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## Reviews of Web Sites, CD ROMs, Books

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## Web Sites on Urban Development

Very few web sites explicitly address urbanization issues in mountain environments. The first listed here is one of the rare ones currently focusing on mountain issues; the other sites are maintained by important international or national organizations and offer useful resources to readers of *MRD* who are new to the field of urban development.

## Urban Development and Environmental Impacts in a Mountain Context

[www.umanitoba.ca/institutes/natural\\_resources/mountain/current/index.html](http://www.umanitoba.ca/institutes/natural_resources/mountain/current/index.html)

The University of Manitoba runs a program entitled "Sustainability of Mountain Environments." The topic of "Urban Development and Environmental Impacts in a Mountain Context" is the object of ongoing comparative research carried out under the Partnership Program of the Canadian International Development Agency (CIDA) and the Shastri Indo-Canadian Institute (University of Calgary).

## Sustainable Cities Programme of UN-Habitat

[www.unchs.org/programmes/sustainablecities](http://www.unchs.org/programmes/sustainablecities)

The Sustainable Cities Program (SCP) is a joint UN-HABITAT/UNEP facility for building capacities in urban environmental planning and management. It contributes to promoting urban environmental governance processes, as a basis for achieving sustainable urban growth and development. Currently the SCP operates in 20 main demonstration and 25 replicating cities around the world (some in mountain areas), with others in preparation.

## Urban Development and Governance of UNESCO-MOST

[www.unesco.org/most/most2.htm](http://www.unesco.org/most/most2.htm)

MOST (Management of Social Transformations Programme) is a UNESCO research program that supports international comparative social science research. The MOST theme "Urban Development and Governance" promotes socially sustainable human settlements through empowerment of citizens, dissemination of policy-relevant knowledge, and the support of innovative initiatives in the field of city professionals' education.

## WorldBank Sites

The WorldBank maintains several sites that focus on urban development issues:

### Urban Development

[www.worldbank.org/urban](http://www.worldbank.org/urban)

One of the WorldBank's "Development Topics."

### Rural Development–Urban Development

[www.worldbank.org/urban/urbanruralseminar/pres.html](http://www.worldbank.org/urban/urbanruralseminar/pres.html)

Presentations and papers from a joint rural–urban WorldBank seminar.

### Rural–Urban Linkages and Interactions

[wbIn0018.worldbank.org/External/Urban/UrbanDev.nsf/Urban+Rural+Linkages/D02D4131298EF6A68525688D0052B27B?OpenDocument](http://wbIn0018.worldbank.org/External/Urban/UrbanDev.nsf/Urban+Rural+Linkages/D02D4131298EF6A68525688D0052B27B?OpenDocument)

A WorldBank joint "Urban and Rural Development Strategy and Policy Initiative on Policy Implications for Development Planning and Poverty Reduction."

### International Network for Urban Development

[www.inta-aivn.org](http://www.inta-aivn.org)

INTA is an international network that encourages exchange of information,

experience and best practices on urban development and renewal across the world. Emphasis is on practical and realistic experiences that result in the improvement of urban areas for all inhabitants through proper application by the public, private and not-for-profit sectors. INTA is currently announcing its 28<sup>th</sup> World Urban Development Congress (September 2004).

## Virtual Library on "Urban Environmental Management" (UEM)

[www.gdrc.org/uem](http://www.gdrc.org/uem)

The UEM web site of the Global Development Research Center is an output of the Urban Environmental Management Research Initiative (UEMRI), a grouping of urban planning researchers from around the world. It looks at urban areas as the intersection of natural, built, and socioeconomic environments, creating sustainable ecosystems.

## Network for Regionalization, Decentralization and Municipal Development (of GTZ)

[www.urbanet.info](http://www.urbanet.info)

URBANET is the network of German Development Agency (GTZ) staff, associated professionals and researchers in the field of regionalization, decentralization and municipal and urban development. It promotes exchange and provides documentation, analyses and concepts of key political and practical relevance in this area as well as technical and advisory support for its members.

## IIED Human Settlements Program

[www.iied.org/human/index.html](http://www.iied.org/human/index.html)

The London-based International Institute for Environment and

Development (IIED) has a Human Settlements Program that promotes poverty alleviation, good urban governance, and better health and housing conditions in urban areas of developing countries. The Program publishes the international journal *Environment and Urbanization*.

### International Centre for Sustainable Cities (ICSC)

[www.icsc.ca](http://www.icsc.ca)

The Centre's mission is to promote sustainability in cities around the world through practical demonstration projects using Canadian expertise and technology. It brings together private, public and civil sectors for mutual benefit. ICSC helps to find financial and human resources to meet needs identified by local municipalities and the implementation of Local Agenda 21. Issues tackled by ICSC include: housing and green buildings (including energy efficiency), sustainable transportation, capacity building and multi-stakeholder processes, waste management and treatment (solid waste and liquid waste), land use planning and urban design, urban agro-forestry, disaster mitigation and reconstruction, and sustainable tourism.

### Urbanization and Poverty Reduction

[www.rawoo.nl/main-4b7.html](http://www.rawoo.nl/main-4b7.html)

Part of the web site of the Netherlands Development Assistance Research Council (RAWOO) which addresses the need for research in the field of urbanization and poverty reduction.

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### Books

#### Swat: An Afghan Society in Pakistan. Urbanization and Change in a Tribal Environment

By Inam-ur-Rahim and Alain Viaro.  
Karachi: City Press, 2002. x + 334 pp. Pak Rs 495.  
ISBN 969-8380-55-8.

#### Mingora: The Unplanned City. Dynamics of Development and Public Participation

By Zeenat Hisam and Alain Viaro.  
Karachi: City Press, 2002. 174 pp. Pak Rs 245.  
ISBN 969-8380-56-6.

The Swat Valley of Pakistan is one of the most fertile regions in the Eastern Hindu Kush. It has attracted travelers, settlers, nomads and pilgrims for centuries. Greek historiographers termed Swat *udyana*, the "green garden" characterized by fertile rice fields on the valley floor, crop cultivation on the slopes, plentiful forests, and superb pastures in the higher elevations. Glacier meltwaters and monsoonal rains contributed to an abundance of water, compared to the arid environments further north, which has supported the farming of a wide variety of cultivars and cash crops until today. Culturally Swat was a center of Buddhist learning during the Gandhara period, and has been a valley of fame because of excellent craftsmanship in wood carving and furniture-making and ethnic diversity. Pashtun clans of the Yusufzai occupied the lower parts of the valley, while so-called Kohistani (mountain dwellers) occupied the higher elevations.

