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Books

Rains, Landslides and Floods in the Darjeeling Himalaya

Edited by Leszek Starkel and Subhashranjan Basu. New Delhi, India: Indian National Science Academy, 2000. vi + 168 pp. US\$30, Rs 250.

Most researchers with an interest in landsliding and flooding in the Himalayas will be familiar with the large number of academic papers deriving from an extensive series of studies in the Darjeeling Himalaya of northeast India. The 1972 article by Leszek Starkel must be one of the most cited Himalayan research articles. These studies led to a collaborative project between the Indian National Science Academy and the Polish Academy of Sciences from 1984 to 1996, the former led by Professor Subhashranjan Basu and the latter by Professor Starkel. The project has considerably expanded our knowledge and understanding of the nature and rate of operation of environmental processes in this part of the Himalayas. Staff in the Departments of Geography at North Bengal and Calcutta Universities have also been involved in some of this work.

The results of much of this research have already been published in a variety of publications, not all of which have been readily available to the wider academic community. Here lies the importance of this volume: it brings much of this literature together in a meaningful way to produce a comprehensive record of the relationships between rainfall characteristics, runoff, erosion, landslides, and land use in this very sensitive mountain environment. Because of the length of the period of study, the results can be used to make useful inferences concerning the magnitude–frequency conundrum that bedevils much

short-term research in highly dynamic mountain environments. The opportunity is also taken to compare the Darjeeling studies with those conducted in other parts of the Himalayas.

The first 4 chapters (“Mountains of the Monsoon Rainfall Tropics,” “History of Research and Methods,” “Environment,” and “Rainfall Characteristics”)—although short—provide the general background to the environmental characteristics of the study area. The chapter on rainfall characteristics is especially interesting because of the 100-year rainfall record for Darjeeling town. The annual sequence shows an interesting cyclic character with a periodicity of about 10 years and a general decline in annual amounts from about 1920. These characteristics are not examined in the chapter, which is unfortunate because there is clear scope for a general discussion of long-term changes. What is abundantly clear is that there is little relationship between annual rainfall and landsliding events. The intensity and timing of the rainfall is much more important. As the authors admit, information on rainfall intensity is limited, although the intense landsliding in 1950, 1968, and 1980 appears to have been triggered by days of continuous rain.

The bulk of the volume is contained in 2 chapters (“Mechanism of Slope Processes and their Evolution,” “Floods, Sediment Load and Channel Formation”). Each chapter summarizes a series of individual studies, such as “Mass Movements Created During Extreme Rainfalls,” “Landslides Along Roads,” and “Generation of Flood and Sediment Load.” The book concludes with 3 short chapters (“Role of Extreme Events in the Transformation of the Darjeeling Himalaya,” “Present Day and Future of the Darjeeling Himalaya,” “Case of the Darjeeling Himalaya in the Context of Environmental Changes in the

Mountains of Monsoonal Tropics”). All 3 chapters are disappointingly short, especially the last.

Having visited the Darjeeling Himalaya,—thanks to the hospitality of Professor Basu—and worked extensively on landsliding and soil erosion in the Middle Mountains of Nepal, and having also visited the Himalayas of northwest India, I have my own views of where the Darjeeling Himalaya fits into the wider Himalayan system. But it would have been useful to learn the authors’ views. Much research, especially since the publication of *The Himalayan Dilemma* (Ives and Messerli 1989), has indicated that a general reassessment of Himalayan environmental degradation is needed. This book represents a lost opportunity to inform that debate—though the information presented in it will enable others to perform that task. Apart from this slight deficiency, the book is an excellent summary of the Darjeeling research, is well illustrated (including a number of clear color plates), and is authoritative and readable. It represents a classic example of what can be achieved by a reasonably long period of continuous observations. Unfortunately such studies are rare in the Himalayan region.

