

HIMALAYAN NATURAL RESOURCES

Eco-Threats & Restoration Study



EDITED BY
B.D. SHARMA & TEJ KUMARI

HIMALAYAN NATURAL RESOURCES

Eco-Threats & Restoration Study



Edited by

Dr. B.D. SHARMA, Ph.D., D.Sc
Head of the Zoology Department
GGM Science College, Jammu (J & K)

Associate Editor

Dr. TEJ KUMARI, Ph.D
Lecturer in Zoology



INDUS PUBLISHING COMPANY
NEW DELHI

Preface

The Himalayan natural resources are a subject of prime interest and attention for the mountain environmentalists all over the world. This subject attracts a wide spectrum of its readership such as ecologists, climatologists, mountain biologists and environment researchers.

During the past few decades, there has been a random upsurge in urbanization and industrialization in various parts of the Himalaya which posed serious eco-threats to the security of the entire Himalayan environment.

The unabated poaching of the natural resources coupled with their commercial exploitation without preserving the genetic diversity has pushed various natural resources on the verge of extinction.

This book is an up-to-date presentation of eco-threats and restoration studies related to the natural resources of the Himalayan regions in India.

Various methods have been suggested in the book for the restoration and ecological security of the rich and varied biodiversity of the mighty Himalayan mountains.

Acknowledgement

Thanks are due to the Principal, GGM Science College, Jammu for his constant encouragement during the completion of this book.

B.D. SHARMA

Contents

<i>Preface</i>	5
<i>List of Contributors</i>	11

Section I: Himalayan Natural Resources Habitats and Bio-Ecology

1. An Equitable Earth	17
<i>Tathagata Bhattacharyya & Jajati Bhattacharyya</i>	
2. Floristics and Vegetational Composition in an Alpine Zone of North-West Himalaya	28
<i>B.P. Nautiyal, Nirmala Pandey & A.B. Bhatt</i>	
3. Non-Wood Forest Resources of the Himalaya: A Need for Conservation	84
<i>C.L. Goel</i>	
4. Man and Environment: A Case Study of Bhaderwah Area, Jammu Lesser Himalaya	112
<i>K.R. Sharma</i>	
5. Lichens of Kumaun Himalaya	117
<i>Ravindra K. Pande</i>	
6. Biodiversity of Medicinal and Aromatic Plants of Western Himalaya, their Utilization and Strategies for Conservation	121
<i>Avinash K. Sharma</i>	
7. Diversity of Bird Life in Upper Reaches of the Neora Valley National Park, West Bengal	160
<i>A. Mukhopadhyay, D. Das, G.G. Biswas, and A.K. Mukherjee</i>	

**Section II: Himalayan Natural Resources
Degeneration and Regeneration**

8. Some Issues in Environmental Degradation in the Mountain Region with special reference to Darjeeling District, West Bengal 209
N.K. De & Anil Chattopadhyay
9. Soil Loss Assessment in Karewa Landforms of the Kashmir Himalaya 223
M.S. Bhat & T.A. Kanth
10. The Uprooted Himalayan Society and Ecological Adaptation 231
Mamta Desai
11. Landslides along the Arterial Routes to Darjeeling and their Control 245
S.R. Basu & Paromita Majumdar
12. Flood Disaster and its Management in Eastern Uttar Pradesh 258
Ramanand Yadav & Pandey B.B. Lal

**Section III: Himalayan Natural Resources
Impact, Eco-Conservation and Management**

13. Equilibrium in Ecosystem 277
K.B. De
14. Eco-Conservation of Hill Areas: The Challenges and Proposals 285
B.D. Sharma
15. The Role of Forestry for Environmental Protection 291
Ramanand Yadav
16. Environmental Impacts of Vishnuprayag Project, Garhwal Himalaya 299
Ramanand Yadav
17. Managing Forest Resources: Kalej Chu Watershed in West Sikkim 308
Mamta Desai

18. Conservation, Management and Development of Non-Wood Forest Resources of the Himalaya
Avinash K. Sharma 321
19. Environmental Management of the Central Himalaya
Ramanand Yadav 342
20. Diversity of Medicinal Flora of Chamoli District of Garhwal Himalaya
Avinash K. Sharma and Rakesh P. Khali 353