Therefore it is not surprising that Swat has attracted scholars for different purposes. Archaeological

evidence was contributed by Sir Aurel Stein and Giuseppe Tucci. Frederik Barth (1956a; 1956b; 1969) did his fieldwork on ethnic boundaries and political leadership among Swat Pashtun tribes. His studies revolutionized cultural anthropological thinking in the 1960s when "ethnic groups" were thoroughly discussed and constituted the prime interest of scientific discourse in the field of migration and minorities. Barth inspired other scholars, such as Akbar S. Ahmed (1980) and Charles Lindholm (1982), to study tribal structures. Anthropologists who were mainly interested in material culture (Kalter 1991) studied and collected the wooden artefacts and silver jewelry of the Kohistani craftsmen, consequently contributing to an international art collectors' run for Swati items and a depletion of the valley. From a geographical and development perspective, an early and thorough study by Bruno Fautz (1963) received only limited international attention. David Dichter (1967) included a brief chapter on Swat in his regional geography of the North-West Frontier Province. Surprisingly little attention was given to the Swat Valley from a specific mountain perspective although it offers a perfect laboratory for the study of utilization strategies at different altitudinal levels, highland-lowland interaction, and the growth of an exchange economy, migration and urbanization in a mountain setting.

The authors of the two volumes under review address recent changes in Swati society, especially in the urban context of Mingora, the administrative capital of Swat after the abolition of the state in 1969. The more general volume on Swat carries the subtitle "An Afghan Society in Pakistan," which sounds a little odd for the reader who is unaware of the tradition that the term "Afghan" is applied to members of the Pashtun ethnic group synonymously. The book is a joint

venture by Inam-ur-Rahim, a Pakistani “development planner of the mountainous environment by choice,” and Alain Viaro, a Swiss architect with specific interest in traditional architecture and urban history. The first 2 chapters introduce the valley in its ecological properties and historical features. The 3<sup>rd</sup> chapter is devoted to the “urban area,” and is followed by 2 chapters on Pashtun society and culture. The final 4 chapters cover aspects relevant to social science, such as demography, employment, migration, urbanization, administrative organization, public services and economic activities.

Due to the authors’ interest in the transition from what they call a tribal to an urbanized society they leave behind the more historical studies and focus on the last 3 decades. Thus they provide information about important aspects of change in the valley including data from the district census of 1998 and from their own empirical research. Somehow the conceptual basis for their research effort remains unclear. Consequently we are confronted with a narrative of a modern story of Swat in general and Mingora in particular—which is rather poorly illustrated considering that an architect is the co-author: just 3 simple maps (1 sketch of Swat and 2 of Mingora) and some make-shift diagrams (without references) and tables, as well as some black-and-white photographs illustrate the text.

While the 1<sup>st</sup> volume results from a study aiming at Mingora, but acknowledging the fact that understanding Mingora requires a certain knowledge of Swat as a region, the 2<sup>nd</sup> book is titled *Mingora: The Unplanned City*. Here the focus is quite clear, as development aspects are in the forefront. Viaro is joined on this volume by Zeenat Hisam, who is a professional development planner by training and worked as a journalist before she joined the publishing company of both vol-

umes. This smaller book elaborates on the idea of medium-sized urban centers functioning ideally as arenas for good governance, sustainable development and people’s participation.

The focus of the research was development-oriented and Mingora the case study. The context and objectives of the research are clearly stated in the introductory chapter. The idea was to implement a planning process in an urban setting perceived as an unplanned city. Consequently the results of the project, documented in the volume, focus strongly on institution-building, communication, and people’s participation. The book documents this process and therefore provides important information about urban management in the fields of sanitation, solid waste, transport and traffic. Planning strategies and governance as well as women’s participation are addressed in addition.

The 2 books are quite different in their objectives and their achievements. Both provide a valuable insight into recent development processes in an area that is not covered as frequently as some other well-researched valleys, towns and cities. Readers who are interested in the urbanization process in the mountain regions of developing countries will find useful information and get a vivid insight into the constraints of implementing development blueprints and communicating fashionable concepts. Finally they might be challenged to draw more attention to this unfairly neglected part of the Hindu Kush.

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### Pseudocereals and Less Common Cereals: Grain Properties and Utilization Potential

Edited by Peter S. Belton and John R.N. Taylor. Heidelberg: Springer, 2002. xviii + 269 pp. €89.95, US\$99.00. ISBN 3-540-42939-5.

The purpose of this book is to inform, stimulate interest, and promote knowledge-sharing about the structure, chemistry, nutritional value, processing technologies, and current and potential uses of a number of important but under-utilised food grains. The book examines sorghum (*Sorghum bicolor*), spelt wheat (*Triticum spelta*), the major millet species—pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*), fonio (*Digitaria* sp.) and teff (*Eragrostis tef*)—as well as three dicotyledonous pseudocereals: grain amaranth (*Amaranthus* sp.), buckwheat (*Fagopyrum* sp.), and quinoa (*Chenopodium quinoa*). Seven well-edited chapters by different authors on each of these grains provide detailed information on production, plant and grain structure, chemical composition and nutritional value, processing, traditional and novel uses.

The book provides a sound warning that today, at the begin-

ning of the third millennium, just three cereals—wheat, rice and maize—dominate the world's food supply, posing risks for the future of humankind in the event of catastrophic crop failure as genetic diversity is reduced. The book also warns that introduction of genetically modified cereals may exacerbate this situation, with different species possibly sharing the same genes conferring resistance to pests and diseases. At the same time, reliance on so few grains may be detrimental to our long-term health, with concerns about deficiencies in micronutrients and an increase in food allergies and intolerances. A timely reminder is given that humankind around the world has traditionally cultivated a large number of different grains, both true cereals and other cereal-like grains known as pseudocereals.

It is pointed out that a common advantage of these grains is that they can be cultivated in environments unsuitable for the “big three” cereals, producing a crop without intensive agricultural practices. For instance, amaranth and quinoa originate from central and south America, where they are cultivated at high altitude in mountainous areas. Buckwheat originates from middle Asia with its extremes of temperature, and is often grown in high-altitude areas, and spelt wheat comes from hot arid extremes of the Middle East. Sorghums and millets originate in the semiarid tropics of Africa and are noted for their drought tolerance.

These cereals have many advantages, but they are certainly not a panacea. Their common downside is the problem of processing them into foods that are acceptable to people who have become accustomed to consuming high-quality products made from the “big three.” Problems include the size, shape and structure of these grains, which are often very small or thin, making conventional milling methods unsuitable. At the same time, the chemical composition of the grains poses problems with

respect to both processing and digestibility. However, as the authors of the various chapters indicate, none of these problems is insurmountable. Puffing/popping and fermentation are traditionally applied to preserve and improve nutritional value and acceptability. Malting can also be a simple and effective method to produce novel foods.

Many of these grains present alternatives for increasing the spectrum of food in our diets and for growing crops in marginal areas to which they are ecologically suited. This provides opportunities for improving the livelihoods of farmers in these environments. However, to achieve this requires intensive breeding effort and research to develop products that meet the tastes and consumer habits of urban dwellers. Marketing efforts are needed to increase the knowledge and popularity of these grains, because at present they are consumed only by a small percentage of the global population. These two aspects need to be considered if successful commercial exploitation is to be achieved, with farmers expanding the areas under these crops in preference to the ‘big three’. This book provides a useful starting point for researchers, extension agents, and commercial companies to develop this potential.

