) highlight the impact of land privatization on shortened *jhum* cultivation cycles, and the editors refer to disappearing knowledge of practices such as green manuring. However, the qualitative intimacy of people, plants, and animals that keeps farming communities alive can rarely be perceived in the book. The pleasure of first tasting the new local maize crop straight from the roasted cob, the sharing of colostrum among close kin after a calf is born, the household dedication of fermented grain marking the initiation of a new harvest season, and the ribald exchanges accompanying cooperative transplanting work groups all deserve to be recognized as formative contexts in which people's relationships with and attention to distinctions and qualities of agrobiodiversity are engaged. It is through these experiences and contexts that knowledge is transmitted. Such knowledge cannot be stored away in the bibliographic equivalents of gene banks. Chapter 34 by A. Rastogi is a welcome stylistic exception, contrasting opposing approaches to pest control represented by priestly chanting on one hand and the application of DDT on the other.

The contemporary challenge to think about policy issues regarding agrobiodiversity is well discussed in the final chapters. Should the HKH countries form a common platform to resist biopiracy? How can custodian communities of agrobiodiversity receive benefit from the genes that biotech companies protect with patents? Will "mountain farmers" rights receive legal recognition parallel to that of intellectual property rights? A sobering case is presented in Chapter 36, warning against unseen effects of conservation laws. The *kuth* plant cultivated for its medicinal root in Lahul was prohibited from trade in the 1980s due to its threatened state in the wild, and this enterprising example of farmers initiating conservation through cultivation fell victim to bureaucratic suffocation. The role of the state in conservation interventions has to be considered circumspectly. The degree of agrobiodiversity that currently exists in the mountains is probably due to the historical inability of the state to intervene effectively in other programs of development extension. Where strict biodiversity conservation has been implemented, knowledge of agrobiodiversity is threatened.

Managing Agrobiodiversity can be strongly recommended as an accessible collection of vantage points on a theme that the HKH countries need to respond to with some urgency if their centuries of farmers' knowledge is not to lose out to biotech imperialism.

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Carnivores in Ecosystems: The Yellowstone Experience

Edited by T. W. Clark, A. P. Curlee, S. C. Minta, and P. M. Kareiva. Yale University Press, New Haven, CT, USA, 1999. xii + 429 pp. $37.50, £25.00. ISBN 0-300-07816-1.

Mammalian carnivores have captured human attention and imagination for millennia. Some make us their prey, others compete with us for our wild food or livestock, and many inspire awe with their amazing predatory skills and beauty. As a result, different carnivores elicit different human emotions ranging from fear, loathing, and suspicion through greed, deep care, and worship. Whatever the case, our attitude is rarely one of indifference and most often is deeply held.

Such firm human convictions, coupled with the inherent rarity of many species in a world of diminishing wildness, have catapulted carnivores into leading roles in conservation initiatives worldwide. Species such as grizzly bears, tigers, and giant pandas have become the rallying "flagships" for the design and management of protected areas. These conservation initiatives often focus on mountainous regions where many carnivores have their last strongholds. The Greater Yellowstone Ecosystem (GYE) is one

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such region. Centered on Yellowstone National Park, the world's oldest national park, it is a large area (nearly 8 million hectares) of mountain ranges and high upland plateaus. Land is predominantly publicly owned, as national parks or national forests. Ecosystem conservation is the primary management regime in the parks and is integrated with natural resource extraction in national forests. These public lands are well enough linked to act as a conservation network. Livestock ranching dominates the extensive private lands.

This book is, in part, a case history of the GYE and its role in conserving many of North America's mammalian carnivores. It is also a synthetic review of the ecologies, throughout North America, of many of the GYE's carnivores and the present state of the science of carnivore ecology and conservation. The result is a fascinating mixture of knowledge about these species and the process of studying them. This is dominated by insights into the animals' lives in the wild and into the interplay of science and management actions in their conservation. There is also frequent mention of what the editors term an overarching theme, "… the role of human attitudes and behavior as the ultimate arbiters of carnivore persistence" (p 8). Yet perhaps the major weakness of the book is the relatively minor effort at a systemic analysis of the sociocultural forces driving human attitudes, legislation, and policy, both locally and nationally, and the value of the GYE as a case history in this regard.