List of Contributors

1. **Basu, Dr. S.R.**
Professor & Former Head, Department of Geography
University of Calcutta, Calcutta-700019
2. **Bhatt, Dr. A.B.**
Department of Botany
HNB Garhwal University, Srinagar, Garhwal-246174 (U.P.)
3. **Bhat, Dr. M.S.**
Department of Geography & Regional Development
University of Kashmir, Srinagar-190006 (J&K)
4. **Bhattacharyya, Jajati**
Executive Member
Indian Society for Wildlife Research
Calcutta (West Bengal)
5. **Bhattacharyya, Tathagata**
Secretary, Indian Society for Wildlife Research
Calcutta (West Bengal)
6. **Biswas, G.**
Department of Zoology
University of North Bengal
Siliguri-734430 (West Bengal)
7. **Chattopadhyay, Dr. Anil**
Asth. Professor of Geography
Chandernagore Government College, University of Burdwan,
Chandernagore-712136 (West Bengal)
8. **Das, D.**
Department of Zoology
University of North Bengal
Siliguri-734430 (West Bengal)

12 *Himalayan Natural Resources*

9. **De, Dr. K.B.**

Ex-Professor of Chemistry

Indian Institute of Technology, Kharagpur-721302, Kharagpur

10. **De, Dr. N.K.**

Professor of Geography

University of Burdwan, Burdwan-713104 (West Bengal)

11. **Desai, Dr. Mamta**

Professor and Head, Department of Ecology

Netaji Institute for Asian Studies, Calcutta

12. **Goel, C.L.**

Head, Nonwood Forest Products Division

Indian Council of Forestry Research and Education (ICFRE)

P.O. New Forest, Dehradun-248006 (U.P.)

13. **Kanth, Dr. T.A.**

Department of Geography & Regional Development

University of Kashmir, Srinagar-190001 (J&K)

14. **Khali, Dr. Rakesh P.**

Forest Research Institute, New Forest, Dehradun (U.P.)

15. **Lal, Dr. Pandey, B.B.**

Principal

Madan Mohan Malviya Engineering College,

Gorakhpur-273010 (U.P.)

16. **Majumdar, Ms. Paromita**

Department of Geography

University of Calcutta, Calcutta-700019

17. **Mukhopadhyay, A.**

Head, Department of Zoology

University of North Bengal, P.O. North Bengal University,

Raja Rammohunpur, Siliguri-734430 (West Bengal)

18. **Nautiyal, Dr. B.P.**

Department of Botany

HNB Garhwal University, Srinagar, Garhwal-246174 (U.P.)

19. **Pande, Dr. Ravindra K.**

Department of Geography

University of Kumaun, Nainital-263002 (U.P.)

20. **Pandey, Dr. Nirmala**
Department of Botany
HNB Garhwal University, Srinagar, Garhwal-246174 (U.P.)
21. **Sharma, Dr. Avinash K.**
Nonwood Forest Products Division
Indian Forest Research Institute, Dehradun-248006 (U.P.)
22. **Sharma, Dr. B.D.**
Department of Zoology
GGM Science College, Jammu (J&K)
23. **Sharma, Dr. K.R.**
Department of Geology
GGM Science College, Jammu (J&K)
24. **Yadav, Dr. Ramanand**
Hon. Director
Dr. Ambedkar Environmental and Water Management Centre,
399 Zaruri Bazar, Ranikhet (U.P.)

SECTION I

Himalayan Natural Resources
Habitats and Bio-Ecology

An Equitable Earth

Tathagata Bhattacharyya & Jajati Bhattacharyya

It would be perhaps wise to view environmental degradation and erosion of our scarce natural resources as a by-product of modern civilization instead of highlighting the moral failure of politicians and policy makers.

For the last two decades environmental movement around the world have prompted significant improvement in the quality of soil, water, land, forest and other natural resources primarily through command and control regulations.

With the environmental movement poised to enter a second generation, the progressive challenge for environmentalists in the 1990s is to harness the power of markets which can be more effective and far reaching than centralized regulations.

Command-and-control regulations were powerful in the early battles against environmental degradation, but they have begun to reveal many of the same limitations that led to the collapse of command-and-control economics around the globe. They can be inefficient, they hamper innovations, they ignore important differences between countries, communities individuals and regions. And these regulations tend to make environmental debate, a closed technical session among bureaucrats and vested interests groups rather than an accessible public dialogue.

In fact the world's less developed countries are still holding the finest forest resources in this planet.

While speaking of the tropical rain forest of Asia, they have always been a key element in the lives of people in most countries of Asia and continue to be of fundamental environmental, social and economic importance both in regards of national and regional development.