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## Mountain Biodiversity: A Global Assessment

Edited by Christian Körner and Eva M. Spehn. New York and London: Parthenon, 2002. xiv + 336pp. £55.99, US\$79.95. ISBN 1-84214-091-4.

“Biodiversity” has become one of today's most widespread buzzwords among environmental biologists and

decision makers. Despite its frequent use, the concept has proved to be somewhat elusive, perhaps more so than anyone expected. On the one hand, the idea is inherently understandable—an expression of the complexity of life in all its forms, over a wide range of scales of time and space. Such thinking has led to a variety of descriptive definitions of the term that try to encompass such richness (eg Wilson 1992; Haslett 1996). On the other hand, it is still extremely difficult to decide exactly which aspects of biodiversity are important, and then how to measure them. One approach is to take a primarily socioeconomic view which says that biodiversity is important because of the resources that organisms presently provide, and the resources they may provide in future. This may perhaps be most easily envisaged in tropical environments, where the store of unknown biological resources is well recognised.

In mountain environments, the general economic standpoint remains valid, but there is also a much more direct aspect of the value of biodiversity—it provides physical stability on mountain slopes and therefore also safety from avalanches, landslides and erosion. Thus biodiversity can be thought of as providing *ecological services* (*sensu* Luck et al 2003) rather than simply offering resources that are available to be “used up.”

The importance of the stability and protection services, as well as other services provided by mountain biodiversity such as water capture, is clearly stressed by Christian Körner early in the first chapter of *Mountain Biodiversity: A Global Assessment*. The chapter, which comprises Part I of the book, provides an extremely informative and succinct introduction to and overview of the subject. Indeed, it is most successful in setting the framework for the rest of this multi-authored work, often by posing relevant questions and then suggesting various plausible explanatory hypotheses. These relate observed biodiversity patterns



on mountains to topics such as reduced land area and habitat heterogeneity, species interactions, organism size, and population age structure and genetics. All of this is capped by short, pertinent discussions of the effects of human land uses on mountain biodiversity, including sustainable development and conservation issues, and potential influences of climatic change.

Aspects of all of these subjects are explored in more detail in the remainder of the book. Chapters are grouped into a further 4 parts. Part II (15 chapters) examines the pure aspect of mountain biodiversity research, asking "How much mountain biodiversity is there and why?" Part III (6 chapters) is devoted to climatic change and mountain biodiversity; Part IV (5 chapters) to land use and conservation; and the single chapter of Part V attempts a synthesis to provide a global assessment of mountain biodiversity.

A wide spectrum of authors has ensured that contributions cover many of the world's mountain regions, particularly the Alps, Rockies, Andes and the Asian mountains, though there are also single contributions that refer to South Africa, Ethiopia, Madagascar and Australia. The range of approaches is equally varied, from single case studies to literature reviews and meta-analyses, at local, regional or continental and global scales. Given such differences, it is hardly surprising that the type and level of resolution of the data presented are also very variable. Descriptive studies prevail at the expense of analytical approaches. This is particularly true in those chapters that consider more remote, less well documented areas, such as Tibet and China (chapter 11), but even here the information given is a very valuable first description of the area, and provides good baseline data.

The biggest limitation concerning the coverage of the book as a whole is that it is confined mainly to plant biodiversity. Only 4 of the con-

tributions are animal-oriented. This imbalance is not the fault of the editors; it merely reflects the lack of information and modern research by zoologists on mountains. Words to this effect are provided by Körner in his introductory chapter, and, as a mountain zoologist myself, I wholeheartedly endorse his comment that "Thankfully a few animal scientists have joined this assessment and the doors are wide open for more to come in!" (page 5).

The final synthesis chapter, written by the editors and Bruno Messerli, is mostly a summary of the main conclusions that may be drawn from the different contributions. The information is presented in line with the book sections, further separated according to geographical region. While this descriptive approach lacks any attempt at meta-analysis and considerably limits the chapter's synthetic value, it does allow information gaps to be identified and strategies for future research to be suggested. Although a true global assessment of mountain biodiversity is still clearly some way off, I certainly agree with the authors' conclusion that quantitative methods and analyses are necessary to allow elucidation of the functional significance of biodiversity on mountains. Perhaps direct links could then be made between mountain biodiversity, its constituent populations of organisms, and the ecological services (such as physical stability mentioned above, or medicinal qualities of plants [chapter 22]) that these populations provide. This would in turn enable assessment of the consequences of biodiversity (population) changes for service provision (Luck et al 2003), and would provide real support for the need to protect biodiversity in mountain areas.

In summary, *Mountain Biodiversity: A Global Assessment* brings together a wealth of important, often new information, in a field that has for many years lacked sufficient modern, ecological research effort, and requires an integrated

and coordinated approach. This places the book in a position of extreme relevance to a wide readership. It provides an important new stepping stone for directing future ecological research within mountain environments and it may be considered an essential reference not only for all concerned with mountain biodiversity, but also for anyone with interest in functional ecology, land use management, or the effects of climate change in the mountain regions of the world.

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### Global Environmental Change in Alpine Regions: Recognition, Impact, Adaptation and Mitigation

Edited by Karl W. Steininger and Hannelore Weck-Hannemann. Cheltenham, UK: Edward Elgar, 2002. xix + 271 pp. £59.95. ISBN 1-84376-183-1.

While the title of this book suggests a major overview of global environmental change in alpine regions, its 13 chapters focus almost entirely on the Alps. The contributors are all from the Alpine countries. About half are Austrian or have Austrian connections, and the preparation of the book benefited from Austrian funding. It attempts to explore solutions to global environmental change within the 4 areas of recognition, impacts, adaptation, and mitigation.

Following the first chapter, an introduction and overview prepared by the editors, Part 1 addresses “recognition.” Chapter 2 provides a good overview of the many chemical and physical influences—some more “natural,” others more anthropogenic—on high mountain lakes, concluding with a conceptual model which shows the interactions of these influences. It would have been desirable for this to have been complemented by another chapter or two addressing glaciers and the other alpine ecosystems which cover the majority of Alpine space. Chapter 3 is “On the economics of climate change and the climate change of economics.” Both of these chapters are largely written for specialists in their disciplines, though they end with useful conclusions. As a non-economist, I found much of Chapter 3 particularly hard to understand. Had it been written in less condensed form, with greater explanation for the general reader, it would probably have been a very welcome contribution to the literature.

Part 2 also has two chapters, on impacts. Chapter 4 addresses the economic consequences of climate change in the Alps. On some topics, such as impacts on snow processes and tourism, it has good overviews, probably reflecting the authors’ fields of work. However, the section on impacts on agriculture and forestry is very brief and incomplete, ignoring much work undertaken over the past decade or so. The chapter also has a good discussion on changing natural hazards and increasing vulnerability, which moves into adaptation and mitigation. Chapter 5 is correctly titled “Climate change and its impact on the insurance industry.” Apart from restating the conclusions with regard to mountain regions from the third report of the Intergovernmental Panel on Climate Change, it takes a global perspective, barely mentioning the regions which are the focus of the book.