Twenty-five contributors, among the leading North American researchers of carnivore ecology and conservation biology, have collaborated on 12 chapters. The introductory chapter, written by the editors, outlines why the GYE is such a valuable landscape for studying conservation of carnivores in particular and what lessons we might have learned so far. The history of management actions in this ecosystem, and particularly in the national parks, is painted with broad-brush strokes in the stimulating second chapter. Bears, wolves, coyotes, and cougars are then accorded a chapter each, reflecting the detailed knowledge gathered about these larger carnivores over a number of decades. Numerous mesocarnivores such as marten, fisher, wolverine, and river otter are dealt with in 1 chapter. The questionable assumption that their persistence will be ensured under the umbrella of conserving the larger species is here brought into focus. Another 4 chapters are more synthetic in dealing with interspecific ecosystem processes in the GYE. Two of these chapters focus on the vegetation–ungulate–wolf interaction, including the role of wildfire in vegetation production and the possible cascading effect of wolf predation on ungulates and other ecosystem processes. One summarizes the likely roles of smaller prey in the feeding and habitat ecology of various carnivores, and 1 deals with genetic considerations in carnivore ecology. The final chapter is a sweeping, sometimes rambling, synthesis of carnivore research and conservation worldwide. Here, all the strengths and weaknesses of the carnivore research agenda, from technique to experimental design to conceptual models and relevance to ecological theory, are scrutinized.

What lessons have we learned from the GYE? It has been remarkably successful in conserving carnivores. This reflects its large size and the dominance of public lands managed to maintain ecosystem processes and constituent species. Authors highlight the remarkable resilience of this ecosystem in adapting to change, whether anthropogenic (eg, hunting) or not (eg, wildfire). It is large enough to absorb the disturbances while maintaining representation of most species and most ecosystem processes. The studies also reinforce the idea that there is no one natural trajectory that we should be managing for or aiming toward. There are likely a number of paths this ecosystem can take and along which we are consciously, or unconsciously, directing it with our management actions. Our most useful scientific tools are (a) models of sufficient sophistication to allow realistic projections of alternative management regimes; (b) more deliberate focused research, ideally experimental, on the ecosystem processes (most often interspecific interactions) that are needed for model realism; and (c) an approach that considers management as a large-scale experiment with attendant monitoring and evaluation and ideally with controls. Our knowledge will always be incomplete and tentative, and the precautionary principle must be paramount.

And what have we discovered of the role of human attitudes? In their review of the history of policies, Schullery and Whittlesey make it clear that predator control and poisoning, even within the young Yellowstone National Park of the late 19th and early 20th centuries, came close to removing all the larger carnivores except bears. Fortunately, only the wolf was lost. Bears meanwhile were intentionally fed by the Park to draw tourists. Policies reflected attitudes widespread in society, and most importantly in natural resource management agencies, that all large carnivores that might depredate livestock and wild game should be removed to reduce competition and that parks should be managed for the enjoyment of visitors. Such anthropocentric thinking shifted dramatically in the mid- to late 20th century, and policies came to reflect a more biocentric approach espoused by the broader society. This shift included explicit conservation of all species (eg, the Endangered Species Act, the reintroduction of the wolf in the 1990s), explicit management of

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all carnivores as wild animals (eg, closing of the Park garbage dumps where bears had been encouraged to feed), and integration of a broad range of ecosystem functions into land management on all public lands. Without this broad shift in societal attitudes, the GYE would most likely be relatively depauperate in carnivores today. The facts are clear, but this book provides no analysis of how such a pivotal attitude change happened, how resilient the present circumstances might be, and how characteristic the GYE might be of carnivore conservation scenarios elsewhere.

The global evidence suggests that a similar attitude shift is relatively uncommon elsewhere except in some parts of Europe. Fear of economic losses through livestock and crop depredation and economic opportunity to sell poached carnivore body parts continue to drive a great number of carnivore population declines. Even within North America, carnivores are not held in high esteem by all. Opposition to the reintroduction of wolves, largely from local ranchers within the GYE, almost halted and reversed the process. Livestock depredation was seen as too great a cost to bear, despite compensation programs.

It seems to me that at least 2 conditions are necessary to foster a sympathetic attitude toward carnivore conservation. One is a link between the life of the animal or species and the broad cultural belief system, such that people believe the animal or species has a function to perform or a right to exist. This link may be reinforced through religious or secular sanction (edict or legislation) but would appear to be most robust as an emotive narrative reinforced by personal experience. Second is the removal of any survival cost to the individual human resulting from having carnivores present. In many circumstances, this can be realized through compensation for economic loss and ironically by segregation of the human from the carnivore's life, for example, in an urban lifestyle. As many of the authors in this collection understand, we must be wary of allowing all their wonderful scientific knowledge to become academic by failing to better understand, influence, and perpetuate the relatively positive attitude in which carnivores are held in the GYE at present.