Although the area of tropical forests in Asia is smaller than in

other tropical regions the annual rate of change is considerably greater than in Latin America or Africa. It is estimated that Asian Forests are being lost at the rate of 1.2% annually nearly 4 million hectares which is considerably higher than the world average of 0.8% annually. Tropical forests are now estimated to cover some 1750 million hectares (1990) down more than 15 million hectares per year in the period since 1980. Deforestation in much of Asia is caused by 3 main set of activities namely:

1. Forest clearance for agriculture.
2. Unsustainable level of harvesting.
3. Forest clearance for development programmes.

Attention can be drawn to the fact that these developing countries holds the last residue of pristine forest cover in the planet.

Traditional Energy Consumption in Developing Countries

A Study of RWEDP (Regional Wood Energy Development Programme) member countries like Bangladesh, Bhutan, China, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam shows that traditional energy as a share of total energy consumption in these tropical developing countries accounts upto 94%.

Several studies reveal that in south and southeast Asia 2/3rd of all fuel wood come from non-forest area. Considering the dominant contributions from non-forest land as well as from perennial crops and various sorts of residues, it must be concluded that deforestation is not generally caused by fuelwood collection in developing countries.

(Wood Energy Concepts Dr. W.S. Hulscher)

Debt-For-Nature

Since the developed countries of the world are the major polluters of the planet, and the idea of making the polluter pay is quite befitting in the light of the enormous expenditure and scarcity of resource of developing countries in terms of maintaining ecological security. The very key issue in this resource management policy is the inequal distribution of wealth between North and South. Natural resources

move across the globe from the poor to the rich without adequate compensation, the result is that environmental damage falls disproportionately on the poor.

Japan for example according to Hanns Maul, is the largest importer of tropical broadleaf logs in the world (49.6%) of the world imports in 1988. It pulls tropical timber predominantly from Sabah, Sarawak, Borneo and Papua New Guinea. While it is simply a matter of economics—a matter of supply and demand but it also indicates that the way Japan harvests tropical timber directly contributes to the destruction of the world's rainforest. Almost all countries that can afford to preserve their own environment by importing natural resources from abroad do so. What is striking is that in all such instances little consideration is given to the environmental well-being of the people from whom the resources are taken. Such practices are just another instance of powerful countries raiding the biological wealth of less powerful countries.

Even if the North who are the major polluter and major consumer of earth's renewable and non-renewable resources are asked to pay a heavier compensation but that too perhaps does not resolve conflict and moreover this can be treated as a license to pollute. Additionally the polluting north treats the forests of the South as carbon dioxide sinks and wants to maintain them free from any biotic interference of the local community.

Attitude of the World Bank and International Funding Agencies towards Forestry in India

An article by Seema Paul in *Telegraph* (Calcutta Daily) 8th February 1994 states, "Union Environment Minister Mr. Kamal Nath took everybody by surprise when he recently announced his intention to permit the private sector to raise plantations on Forest Land." The draft proposal indicates that the State Forest Departments would take up joint ventures with corporate sector in raising such plantation. In a nutshell the proposal is a carbon copy of the successful joint forest management projects launched by fringe villagers and forest departments in India; but this time industry replaces the villagers.

This move to allow private plantations on forest lands had been initiated by the World Bank who after supporting India's forestry

programmes for two decades are moving towards auctioning the Indian forests.

In a report by Anumita Roychoudhury in *Down to Earth*, (Vol. 2, No. 2) states “labelling the Indian Governments forest policy in force since 1988 as monopolistic and inefficient, the World Bank (WB) in its latest review of countries forest sector, insists the best solution now would be to encourage private industrial plantations on forest lands.” “After supporting 10 forestry projects in the country to the tune of about US \$ 500 million most of it spent in social forestry and watershed development—WB now calls for a shift in focus to what it calls sector wide (involving all aspects of forestry) projects combining policy reforms. In other words WB wants to get into comprehensive forestry plan.

The WB criticizes the government policy by saying that despite the government monopolizing the forestry sector as policy maker, producer exploiter and provider it has failed to induce people to manage and develop forest resources adequately.

In this backdrop WB suggests to take away such forestry activities as plantations, extension services and research out of public sector control.