Part 3 has four chapters, on adaptation, of which the first three

focus on natural hazards. Chapter 6 notes the increasing vulnerability of social systems with respect to natural hazards, and presents a generic agent-based framework, with a few Alpine examples. Chapter 7 notes the importance of regional information systems and risk analysis and the need for interdisciplinary/crossdisciplinary approaches which need to be proactive, rather than reactive. Chapter 8 reviews natural hazard control in Austria and concludes that there is a need for institutional change, rather than policy change, particularly in the context of climate change. Chapter 9 considers urban climatology, but does not mention environmental change at a more than local scale. All of these chapters could have been valuably extended to consider how their conclusions relate to the likely impacts of global environmental change in the Alps.

Part 4 includes four chapters, on mitigation—though the last comprises conclusions and future prospects, drawn from the book as a whole. Chapter 10 describes the role of Alpine agriculture and forestry in contributing to climate change, based on studies funded by the European Union, and concludes that they are not major contributors. The German word *Haushalt* has been mistranslated to household, rather than budget (as in carbon budget), which makes some of the sentences in this and other chapters a little strange to non-German speakers. Chapter 11, on the use of renewable energy for climate change mitigation, especially in Carinthia, provides a good holistic overview on issues relating to renewable energy. One key conclusion is that, while the use of renewable energy sources can lead to decreasing emissions of greenhouse gases (GHGs), this can be at high political and environmental cost, especially with regard to the further development of hydroelectricity. Consequently, economic instruments, such as taxes and subsidies, are an essential part of the policy mix. The

authors note that the high fragility of alpine regions to climate change may make their inhabitants more receptive to taking action to reduce GHG emissions. Chapter 12 draws on 3 scenarios developed within an OECD project on environmentally sustainable transportation in the Alps. These show that CO<sub>2</sub> targets will be hardest to achieve; again, a mixture of approaches is needed, including technological change and vehicle downsizing, and requiring political and social acceptance as well as integration with other sectors. It is also recognized that many policy instruments are already in place, but that they can have both positive and negative impacts.

The final chapter brings together many of the conclusions of the previous chapters and suggests some future research prospects. It shows that much is yet to be done, and that there is a need for “interdisciplinary work [that] becomes both fruitful and adequate for the real questions and problems at hand” (p 260). Unfortunately, with the particular exception of Chapters 11 and 12, this book is not a good example of such work. While it contains many of the key themes, it suffers from frequent repetition of current knowledge concerning climate change and mountain areas at the beginning of many of the chapters; and too many chapters only marginally address climate change, let alone the wider issues comprising global environmental change. It provides some interesting and sometimes thought-provoking studies, but cannot be said to present “the most significant cutting edge research on the human dimensions of global environmental change in alpine regions” (p xix), the aim expressed in the preface—not least because its focus is almost entirely on the Alps.

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### **Inventory of Glaciers, Glacial Lakes and Glacial Lake Outburst Floods, Monitoring and Early Warning Systems in the Hindu Kush–Himalaya Region: Nepal**

By P.K. Mool, S.R. Bajracharya, and S.P. Joshi. Kathmandu, Nepal: International Centre for Integrated Mountain Development (ICIMOD), 2001. Developed Countries US\$20.00; Developing Countries US\$15.00; ICIMOD Member Countries US\$10.00. ISBN: 92-9115-331-1. (With CD-ROM. Kathmandu: ICIMOD, 2002. ISBN: 92-9115-359-1.)

### **Inventory of Glaciers, Glacial Lakes and Glacial Lake Outburst Floods, Monitoring and Early Warning Systems in the Hindu Kush–Himalaya Region: Bhutan**

By P.K. Mool, D. Wangda, S.R. Bajracharya, K. Kunzang, D.R. Gurung, and S.P. Joshi. Kathmandu: ICIMOD, 2001. ISBN: 92-9115-345-1. Developed Countries US\$20.00; Developing Countries US\$15.00; ICIMOD Member Countries US\$10.00. (With CD-ROM. Kathmandu: ICIMOD, 2002. ISBN: 92-9115-362-1.)

With the accelerating development of hydropower in Nepal and Bhutan and its dependence upon glacial melt-water, a detailed knowledge of the extent of glaciers is crucial. Similarly such information is extremely important when considering the effects of climate change. Consequently it is important to catalogue glaciers in an inventory that can then serve as the basis for subsequent comparison. To this end the UNEP-funded inventories of gla-

ciers and glacial lakes in Nepal and Bhutan are both welcome and timely. They consist of a hardcopy book and an accompanying CD for each country, and both follow similar organisation of their contents.

Chapters 1–3 introduce the subject and give an overview of the physical geography of each country. Chapter 4 presents an impressive list of materials used, map sheets, aerial photographs and satellite imagery, and provides an easy to follow summary of the method of inventory compilation given by the World Glacier Inventory (WGI). Chapters 5 and 6 explain the use of Geographical Information Systems (GIS) and remote sensing, the latter with visually pleasing images of false-colour composites draped on Digital Elevation Models (DEMs). Chapters 7 and 8 present, by catchment, summary tables of glaciers and glacier lakes respectively. Glaciers are grouped by type and then by aspect, and lakes by type. Chapter 9 gives a background to Glacier Lake Outburst Floods (GLOFs), and Chapter 10 provides information of 6 of the best-studied examples of lakes in Nepal and 5 principal ones in Bhutan. Chapter 11 describes potentially dangerous lakes and Chapter 12 lists the main conclusions. The CD for each country has the same information as the relevant book but with added photo galleries. However, as there are no captions for these pictures it is not possible to determine their location or what is being portrayed, rendering the photo galleries of very limited use.

#### **Nepal inventory**

Having compiled an inventory for just one sub-basin in the Solukhumbu we know the challenges involved, but the ICIMOD inventory is misleading. It gives the impression that topographic maps, based on 1957–59 aerial photography, were supplemented using remote sensing from the 1990s and, from this inventory, dangerous lakes were

identified for more detailed examination. For example, the flow chart on page 3 shows all data collection leading to the production of an inventory, from which dangerous lakes are identified. In reality, only map data from the 1950s were used, with only those glacial lakes categorised as being ‘dangerous’ from other studies being examined later using remote sensing. This has resulted in the peculiar situation where one of the cited potentially dangerous lakes, Lower Barun, which has been well-studied and has 5 pages devoted to it in Chapter 10, did not appear on the 1957–59 aerial photographs and so is not in the inventory! Similarly, Tsho Rolpa has an area of 0.23 km<sup>2</sup> in the inventory (representing 1957–59), but had 6 times the area (1.37 km<sup>2</sup>) in 1993 (Figure 10.24); in January 2002 it had an area of 1.54 km<sup>2</sup>. A similar problem arises in relation to other lakes; the inventory data do not reflect the current or even recent dimensions of the lakes.