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Waters of Life: Perspectives of Water Harvesting in the HKH

Edited by Mahesh Banskota and Suresh R. Chalise. Kathmandu, Nepal: International Centre for Integrated Mountain Development, 2000. Volume I, 101 pp; Volume II, 332 pp. ISBN 92-9115-104-1 or 92-9115-118-1 (Vol I) and 92-9115-121-1 (Vol II)

Water in Nepal

By Dipak Gyawali. Kathmandu, Nepal: Himal Books, 2001. xiv + 280 pp. ISBN 99933-13-11-4

Water is fundamental to both life and livelihoods. It can be argued, quite forcibly, that the efficient management of water resources is the single most important global issue now. Some areas of the world have too much water, some too little. It is generally assumed that mountains are well endowed with water resources. But this is not always so. In the Himalayas, the marked seasonality of precipitation amounts and type means that for part of the year some areas have too much water and at other times there is too little. There are also marked geographical patterns in water availability, with the western parts of the Hindu Kush–Himalaya (HKH) receiving much less precipitation than the eastern areas do. There are also major conflicts over the use of the available water resources. Farmers not only have to compete for water among themselves, but also have to contend with increasing consumption in the industrial, urban, and power sectors. Many of these demands are incompatible, making sustainable water management difficult. The 3 volumes reviewed here provide contrasting insights into the conflicts and issues surrounding water management in the Himalayan region.

Although the emphasis of all the volumes is on the Himalayan region, the issues they raise are of direct relevance to any area where conflicts arise in the management of water resources.

The 2 volumes entitled *Waters of Life* represent the proceedings of the Regional Workshop on Local Water Harvesting for Mountain Households in the HKH region, held in Kathmandu in March 1999. Volume 1 contains the background information to the workshop and a general overview of the main issues. The first chapter summarizes the contributions that are reproduced in full in the second volume. This is followed by general overviews of “Water Resource Management in the HKH,” “Water Policies and Local Water Harvesting,” “Water Harvesting Practices in Mountain Areas,” and “Social Aspects and Local Water-Harvesting Systems.” Volume 1 also contains a very useful annotated bibliography on water harvesting. Volume 2 contains policy reviews and summaries of case studies undertaken in 5 countries of the HKH (Bhutan, China, India, Nepal, and Pakistan).

The 6 case studies reported in detail were carried out in contrasting climatic and water regime areas. Three studies represent conditions in the densely populated Middle Mountain region of India (Tehri Garhwal), Nepal (Kabhre Palanchok), and Pakistan (the North-West Frontier at Mansehra). The other 3 studies represent the cold and arid rain shadow areas of Ladakh (India), Mustang (Nepal), and Baluchistan (Pakistan). All the case studies are remarkably comprehensive, with a wealth of tables, maps, and illustrations. They also provide information on the policies, agencies, and government organizations involved. They illustrate, in exemplary fashion, what is being done and what needs to be done. Although the HKH region is complex and extremely varied, the case studies have been carefully chosen

so that the information provided can be used, with care, as indicative of the issues facing the entire region.

It was implied, in the introduction to this review, that efficient water use and management are complex issues, with no simple answers to the conflicts that frequently occur. This is abundantly clear in the information and discussion presented in *Water in Nepal*. This book, mirroring this complexity, is also difficult to describe and categorize. Its author was a Nepal government engineer before becoming an independent analyst on water issues. His recent work has focused on the interface between technology and the sciences, increasingly using a Cultural Theory paradigm. Thus, the book is part science, part social philosophy, and part environmental economics. It is in 2 parts. One part comprises a monograph originally published by the East–West Center, Honolulu, Hawaii, in 1989 (under the same title); the other part comprises 9 essays written over the last 2 decades and previously published mostly in *The Rising Nepal* and *Himal*. It is not an easy book to read, partly because of the complexity of the topics and issues and partly because the arguments are somewhat convoluted. It must also be stressed that it represents a personal viewpoint that not everyone would agree with. Gyawali admits that many of his ideas are controversial. Yet they are interesting, often stimulating and thought provoking, and deserve to be aired. However, it is not clear how they can be incorporated, in a meaningful way, in the water management decision-making process.