By so far denying industry the opportunity to take up plantations on forest lands WB contends, the government is failing to replace poor natural forests with highly productive plantations that could cut imports and the cost of industrial supplies. The MOEF argues in favour of this proposal by saying that they can generate only a meagre sum of Rs. 10 billion from internal resources annually for regrowing forests. Table 1 indicates the external dependence in Forestry sector through World Bank Aided Projects in India.

While speaking in the Asian-Pacific perspective the two main multilateral funding organizations are the World Bank and the Asian Development Bank. Forestry lending by World Bank in the early 1990's has more than doubled compared with the early 1980's. Since 1977 the Asian Development Bank has made cumulative forestry loans amounting to US \$ 794.32 millions (annual average of US \$ 39.7 million).

In terms of financing technical assistance in forestry, the leading source in UN system in UNDP, particularly allocations under Indicative planning figure, (IPF) of countries. In 1993 UNDP provided

Table 1. World bank aided forestry projects in India

Project	Year	Amount (US \$ million)
Forestry technical assistance	1975	4.00
U.P. social forestry	1979	23.00
Gujarat community forestry	1979	23.00
West Bengal social forestry	1981	29.00
J&K & Haryana social forestry	1982	33.00
Karnataka social forestry (with ODA-U.K.)	1983	27.00
Kerala social forestry	1984	31.04
National social forestry (with US AID) (U.P., Gujarat, H.P., Rajasthan)	1985	165.00
Maharashtra forestry	1992	124.00
West Bengal forestry	1992	34.00
Andhra Pradesh forestry (Being negotiated)	1993	363.00
Total		856.04

Source: *Down to Earth*, June 15, 1993.

US \$ 20.3 million for forestry worldwide through FAO alone. Asia received more than US \$ 10 million in UNDP support for forestry in 1992.

Asia and Pacific receives a relatively large portion of International funding for forestry, but the funding pattern are highly uneven. The Philippines for example has obtained over 100% of the external funding needs identified under its TFAP (Master Plan) process, while Fiji, Laos and Vietnam have received less than 25% of their identified needs.

It is true that in the Indian context under funding in the forestry sector has been a matter of great concern. Since the very beginning of the Five Year Plans allocations in the forestry sector have been extremely low. During the 7th Five Year Plan period allocations were very marginally increased to a little over 1% of the total plan outlay. The 8th plan outlay indicate that only 0.94% of the total plan allocation will be invested for development of forestry sector in the whole country.

However studies reveal (*From Wasteland to Greenery*, B.K. Bardhan Roy, I.F.S., PCED, Cal, 1993) the value of forest produce removed annually from India's forests in the form of recorded and unrecorded removals covering fuel, fodder, timber and other forests produce is estimated to be over Rs. 25,000 crores. As against this massive withdrawal, the size of the current annual plan (both state and Central) in the forestry sector is less than Rs. 1000 crores."

Bardhan Roy argues that suggested investment in forestry sector per capita per year should be as the following:

A) Suggested investment per capita per year	(US \$)
Sub-sector	
1. Environmental forestry	0.26
2. Rural fuelwood and rural developed oriented forestry (S.F., C.F.)	0.23
3. Production forestry	0.11
a) Forest & plantations	0.30
b) Forest industries	0.30
4. Forest institutions	0.19
	<hr/>
	1.09
	<hr/>
B) Investment per hectare of forest area per year	(US \$)
Sub-Sector	
1. Environmental forestry	2.65
2. Rural fuelwood & rural development oriented forestry (S.F., C.F. etc.)	2.30
3. Production forestry	
a) Forest & plantation	1.11
b) Forest industries	3.03
4. Forestry institutions	1.93
	<hr/>
	11.02
	<hr/>

Whether the investment criteria be based on per capita or per ha basis annual investment level comes to Rs. 2000 to Rs. 2500 crores which appears to be quite rational. "It is imperative therefore, that certain formula suited to our country be adopted for rational allocation of fund (*From Wasteland to Greenery*, B.K. Bardhan Roy). Thus the state departments of Forest in many states of India do look upon

World Bank as a source of resource generation, while the World Bank's forest policy hinges on two mutually contradictory concepts—community participation and involvement of private industry. Raising of plantation by corporate sector will deny local community access to the Biomass product of the forest.

The present share cropping system which offers free usufruct of all non-wood forest products (NWFP), additional employment, and a promise of 25% share of the net cash benefits from sale of short rotation sal poles had been significantly successful.