#### **Bhutan inventory**

The reader is led to believe that, for the compilation of the inventory, recent satellite images have supplemented topographic maps. The topographic maps, based on aerial photography from 1956–58, do not cover the whole region with glaciers, necessitating the use of more recent satellite data in some areas. It would have been of benefit to the user if a clear indication of the age of the source data for each region had been given. This has resulted in a temporal smearing, where the statistics of glacier areas, for example, are an amalgam of information from the 1950s to the late 1990s. This has rendered any comparison over time impossible. Brief examination of the entries for the comparatively well-studied lakes of the Lunana area shows that where map data are available they have been used in preference to satellite information. For example, Figure 8.5 shows the development of Raphstreng Tsho in 6



stages from 1956–58 to 1994. In the latter, the lake has an area of just over 1 km<sup>2</sup>, but the inventory entry is only 0.15 km<sup>2</sup>. Likewise, the development of Luggye Tsho, famous for having burst in 1994, is shown in 6 stages from 1956–58 to 1994 in Figure 8.7. The post-GLOF 1994 image has the lake as being over 2 km long, but in the inventory 2 lakes are identified as having an association with Luggye Glacier and these have lengths of only 260 m and 185 m. Thorthormi Glacier has a series of supra-glacial lakes, several of which are large enough to have been included in the inventory. These are rapidly developing into a lake the full width of the glacier, which lies at an elevation of over 65 m above Raphstreng Tsho and is separated by a narrow lateral moraine. Thorthormi Glacier and its glacial lakes had been identified previously (Richardson and Reynolds 2000) as being potentially the most dangerous glacial lake system in Bhutan. Indeed the situation is recognised by Mool et al as being potentially hazardous on page 74, yet these lakes have not been included in the list of potentially dangerous lakes in Chapter 11.

The books are well written and easy to follow. However, both inventories are extremely difficult to use as the glaciers and lakes are not referenced on any of the maps and no coordinate system is used. To identify individual glaciers, the user must find a map of the area (not easy for many parts of Nepal or Bhutan) and use the longitude and latitude to find the glacier: a time-consuming exercise. In the case of Bhutan, an earlier inventory of glaciers compiled by the Geological Survey of Bhutan (1999) is far easier to use than the one being reviewed and is in many cases more accurate as it is based upon SPOT imagery from 1989/90. Unfortunately it is incomplete, with glaciers in some sub-catchments being omitted.

In addition to difficulty in identifying glaciers from the inventory,

comparisons with existing inventories (and our own) were problematic, as Mool et al use a different glacier identification system and do not treat coalescing non-contributing glaciers as separate bodies as recommended by the WGI guidelines.

The Geographical Information System (GIS) on the CDs is not a GIS but a series of digital maps. Again misleading, page 2 shows a collection of GIS layers, including a DEM, geology, soils, hydrology, etc, but the “GIS” provided does not even have a layer for rivers. Furthermore, there is no linkage between the maps on the CD and the inventory database, making it impossible to relate the database to the maps. Ideally, each glacier on the GIS map should offer a direct link to the entry in the underlying database and vice versa.

The chapters in each volume describing the criteria used to determine whether or not a given glacial lake is potentially dangerous reveal a lack of understanding of the glaciological and geological processes involved in the formation of the various glacial hazards. For example, in Nepal, Dig Tsho and Tam Pokhari (Sabai Tsho) are named as potentially dangerous, but both have full-depth breaches in their moraines and much reduced volumes so that neither lake is likely to pose any hazard at all.

In Chapter 12, the authors describe a number of remediation methods. However, having mentioned the case of the successful interim remediation of Tsho Rolpa (Rana et al 2000) in the volume for Nepal, they make no mention of the successful use of siphons at this lake when describing general methods available for remediation in the Bhutan volume. The limitations of Chapter 12 in each volume perhaps reflect lack of experience of the authors in matters relating to glacial hazard assessment and physical remediation. There is published literature available on this subject of

direct relevance to the Himalayan situation but this has not been addressed.

Basing the inventories on data from the 1950s with only limited use of remote sensing images from more recent years has resulted in a very distorted impression of the number of glacial lakes and their state. Many glacial lakes have been missed, and perhaps as importantly, glaciers most likely to form significant glacial lakes have not been identified although criteria for doing so have been published (eg Reynolds 2000), based on analysis of glacial lakes in Bhutan. It is not surprising, therefore, that significant glaciers thought to be on the threshold of forming glacial lakes, such as Ngozumpa Glacier in Nepal (Benn et al 2001), and Thorthormi Glacier in Bhutan, have not been identified as being liable to form potentially dangerous glacial lakes in the future. This has huge implications for the potential management of the problem, as prompt remediation is less expensive and more technically achievable compared with waiting until a large lake forms—such as Tsho Rolpa in Nepal.

The use of approximately 50-year-old data to compile the inventories, coupled with variable usage of more recent air photography and satellite data, means that the results cannot and should not be used in relation to climate change studies or hydrological assessments for hydropower. The inventories do not represent the current situation as to the number and extent of glaciers nor of glacial lakes. The lists of potentially dangerous lakes are misleading and in several cases wrong.

However, the compilation of the inventories is no mean achievement and provides an important first step. The publication of the books and accompanying CDs has served an extremely useful function in highlighting the issues associated with glaciers and glacial lakes in Nepal and Bhutan, although their

scientific value is limited. We have been informed that the principal author intends to update the inventories in the light of recent information and we welcome this news.

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### Lines in the Water: Nature and Culture at Lake Titicaca

By Ben Orlove. Berkeley, CA: University of California Press, 2002. xxvii + 287 pp. US\$19.95. ISBN 0-520-22959-2.

Lake Titicaca is at the center of a classic mountain habitat: close to the upper limit of agriculture, yet the seat of ancient civilizations and contemporary cities; impoverished yet on the tourist trail and the scene of a long series of scholarly projects.

The book under review is a relaxed, chatty, loving reminiscence of years of field work in the region, full of specific details, which accurately evokes the challenges and rewards of participant observation. Orlove has repeatedly visited the region since 1972, and has taken full advantage of his repeat visits to deepen and broaden his insights. The focus of his research has been on the lakeside villages and those

who have exploited the rich fisheries and reed beds of this gigantic lake.

Orlove begins the book with a look at the place of lakes in literature. In most novels, lakes are scenes of vacation and danger, while Titicaca is “a place of sustenance and memory.” Works by Thoreau and Garrison Keillor, and the Gospels, do express the sense of a lake as a “presence.” Orlove suggests that relationship to landscape is one of the realms (along with sex and illness) in which the affinity of different people is strongest, and provides the basis for mutual understanding.

The remaining chapters are organized under the simple themes of “not forgetting,” “mountains,” “names,” “work,” “fish,” “reeds,” and “paths.” In the first of these chapters, Orlove’s analysis of song lyrics and interviews suggests that memories of the lake and local relationships are strong, and are reinforced by a condemnation of forgetfulness. Through memories and commitment, the peoples of the lake have struggled to maintain local ties while adapting to the changes of recent decades.