Analysis and deliberation are key issues in environmental decision making. The levels of analysis and deliberation presented in *Waters of Life* are realistic and pragmatic, largely because the issues are site-specific and hard decisions are taken. By contrast, the views pre-

sented in *Water in Nepal* are, in general, theoretical and idealistic. This is largely because Nepal is considered as a whole and the decisions taken are mostly political. Issues such as state control, national politics, foreign-aid dependency, and international negotiations where the major rivers cross national boundaries are all relevant at this level.

The 2 volumes demonstrate very forcibly the dichotomy between small and large projects, and between local and national control on the decision-making process. The gap between pragmatism and idealism seems as wide as ever. As a geographer, it brought home to me that we have not yet come to terms with the scale problem. Hydrologists and climatologists talk about upscaling and downscaling. This may be statistically feasible, although not necessarily easy, when dealing with scientific data. It is virtually impossible when dealing with the social and cultural dimensions. This is why, on reading the 3 volumes together, I was stimulated, frustrated, enlightened, and confused in equal measure. But the whole process was extremely beneficial, and I have no doubt that many other readers will benefit from reading these volumes.

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Innovaciones Mexicanas en el Manejo del Agua

Compiled by David Barkin. Mexico DF, Mexico: Centro de Ecología y Desarrollo, AC, 2001. 231 pp
US\$15.00. ISBN 968-7671-05-X

Few issues are as central to Mexico's future as the sustainable use of its national water resources. Few issues so signify its struggle to equitably

modernize the management of natural resources. For more than a decade, Mexico, with the support of multilateral institutions, has engaged in a process of restructuring its water sector, decentralizing both agricultural and urban water management, creating new arrangements for the representation of stakeholders, establishing mechanisms for more effective water markets, and according greater weight to improving water quality. For such an ambitious reform, it is not surprising that the process has been uneven. Its achievements to date are decidedly mixed, and its social implications remain controversial and imperfectly understood.

It is curious, then, that such a far reaching set of reforms has received comparatively little analytical attention outside government bureaus, especially when compared with the considerable scholarly attention given to Mexico's land reform process in this same period. *Innovaciones Mexicanas en el Manejo de Agua* is a welcome addition to an all too sparse literature examining recent changes and critical responses to Mexico's water reforms.

Readers should know at the outset that the verb "innovations" in the book's title is meant to embrace a set of articles that variously offer critical examination of Mexico's national water reforms, analysis of efforts to decentralize water policies, descriptions of regional and local efforts to address both water quantity and water quality issues, and proposals for further reforms, both speculative and concrete. The 15 contributions range from the merely descriptive to the analytical—but each contributes to an understanding of the complex panorama of change in Mexican water policy.

An early essay by Asit Biswas stresses the importance of the topic by situating Mexico's reform effort within a global context in which water may well establish the limits of national development. Biswas

draws attention to the need for greater attention to water quality and needed investments in water infrastructure if national water stocks are to be used in a sustainable manner. Few would deny that both challenges are critical as Mexico faces the future. Framing the problem globally and nationally simply in terms of quality and supply, however, neglects the cardinal equity factor in meeting the needs of a society still substantially defined by a socioeconomic dualism. This reality in Mexico complicates the familiar terrain of social and political conflict amongst water users and ups the ante on modernizing solutions to the familiar dilemmas of water provision and conservation.

Such equity issues pervade the reform discussions that follow. At the national level, Mexico's water reform is analyzed by Enrique Castelan, whose insightful essay traces Mexican water administration from a centralized, technocratic planning past through structural transformation since 1989. Castelan argues that centralized management of the water sector neglected the maintenance of infrastructure and sanitation provision and made no allowance for ecological demand. These problems now loom large as Mexico contemplates a population that may well exceed 130 million in the next quarter century. The reform program has sought to incorporate market principles and local administration in restructuring both agricultural and urban water management, but these policies have proceeded unevenly and sectorwise. Poor policy integration and lack of fiscal support at the national level continue to dog the reform process. This is further affected by the structural reality of economic dualism, neglect of subsistence farmers in rural areas, and political changes that have altered the structure of formal representation of water stakeholders while delaying consensus on policy questions. Mexico's challenge, argues

Castelan, is to balance the search for more efficient water utilization without imposing greater burdens on the poor, and with mechanisms that extend the benefits of water utilization to marginal groups. Accomplishing this will require a cultural transformation of public attitudes toward water, greater public participation in water policy and management, and fine tuning the market and decentralization measures now in play.