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Reconciling Conservation With Sustainable Development. A Participatory Study Inside and Around the Simen Mountains National Park, Ethiopia.

By Hans Hurni and Eva Ludi, with the assistance of an interdisciplinary group of contributors. Centre for Development and Environment (CDE), University of Berne, Switzerland, 2000. xviii + 208 pp. + 9 appendices. $100.00. ISBN 3-906151-44-1.

There are few countries in the world where the need to reconcile the requirements for conservation of natural resources with the exigencies of development is as acute as it is in Ethiopia. The country is affected by chronic food insecurity and is dependent on external food aid. It is one of the poorest countries in the world and ranks 171 (out of 174) on the United Nations Development Program's Human Development Index. The overwhelming majority of its population—85%—is engaged in low-yield agriculture, in which technology is said not to have changed much for thousands of years. This population is growing at an annual rate of 2.5%. Agricultural land is scarce, forests have largely disappeared, and water is limited in many places. How can resources be conserved and development strengthened? What is the outlook for the future in the badly eroded and overpopulated Ethiopian highlands?

These questions have no easy answers. Given the country's recent history of social upheavals, wars, and famines, economic resources are necessarily limited. There are no models that can be readily applied, although there is a growing body of field experience with promising approaches. Hard data for planning purposes are difficult to find. One way of trying to overcome these obstacles is to conduct carefully monitored case studies that can generate such hard data in a limited area and then extrapolate their findings.

One such case study is *Reconciling Conservation With Sustainable Development: A Participatory Study Inside and Around the Simen Mountains National Park, Ethiopia,* authored by Hans Hurni and Eva Ludi and published in 2000 by the Centre for Development and Environment at the University of Berne, Switzerland. Both authors are eminent scholars of Ethiopian natural resources, having worked in the country for many years and trekked on foot over vast distances in the mountainous highlands.

The Simen Mountains National Park in the northern Ethiopian highlands was identified by UNESCO already in the 1960s as an area of international interest because of its unique flora and fauna. It is known for its topographic ruggedness, with steep escarpments and high mountains—the highest being over 4500 m—and for its rich natural biodiversity. There are species endemic to this area, such as the *Walya ibex,* a long-horned mountain goat. The park was gazetted in 1969. It was affected by the civil disturbances in Ethiopia during the 1980s, but today it is open and functioning as a natural park and a destination for tourists.

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But the area in and around the park has been inhabited for over 2000 years. Demographic trends today show a doubling of the population every 25 years or so. The result is a scarcity of good farmland, heavy soil erosion, shortening of fallow periods, declining agricultural yields, and deforestation. The farming population is encroaching on the habitats of the rare animals, threatening their numbers. The future viability of the park is in serious danger.

Hans Hurni assembled a multidisciplinary team to carry out a comprehensive field survey in and around the park during 5 months in 1994. His team included Ethiopian and Swiss experts in fields such as wildlife, ecology, soils, land use, and socioeconomics. As the title of the study indicates, the team used participatory appraisal techniques to define the needs and priorities of the local population and then juxtaposed them against the views of the team. In this manner, the team arrived at a set of development priorities designed to reconcile conservation with sustainable development by protecting the habitats in the park while providing a lasting livelihood for the affected population. The study thus provides a blueprint to the Ethiopian government and foreign donors for safeguarding the park and its unique natural resources.

The technique used, called *sustainable development appraisal* (SDA), differs from the more widely known participatory rural appraisal (PRA) technique in terms of its integration of "external" views—that is, those of the study team—with those of the indigenous population. This methodological tool was specifically developed for this study and has subsequently been further refined. However, the study does not discuss the operational implications of this technique in sufficient detail to allow conclusions about its wider application in other contexts inside and outside Ethiopia. Obviously, development planners cannot always have at their disposal a large, multidisciplinary team able to spend several months in the field in a relatively limited area. It would be interesting if Hurni et al could devote some future work to examining the costs and other resource constraints of this technique. One suspects that for large rural development interventions, the more rough-and-ready traditional PRA techniques will be more affordable.

The study provides very precise local development profiles for 30 villages in and around the park area with a total population of some 30,000 people. These profiles yield information on socioeconomic characteristics, land use and farming systems, natural resource endowments, and village dynamics and trends. They also include development priorities that reconcile farmers' expressed needs with needs perceived by the study team, according to the SDA methodology. This information is the backbone of the study.