After describing a mountain climb that serves as the occasion for discussing the geography of the region, Orlove discusses the pitfalls of terminology. There is no Quechua term for “fisherman,” for example. Orlove opts to use the place-based term “villager” instead of terms referring to class or ethnicity, following the example of the villagers’ own usage. He then discusses at length the difficulties of determining the labor efficiency of fishing. A detailed survey suggested that fishing was a more labor-efficient way of earning income than other options available to villagers; the continued sustainability of the fishing economy has thus been dependent on the ability of villagers to establish territorial use rights in fishing and turn an open resource into regulated common property.

Orlove finishes his discussion with the provocative hypothesis that villagers are not just concerned with efficiency but also feel a need to make all available time and space productive.

A long and detailed chapter on fishing documents the relative sustainability of this livelihood over time; despite the abortive introduction of canneries, and the introduction of new varieties of fish, only one fish species has gone extinct and villagers remain in control. The reed beds of the lake have also been relatively stable over time and managed by village institutions. Waterfowl are abundant and there are no endangered species. Orlove discusses the experience of the Titicaca National Reserve set up in 1978 to “protect” the reed beds and local fauna. Since 1986, this has been merely a paper park, thanks to successful local resistance and the lack of sustained national enforcement. His sympathies clearly lie with the locals.

The final chapter discusses a perspective on conquest as being an ongoing process or path, rather than a completed project, in view of the continued ability of indigenous peoples to resist and retake control of resources. Indeed he suggests that the Americas are experiencing a “third conquest” after the first conquest of the sixteenth century and the “second conquest” of the nineteenth century (Topik and Wells 1998). Around Titicaca, the third conquest may involve petroleum exploration, and efforts to divert water to coastal mining districts.

Although villagers have worked to improve roads and bring schools to their region, Orlove argues that they lack an overarching indigenous concept of development. Instead, they view change in a more nonlinear way. The paths they follow are not metaphorical paths of conquest or development, but real paths of opportunity and threat, including the threat of departure and forget-

ting. The book rises to eloquence in its final two pages, with an evocation of the contemporary presence of villagers around the world.

The book is illustrated with simple maps and black-and-white photographs. The maps communicate effectively, but not all the photographs have reproduced well (at least in my copy of the book). The shape, size, typeface, and binding are pleasing, and the editing is impeccable. The entire project communicates the highest standards of contemporary humanistic scholarship.

The book is richly informative as a critical discussion of methodology, conveying the excitement and creativity needed in seeking out, creating, and analyzing novel data sources such as surveys, diaries, and interviews. It is an excellent choice to put in the hands of graduate students, especially those tempted by over-theorization. Orlove's humanism, and reverence for the real and contextual, allows his Andean informants and case examples to speak. At the same time, his methods involve real rigor; no point is grounded in a small database, and no conventional wisdom (from whatever academic source) is left unchallenged.

Although Orlove was a pioneer of post-ecosystemicist approaches in cultural ecology, including adaptive approaches, overt theorizing is absent from the text. The theory is there, but is implicit rather than explicit. The scholarly apparatus and references are discreetly ensconced in 35 pages of fascinating notes. Another resource: Orlove publishes the addresses of websites containing lots of raw data used in his research.

Orlove has crafted a masterpiece that transcends labels. Those of us interested in labels will place it among the classics of Andean studies, mountain studies, and cultural and political ecology of the last three decades. Others will simply look at it as a model of how to

be a scholarly pilgrim in a distant place, connect, and keep faith.

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### Doi Moi in the Mountains: Land Use Changes and Farmers' Livelihood Strategies in Bac Kan Province, Viet Nam

Edited by Jean-Christophe Castella and Dang Dinh Quang. Hanoi, Vietnam: The Agricultural Publishing Press, 2002. viii + 283 pp. Highly developed countries: US\$42; less developed countries: US\$14. Postage and handling: US\$12. Available from the International Rice Research Institute (IRRI), DAPO Box 7777, Metro Manila, Philippines; Fax: (+63-2) 845-0606; irri@cgiar.org

This collection of articles, also available in Vietnamese, presents the results of extensive field studies of farming communities in the province of Bac Kan, in the northern mountains of Vietnam. Bac Kan, mostly inhabited by ethnic minorities, is one of the poorest provinces in Vietnam. The focus is on changes since Doi Moi, the Vietnamese Communist Party's term for reform and renovation in the economy. Doi Moi literally means "change and newness"; the term was coined in 1986 for a transition from the centrally-planned Stalinist command economy to a "market economy with socialist direction," often referred to as market socialism. The studies were conducted by the SAM (Mountain Agrarian Systems) program, a partnership of the Vietnam

Agricultural Science Institute, the International Rice Research Institute, and the French Institut de Recherche pour le Développement and Centre de Coopération Internationale en Recherche Agronomique pour le Développement. The researchers employed a wide variety of methods, including analysis of air photographs, participatory observations, household surveys and in-depth interviews with key informants. They selected a number of villages to represent the region's diversity in ethnic backgrounds, resource endowment and socioeconomic conditions.

The 10 articles are presented in 2 parts: monographic studies and thematic studies. The monographic studies cover 5 different districts of Bac Kan Province. They analyze agrarian change at village level as the result of historical factors and internal household characteristics. The central hypothesis is that household differentiation is the product of 2 main factors: 1) labor force availability within households, and 2) access to land, especially paddyland. The thematic studies provide an analysis of change at the regional scale. They provide an explanation of the complex relationships regarding the behavior of individual farmers, the institutional framework regulating access to resources, and the natural and socioeconomic environment that characterizes the period of transition ushered in by Doi Moi in Vietnam.

In Part I, Chapter 1 describes land use changes in Xuat Hoa Commune since Doi Moi. Pro-market reforms have led to the replacement of shifting agriculture by intensive farming, including paddy fields and orchards. This has raised incomes and helped preserve wooded areas. At the same time, however, household differentiation has increased substantially. The poorest families have been unable to participate in the reformed economy. Chapter 2 investigates the transfor-

mation of farming systems by two ethnic groups in Ngoc Phai Commune. The Tay are sedentary paddy-rice farmers; the Dao are nomadic swidden agriculturists. Commercial agriculture has led to a convergence of farming systems in these two groups. The Tay and Dao who have access to lowland fields have become paddy-rice farmers. On the other hand, destitute members of both ethnic groups practice swidden farming. Ethnicity has become less important than socioeconomic status in determining livelihood practices. Chapter 3 analyzes the impact of Doi Moi on agricultural diversification in a commune of Choi Moi District. The study emphasizes the strong reactivity of farmers to policy and institutional changes. Forest allocation to households has led to considerable diversification of farming, including fish raising, pig rearing, and fruit- and timber-tree production. For most farmers, profitability depends on access to market information. Chapter 4 investigates the role of the state in agrarian dynamics in Duc Van Commune. This study confirms the importance of government intervention in rural development. Agricultural support services, especially market research and agricultural extension, are keys to rural development. Chapter 5 studies the impact of accessibility on farmer's livelihood options in Ba Be District. For market reforms to succeed in boosting agricultural incomes, it is necessary for governments to invest in roads and communication networks. A strong focus on rural development policies is needed to prevent large-scale rural-to-urban migration.