Castelan's concern with the distributive consequences of liberal reform in the water sector is echoed by other scholars. Abraham Cazares describes the predicament of the state of Morelos' highland *municipios*, now granted greater authority for administering municipal water services but lacking the economic means to adequately appropriate and deliver those resources. Poor highland *municipios* of largely subsistence farmers, by failing to use their water entitlements, subsidize more prosperous *municipios* downstream. Sergio Vargas and Robert Romero note that administrative changes devolving management authority to user groups (*usuarios*) in Rio Lerma's Irrigation District No 011 have ironically undercut the bases of political representation of user groups. The old system, however corporatist and tutelary it may have been, provided farmers a channel of representation that is no longer available in the new, decentralized and market-competitive environment. Patricia Avila's study of political dispute over water quality in Morelos' Cuitzeo River watershed points out the enduring political asymmetry in water policy-making between poor farmers and powerful industrial concerns.

Other contributors are critical of the decentralizing reforms even within their own terms of reference. Vicente Guerrero's case study of Guanajuato State's experience with decentralization observes that, despite formal policy devolution, Mexico's National Water Commis-

sion (CNA) retains tight control over most of the state's water functions. State delegations have little leeway or financial means to sustain independent policy initiatives. The river basin councils (*consejos de cuencas*) established by federal law remain underfunded and ineffective. In the area of potable water provision and sanitation, where devolution is formally most advanced, *municipios* still remain heavily dependent on the states. Existing patterns of federal revenue sharing, a lack of transparency in distributing resources, poor inter-governmental and inter-sectoral coordination, and political gridlock combine to shackle progress in decentralizing water policy.

The solutions to these many problems are by no means simple—as the volume's contributors are well aware. Suggestions for further reform range across a spectrum that includes boosting federal fiscal support for decentralizing initiatives, better integrating water relevant policy sectors, and creating new institutions that are better configured to watershed realities and more responsive to regional and local publics. Quite a few of the contributors support the strengthening of mechanisms or procedures for public participation in water management. Among the most innovative suggestions are those of Barkin and colleagues, who propose the creation of Water Production Trust mechanisms (*Fideicomisos para la Producción de Agua en Mexico*): a quasi-market mechanism that would credit poor rural farmers, particularly those in headwaters regions, for their efforts in water conservation. Such trusts would promote rural water conservation and sustainable development with the support of government agencies, private enterprises, and nongovernmental organizations. Other authors point to the joint experience of the Border Environment Cooperation Commission and the North American Development Bank along Mexico's northern

border as examples of regional water infrastructure development within a framework of sustainable development values and participatory policy mechanisms that is building both administrative and political capacity for water conservation at the *municipio* level.

In sum, these essays afford a series of important snapshots of what seems to be working, what remains to be done, and what could be done in advancing water management reform in Mexico. They illuminate the many tensions associated with liberal policy reform in the water sector in a democratizing but economically divided society. The criticisms and insights should be appreciated by those interested in the progress of Mexico's water reforms over the past decade and those seeking equitable and sustainable solutions to Mexico's many water problems today.

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Inland Flood Hazards: Human, Riparian, and Aquatic Communities

Edited by Ellen E. Wohl. Cambridge, UK: Cambridge University Press, 2000. xiv + 498 pp. £70.00. ISBN 0-521-62419-3.

The book has a superb photograph of Ama Dablam on the front cover. The photograph is used later to illustrate the depositional and erosional effects of the flood caused by a moraine dam failure in the Everest region in 1977. Unfortunately, for those interested in mountain areas the front cover is misleading. Although there are elements relating to mountain areas, the majority of the book is concerned with floodplains and non-montane rivers. However, there is much of interest in this volume even if the mountain

aspect is minimal. As the preface states, it is designed to provide both a general reference on inland flood hazards and a comprehensive review of existing knowledge using specific case studies. These aims are achieved, as far as is possible, by using 3 drainage regions—the Colorado River basin of the United States and Mexico, the Tone River basin of central Japan, and the lower drainages of the Ganges and Brahmaputra in Bangladesh—to illustrate various aspects of inland flood hazards.