The authors are able to demonstrate in precise terms why the peasant agriculture being practiced in these villages is not sustainable. In this rugged terrain, steep slopes are being cultivated because of the shortage of arable land, as elsewhere in the Ethiopian highlands—a practice that accelerates soil erosion. The study estimates that 7 mm of soil, corresponding to 70 tons/ha, are lost to erosion every year. Replacing this loss would require fallow periods ranging from 6 years in the lowlands to 23 years in the highlands for every single year of cultivation. But the pressure on arable land means that fallow periods have in fact been reduced to 1 to 4 years "if existent at all." This neatly illustrates the situation over most of the Ethiopian highlands. Given existing farming technology, the land simply cannot sustain the population living on it today, let alone increased numbers in the future. As a consequence, the authors correctly conclude that "there is an urgent need to induce other development activities in other sectors such as economic development outside the farming sector."

But they are less specific on how this might be achieved. Perhaps it is unfair to ask them to supply ideas along these lines, as that would take them far beyond the original purpose of their study. Nevertheless, the search for sustainable solutions to the major development issues facing Ethiopia must certainly proceed in this direction. It is worth noting that in one sense, Ethiopia is facing the opposite problem of Zimbabwe, a country much in the news these days. There the government is opting, albeit seemingly illegally and sometimes with the use of violence, for the solution of allowing landless people to occupy large land holdings. In Ethiopia, the government is faced with the need to get people off the land, in a sense making them landless, with a view to allowing the land to recuperate, and also to allow consolidation of small farms into large and more rational farm units.

But if the country is to avoid another social upheaval, alternative employment opportunities will have to be provided. Therein lies the real difficulty, given Ethiopia's poverty, lack of resources, and lack of urban growth centers. Ethiopia has an urban population of only 16.7% (1998), far less than the 32.7% average for sub-Saharan Africa. Industry accounts for only 6.7% of the gross domestic product (1998), the lowest figure in the world, and thus cannot absorb significant numbers of landless people from the countryside. The solution must therefore be sought in diversification of the rural economy through stimulation of cottage industries, intensive rural projects, etc. No ready solution to this complex problem is available, and few viable ideas have been tested. Yet the issue must be tackled, lest famine become a permanent feature of life for the millions of people liv-

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ing in the Ethiopian highlands. The authors show that several of the villages in the study area already depend on external food aid.

The Simen Mountains National Park can provide some employment opportunities through tourism. The study has a short section on management of the park, with the involvement of the local population. This section could have been further elaborated—for example, through references to the Campfire Model developed in Zimbabwe, where some success has been achieved by making local populations responsible for the management of wildlife and other natural resources to promote tourism. Experience with the Campfire Model could be very valuable in the Simen Mountains and elsewhere in Ethiopia.

Land tenure is one of the major issues in domestic Ethiopian politics today. In the process leading up to the parliamentary elections in May 2000, the major calamities facing the nation in the north (war with Eritrea) and in the south (famine) were barely mentioned. But the system of land tenure was subject to lively debate, with the opposition arguing that land must be privatized and the government insisting that the present system of state ownership of all land remains viable. The current system is criticized, among other reasons, because it does not give land users security of tenure, since land is subject to redistribution caused by the population pressure. The lack of security of tenure leads to the low propensity of farmers to undertake permanent improvements of their holdings, such as terraces on sloping land and the planting of trees. As a result, insufficient action is taken to arrest soil erosion. The study mentions this problem, saying that "lack of land security, whether real or perceived, was often mentioned as a cause for not investing in the land." However, it could arguably have gone even further, highlighting this as one of the major issues that the government needs to address to increase farm productivity.

The layout of the book is appealing, with useful boxes to highlight key statements. Hurni is a geographer, and this is reflected in the GIS work and excellent maps of the study area. It is therefore somewhat regrettable that the quality of the black and white photographs in the richly illustrated volume does not quite match that of the maps. Nevertheless, the study should be well suited for teaching students interested in the universal conflict between conservation and development. It would be hard to find a better case study to illustrate this conflict.

In April of this year, the UN approved USD $9 million to support a sustainable development project in the Simen Mountains regions. Hurni and Ludi originally formulated the project on the basis of their work in the area. It is not often that academic research results in investment for development. It must be a great satisfaction to the authors to see that there are now improved possibilities for addressing the issues that they raise in the study.

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