In Part II, Chapter 6 combines broad-range statistical analysis with localized monographic studies to identify the main components of land use change under pro-market reforms in Bac Kan Province. It shows that land use is mostly shaped by interactions among the natural resource endowment and local rules

for natural resource management. It emphasizes the growing contribution of internal village factors (population pressure, production strategies, resource management institutions) to land use dynamics.

Chapter 7 shows that paddy-rice farming remains the top economic activity in the province. While market reforms have led to the diversification of the rural economy, farmers reinvest most of the profits from cash crops and non-farm activities into paddy-rice farming. This is accompanied by 2 main trends: the decline of upland rice and swidden agriculture, and the sedentarization of farmers. Chapter 8 focuses on the impact of forest allocation policy on shifting cultivators. The main result is that forest allocation has put an end to shifting cultivation and forced people to experiment with new farming methods, including silviculture, aquaculture and animal husbandry. This has ushered in an era of uncertainty. As the land base per capita continues to decrease, some households have migrated to New Economic Zones in the south of Vietnam. Chapter 9 investigates the challenges associated with raising livestock and growing crops on a scarce land base.

Animal husbandry is an important component of farming systems in these uplands. However, the paucity of agricultural land makes it imperative for farmers to phase out free-grazing and to integrate feed crops in their production systems. Chapter 10 examines the tensions generated by biodiversity conservation policies in upland farming communities. Policies to protect biodiversity in Ba Be National Park have largely failed as poor farmers continue to expand their farming activities into forests. The lesson is that biodiversity protection cannot be dissociated from rural development. And to succeed, local people must be included in the planning process.

Overall, this book contains a useful collection of studies on

upland development in Vietnam. Together, they provide considerable insights into the many challenges faced by rural communities in a region that is undergoing a profound transformation under market forces. The research methodologies adopted in individual studies are diverse and convincing. They provide a powerful framework for theoretical generalization to a broad regional scale in Vietnam. This research shows that farmers have the capacity to innovate and implement farming methods that are ecologically and economically sustainable. The key to success in improving livelihoods may be the local institutional framework. The fate of entire farming communities is linked to the local interpretation of land laws and forest allocation policies. Successful farming and forestry programs depend on the capacity of the policy framework to represent local views. The call is for a "bottom-up," community-oriented process in rural development and a participatory approach in research.

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### **Ecological Restoration of Southwestern Ponderosa Pine Forests**

Edited by Peter Friederici. Washington, DC: Island Press, 2003. xvii + 561 pp. US\$30. ISBN 1-55963-653-X.

Human disruption of natural processes often has quite profound effects on ecosystem viability. A well-known example is from ponderosa pine (*Pinus ponderosa*) and closely related forests in western North America. Prior to European-American settlement in the latter half of the 19<sup>th</sup> century, recurrent, often quite frequent, low-intensity surface



fires killed a majority of regeneration and promoted typically open, low-density, uneven-aged forests. Land use that accompanied settlement—especially intensive livestock grazing that reduced grass and herbaceous fuels and, later in the 20th century, active fire suppression—resulted in cessation of surface fires from almost all ponderosa pine forests. Fire suppression is the great paradox of land management during the 20th century. Loss of low-severity surface fires resulted in drastically altered forest structures and fuel conditions that have led to more intense, catastrophic burns when fires eventually—and inevitably—occur. Widespread and often wasteful logging also took its toll by reducing historical size and age classes across much of the range of ponderosa pine. And, perhaps less visible but certainly no less critical to ecosystem function, the loss of fire as a “keystone” ecosystem process has had cascading effects on interrelated ecosystem components. Reduced nutrient cycling, lessened stream flows, and loss of species diversity are a few of the impacts resulting from fire exclusion and forest closure over the past century.

Widespread recognition of these changes has led to a quite remarkable consensus among ecologists, foresters, land managers, and all others interested in ponderosa pine forests about the need for a return to more sustainable conditions. This consensus finds its strongest voice yet in *Ecological Restoration of Southwestern Ponderosa Pine Forests*, skillfully edited by Peter Friederici and published in association with the Society for Ecological Restoration International and the Ecological Restoration Institute (ERI) of Northern Arizona University in Flagstaff. This compilation is the definitive statement on the context, science, politics, esthetics, economics, consequences, and implementation of ecological restoration in ponderosa pine forests in the

southwestern USA. The volume includes over 20 papers from over 40 contributors, all of whom are among the premier researchers and practitioners in the region.

The volume is divided into 4 main sections, each of which opens with a case study designed to set the stage for further discussion in accompanying chapters. The first set of papers summarizes the historical, social, and philosophical background for why restoration is needed and how it is being and can be implemented. Friederici opens with a review of the “Flagstaff Model,” which is based on years of observational and experimental research mainly in northern Arizona. Much of the book is based on restoration done in the Flagstaff area and this opening paper adequately sets the stage for the rest of the volume. Wally Covington—the founder and current director of the ERI, and one of the earliest and still strongest advocates for landscape-scale restoration efforts—provides an excellent summary of current evolutionary and historical understanding of ponderosa pine ecosystems and community/disturbance interactions. Max Oelschlaeger’s essay bringing “sweet reason” to bear on the contextual and ecological bases for restoration is also a must-read.

The second section outlines ongoing restoration and specific consequences for soils, hydrology, fauna, and fire behavior. Restoration usually involves some combination of silvicultural treatments to reduce current tree density and restore historical variety in tree size and age classes, followed by reintroduction of surface fires. While a principal objective in natural areas is to restore natural forest structure and to reintroduce fire as an ecosystem process, in many areas restoration has the more prosaic goal of mitigating fire hazard by reducing fuel loads and removing “ladder” fuels created by over a century of fire exclusion. The first paper in

this section is a concise summary by Bill Romme and coauthors of the Pines Project in southwestern Colorado, where objectives are both fuel reduction and restoring ecological integrity. Since most of the book focuses on work in northern Arizona, this paper is a good contrast from another region of the Southwest.

The third section includes several papers that discuss what is known about specific effects of restoration on forest composition and biodiversity. Chapters on overstory and understory vegetation, invasive plants, vertebrates, arthropods, and threatened, endangered, and sensitive species provide comprehensive reviews of the state-of-knowledge in each of these subjects. The volume also contains several appendices listing threatened, endangered, and sensitive species that may be affected by restoration in ponderosa pine forests.

I found the last section perhaps the most interesting, with 6 papers on practical concerns that must be addressed when planning or implementing restoration projects. Ann Moote opens with a review of several community-based restoration efforts, which should prove useful to anyone with a specific project in mind but needing some basics on where to start. Other practical details discussed in following papers include smoke management and the protection of cultural resources; the book closes with 2 insightful papers, the first by Pete Fulé and the second by Carol Murray and David Marmorek, on the absolute need for monitoring to make sure that goals are being met and that unexpected results are taken into account in adaptive management frameworks. These last 2 chapters in particular should be considered as must-reads for anyone involved in ecological restoration, not only of ponderosa pine forests but of any ecosystem.