The fact that all the contributors are from North American institutions means that there is a preponderance of North American examples. Thus, in addition to the 3 river basins mentioned above, the Mississippi receives extensive treatment, counterbalanced to some extent by the Amazon. The 19 chapters are grouped into 7 major sections: Physical Controls on Flooding; Flood Processes and Effects; Biological Flood Processes and Effects; Effects of Floods on Human Communities; Responses to Flooding; Flood Hazard Mitigation Strategies; and Societal Controls on Human Responses to Flood Hazards. Most of these headings are self-descriptive, but Responses to Flooding is a strange section title because the chapters in it deal mostly with prediction, modeling, and statistical analysis of floods. There is also a general introduction by the editor and a short concluding chapter looking toward the 21st century. It is not possible to discuss, in detail, all the contributions. All that is attempted here is to highlight some of the topics that reflect or impinge upon mountain issues.

Highland–lowland interactions are implicit in many of the contributions, but although there are many statements to the effect that conditions upstream are often extremely important to an understanding of downstream flooding, there is little detailed analysis of this relationship. There is a brief discussion of snow

and snowmelt in the chapter on the hydroclimatology of meteorological floods and there is the recognition, with respect to Bangladesh, that “rainfall patterns in the upstream parts of Ganges and Brahmaputra appear to have less impact on severe Bangladesh flooding than does a synergism between more locally heavy monsoon rainfall combined with climatologic and hydrologic factors already in place in the lower reaches of the river systems.” In a later chapter there is a more detailed account of the Bangladesh Flood Action Plan.

There is more of a mountain flavor in the chapter assessing floods caused by dam failures. This is very comprehensive and useful, covering both natural and artificial dam failures. Failures of natural dams considered here are of volcanic, landslide, glacier, moraine, river ice, and organic (beavers) origin. The account of moraine dam failures has the strongest mountain interest, with examples from the Cordillera Blanca, Peru, the Canadian Rockies, and the Nepalese, Tibetan, and Chinese Himalayas. There are excellent photographs of the effects of such dam failures on the Imja Khola (in 1977) and Bhoti Kosi (in 1985), both in Nepal. Many of the examples of floods caused by artificial dam failures are from mountain areas, including the Lawn Lake and Cascade Dams failures of 1982 in the Rocky Mountain National Park, Colorado. The Lawn Lake flood is also used in another contribution to illustrate one of the effects of flooding, namely, large debris fans. Another significant mountain-related issue examined concerns the significance of timber harvesting and road building in affecting runoff and potential flooding. Most of the examples are from mountain and upland areas, but the coverage is mostly descriptive, with little attempt to analyze the evidence critically. The road building assessed is that related to timber harvesting; more general effects of road building in mountain areas are

not covered. Also, it is commercial timber harvesting that is the main focus of attention and not more general deforestation.

As stressed earlier, this review has mainly concentrated on aspects of flooding related to mountain and upland environments. But the strength of the book lies in its very comprehensive account of flooding in general. There is much here that will appeal to anyone with an interest in water-related environmental issues. The chapters on “Contaminant Transport Hazards During Flooding” and “The Effects of Variable River Flow on Human Communities” are good examples. A strong point is the emphasis given to biological processes and ecosystems. The last 10 years or so have witnessed a major coming together of hydrology and ecology. The 2 areas of study are no longer treated separately but are now integrated in an increasingly meaningful way, which is reflected in this book. The chapter on “Planning for Flow Requirements to Sustain Stream Biota” is especially stimulating. Much of this integrated work has been conducted on lowland rivers, and there is great scope for extending such studies to high mountain river systems.