Peter Friederici has quite successfully compiled a well-written

synthesis on restoration of Southwestern ponderosa pine ecosystems. I could find little fault with any chapter: each stands alone but complements the rest quite well. This book will be of strong interest to 2 groups of people: first, those who care about the future of ponderosa pine forests in the Southwest (and, in fact, anywhere in the West; much is applicable to all ponderosa pine forests); and second, anyone involved in ecological restoration in any ecosystem. Although the emphasis is on Southwestern ponderosa pine, much of the book will be of practical interest any place where human disruption of natural processes is of concern and ecological restoration is contemplated or in progress.

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### Methodological Issues in Mountain Research: A Socio-ecological Systems Approach

Edited by P.S. Ramakrishnan, K.G. Saxena, Suprava Patnaik, and Surendra Singh. New Delhi, India: Oxford & IBH Publishing, 2003. xiii + 283 pp. US\$47.00 including air-mail postage. ISBN 81-204-1603-1.

This book is a brave attempt to tackle a fundamental topic in mountain research. It is based upon presentations at a workshop in Shillong, India, sponsored by UNESCO, the Mountain Research Initiative (MRI), and the International Centre for Integrated Mountain Development (ICIMOD), which addressed capacity building for young scientists in the region. The book reflects more than 30 years of collaborative work in northeast India and, more recently, in the Himalayan region in gen-

eral. A series of individual contributions examine both the conceptual and practical issues associated with linking the biophysical dimensions of ecology with the human dimensions of development, seen as a "critical requirement in many areas of mountain research" (page v).

The overall direction of the book is established by Ramakrishnan in Chapter 2. He focuses on "an integrative approach" which uses a somewhat unreconstructed view of ecological dynamics to explore natural resource processes and energy flow through agricultural systems. He characterizes the societies and landscapes of mountain areas in terms of their use of traditional ecological knowledge (ethnobiology), and analyzes the processes through which these societies have incorporated new crops, technologies and the wider impact of globalization. The chapter puts particular stress on an examination of these processes at different scales—species, functional group, ecosystem, and landscape—which reflect both increasing complication and spatial extent. Moreover, many communities originally managed natural resources within traditional cultural frameworks. For example, the notion of "Sacred Groves"—an important concept in many mountain regions—provides (or at least did at one time) a strong institutional framework for maintaining biodiversity. He concludes that the techniques of Adaptive Sociological System Management suggest the most useful way forward for thinking about mountain environments and societies.

A further extensive contribution by Ramakrishnan explores in detail research on shifting agriculture (*jhum*) in northeast India. This chapter is almost completely dominated by ecological issues that provide the basis for an analysis of cropping and fallow management. This analysis is constructed using the concept of food energy equiva-

lents, and results in an interesting model of energy flow through the system. The chapter quickly concludes with policy implications based almost entirely on these findings from ecological analysis. At no point is there any attempt to translate the energy measures into economically useful indicators of value in policy analysis.

A number of other chapters seem designed solely to explore certain aspects of the natural environment. Swift et al concentrate on discussing biodiversity as a key factor in soil fertility, but do not show how to compare the social and economic benefits of high diversity with those of a more limited ecology but perhaps greater economic productivity. Likewise, Froehlich et al and Sharma et al, whilst highlighting quite clearly the issues and processes associated with hydrology and watershed management, at no point provide a linkage with institutional or other socioeconomic dimensions that are of considerable significance for mountain communities. It is noticeable that none of these chapters really discuss poverty or livelihoods, surely critical elements in the study areas!

As a contrast, Sengupta places the core of analysis firmly within ecological economics. He emphasizes that all communities, including those in mountain areas, are faced with a series of choices, of which perhaps the most important is that of land use practices. It is through the focus on land use that his contribution effectively tries to link the social with the ecological, using a simple categorization of land use types. He advocates the use of environmental accounting procedures that allow a linear programming model of maximum net value to provide a "rational choice" between alternative land uses. His methodology places the need for environmental valuation at the center of research, but fails to discuss the difficulties and drawbacks of such work especially in mountain

regions and where non-market conditions often prevail.

A rapprochement between these two somewhat contrasting approaches is provided by Maikhuri et al and Patnaik et al. In a discussion of “integrated natural resource management,” Maikhuri et al focus on a parallelism between ecological and social concepts drawing upon the work of Price and Thompson (1997). This emphasizes the individual and social choices facing communities in the way natural resources are valued. In turn, the authors suggest ways in which, through linking biomass development and land rehabilitation to their economic costs, more systematic socioeconomic evaluation can be developed. From the perspective of the development of non-timber forest products, Patnaik et al provide a general account of the role of conservation policies and emphasize the significance of institutional arrangements—which no other chapter really highlights.

Perhaps the most interesting contributions are those of Lele and Miri. Lele proceeds from a general discussion on sustainable development to examining the role of “disciplines” in socially relevant research. In particular, he explores the issues of performing value-sensi-

tive rather than value-neutral research, the latter being the traditional hallmark of much physical and biological research. He notes the recognition of the problem expressed by C.P. Snow as the “big divide,” and goes on to argue that real interdisciplinary work will need wholesale changes in the educational and policy making structures of countries. In this sense, rather like in Patnaik et al, it is the institutional framework that is the barrier to effective research. It is a pity that the only contribution of a philosopher, Miri, is so short. His brief account provides some background to the dilemmas faced by Lele, in particular the dualities around which much of western thinking has been based. There is a whole field here to explore, as many eastern philosophies embrace a more holistic framework, but these in turn are not well linked to current “conventional wisdom” on scientific, especially physical science or biological, research. In social sciences, however, the last few decades have seen a plethora of alternative people-centered models take center stage in some accounts which provide a much better framework for the issues discussed in the book.

The original purpose of these contributions was to provide guide-

lines to new workers in the arena of mountain research. Although it contains some interesting information and ideas, the book suffers from a deficient conceptual framework. The resultant disparate range of approaches does not move us any further forward in this difficult problem. It also fails to assess the considerable literature that now exists on interdisciplinary research and the problems of valuation which are inherent when trying to link biophysical and social research. The “game” is somewhat revealed when the lead editor, when discussing interdisciplinary teams, effectively concludes that they will work if an ecologist is in charge! On the evidence presented in this book such an approach would produce interesting scientific results but be inadequate for clear decision-making.

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The *Revue de géographie alpine* and *Mountain Research and Development* publish their respective tables of contents to promote exchange of scientific information on mountain areas. The articles in *RGA* are available in French and English.

## ***Revue de géographie alpine / Journal of Alpine Research***

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**Luc Descroix, José Luis Gonzalez Barrios, David Viramontes, Eva Anaya,  
Laurent Brouste, Arnaud Bollery**

Eaux des hauts et eaux des bas:

La Sierra Madre Occidentale, château d'eau du Nord Mexique

*Highland and lowland waters:*

*The Western Sierra Madre, the water tower of Northern Mexico*

**Dominique Dumas**

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