The book will appeal to a wide readership. There is something here for anyone with an interest in the operation of natural processes and the ways in which these processes influence and are affected by human activity. Students, researchers, field workers, and policy makers will also welcome the extensive reference lists accompanying each chapter. The individual contributions are well written and copiously illustrated with clear maps, illustrations, and good black-and-white and color photographs. Also, the editing process has been extremely thorough.

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**Deuxième rapport sur
l'état des Alpes.
Données, faits, problèmes,
esquisses de solutions.**

Edited by CIPRA (Commission Internationale pour la Protection des Alpes). Aosta: Tipografia Valdostana, 2002, 434 pp. EUR 24.90. ISBN 3-906521-47-8. Also available in German, Italian and Slovene.

This is the second report on the state of the European Alps produced by CIPRA; the first was published in 1998 by Edisud. CIPRA, founded in 1952, is a non-governmental organization representing 100 associations in the 7 Alpine countries and providing an umbrella structure to coordinate the experience and thinking of bodies concerned with conservation of the physical and cultural environments, sustainable development, and the reduction of the environmental impacts of development. CIPRA publishes its documents in 4 languages (French, German, Italian and Slovene) and produces newsletters and bulletins. It has a very comprehensive web site at www.cipra.org. By grouping expertise from all the member countries, CIPRA also functions as an organ for disseminating information and has an educational mission.

This report is not a book in a conventional sense, but an inventory and audit of the condition of the Alps contributed by 93 authors, mostly academics and engineers. This large number of contributions is made coherent by their grouping into 5 sections: Alpine life, mountain agriculture, forestry, energy and planning, and land use. Apart from the first section, the structure of each section consists of a lengthy and well-documented introductory

essay, replete with recent data, graphics, maps and bibliography, which summarizes the current status and trends within each theme. These are then followed by much shorter essays and notes, in some cases merely 2 to 3 pages in length, which serve as case studies or viewpoints.

Section 1, "Life in the Alps," has no introductory essay but contains 2 extended contributions on metropolitanization and on networks. The other 24 chapters in the section's 130 pages are devoted to cultural—especially linguistic—themes, economic strengths and weaknesses, and the likely impact of climate change. Section 2, on mountain agriculture, is much shorter: 57 pages. The introductory chapter, which gives a statistical and analytical account of agriculture in each of the 7 Alpine states, is particularly useful. The remaining chapters, though brief, contain ideas on the sustainability of farming in its current form and structure and make reference to policy implications. Section 3, "Mountain Forests," discusses the historical, cultural, and ecological role of forestry in addition to its economic potential. Section 4, "Energy," is a timely detailed review of energy production and consumption set against the problems of conservation and environmental conflicts. Finally, Section 5, "Planning and Land Use," begins with a lengthy survey of the current land use structure of the Alps in which the pressures emanating from tourism and the competition for land in the valley corridors are stressed. The following chapters are somewhat disparate and polemical but raise the unresolved issues as to what role the public at large expects the Alps to play, what perceptions and values should inform planning, and the

manner in which planning regulations can mediate all the conflicting interests. The book closes with an Annex giving biographical details and email addresses of all the contributors.

This book can only be judged against its set terms as an audit and inventory rather than a scholarly or scientific text. Here we can indicate strengths and weaknesses. The physical production is of a very high standard, with abundant photographs and two-toned maps and graphs. There is no index, but the very detailed contents pages make reference easy. The most useful sections are the long thematic chapters, whereas the shorter chapters range from quite practical and interesting treatments to others which are just brief notes. Only the thematic chapters contain bibliographies. A further observation is that the authorship is heavily Germanophone. Swiss authors alone account for 38 of the total, followed by 29 Austrians and 10 Germans. Only one author is currently working in a French institution. Inevitably, this gives a Central Alpine bias to the content and a predominance of literature in German in the bibliographies. The huge amount of research being carried out in Alpine France is thus underrepresented, as, to a lesser extent, is that of Italy. With these reservations, and when combined with the first report, the book is nevertheless a useful working manual. It provides easily digested information on issues, trends and forecasts that is all the more useful for being cross disciplinary and free of institutionalized politics.

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