Though shortfalls have been highlighted by environmentalists and the author agrees from his field experience at (S) Bankura Forest Division, West Bengal, India, the Joint Forestry Management, (JFM) in India should more appropriately called a forest based share cropping system. In which all management decisions and control remain with the forest department and the fringe population is allowed to have some access to the biomass product of the forest as well as some cash incentive in return for their efforts to protect the forest. On many occasions it has been observed that a yawning gap exists in communication at the grass-root level and though villagers as partner of JFM project are to certain extent aware of their respective role in the management of the forest but hardly do have any input in managerial terms in the harvest of timbers and poles. Though successful models of participatory resource management can be seen in (N) Bankura Forest Division, Jeypore, West Bengal, Relegan Siddhi in Maharashtra and Pani Panchayat to name a few.

If the traditional rites of forest dwellers and fringe population to the biomass products of the forest is eventually denied that will tamper the very basic fibre of existence of some 200 million fringe population in India. A Ford Foundation aided study by Indian Institute of Biosocial Research and Development worked on the extent and magnitude of flow of non-timber forest produce (NTFP) among the Household (HH) protecting the forests in south West Bengal under Joint Management of Forest Lands (JMFL) programmes. (Role of Non-Timber Forest Produce in Village Economy K.C. Malhotra, Debal Deb et al., 1990).

The study on a total 216 HH belonging to 12 Forest Protection Committees (FPC) revealed that out of a total number of 214 wild plant species observed in regenerating Sal forests, about 155 species

(72.43%) are used by the local communities for fuel, food, fodder, medicine, commercial household articles, religious, ornamental and recreation purpose.

Moreover, the estimated value of NTFP per year per hectare in Jamboni Range amounts to Rs. 2299. It is of immense interest to note that the income flow from NTFP in a HH (Rs. 20,852) is three fold greater than the amount the HH will get from the sale of poles (Rs. 6,974) after 10 years.

The findings of the said study clearly indicates that compared to plantation approach, natural regeneration of degraded forest is not only cost effective, but also socially relevant and ecologically sound in view of the quantification of biomass flow from forest produce to local communities.

The key issue which needs to be addressed in this context is that what exactly are the Government priorities? does it focus on the demand of industry for raw materials from forest or should it be aimed to provide the needs and aspirations of the local community and eventually strengthen the ecological security of the nation.

Perhaps none of the two facets can be denied, but the most important factor can be how to balance the two. Definitely the contradictory interests of local ethnic community and corporate bodies may clash and result to devastation owing to the enormous political clout held by corporate sector in the state machinery.

Case studies on such conflicting interests in Amazonian rainforests of Brazil indicates how an export oriented policy accentuated by monopolistic culture of cash crops resulted in depletion of pristine rainforests.

Jose Lutzenburger, noted environmentalist, an agronomist by profession, and Brazil's Minister of Environment reveals the factors inducting such catastrophe.

Since development of Amazonia was previously the highest priority of the Brazilian Government thus agricultural profits made from reclaimed rainforest areas were exempted from tax.

This previous tax structure also put tremendous pressure on available agricultural land outside the rainforest. It uprooted peasants, pushing them either into the slums of Sao Paolo and Rio de Janeiro or into the Amazonian wilderness. In part the idea was to develop an export economy in soybeans and other feed stocks to supply the

intensive cattle breeding that developed in Europe as a result of common market agricultural policies. Agricultural development thus proceeded not as a means to feed Brazilians but to help the fat subsidized cows of common market. In this process the last remaining temperate forests in southern Brazil were destroyed and replaced with soyabean fields.

We must accomplish with the fact that over the past few decades, anthropogenic habitat destruction has driven an unprecedented number of species to extinction. "Once a species disappears, it cannot be reconstructed or reintroduced into the eco-system. Loss of biological diversity permanently narrows the range of genotypes available for maintaining a robust genetic base. Future generations will necessarily have less genetic resources; lower quality gene pools thus less access to the benefits of biological diversity. This leaves a significant environmental debt to our progeny." (Ethics dumped Paul Wapner, *Down to Earth*, Vol. 4, No. 5, 1995).

Thus market force and funding remains to be a vital factor in environmental protection. The days when nations could afford to consider environmental protection without regard to its costs have ended. This is equally applicable to developed countries. The U.S. Environmental Protection Agency estimates that the "business states and cities now spend more than \$ 100,000 million annually to comply with the federal environmental laws and regulations moreover federal, state and local budget shortfalls make it harder than in previous decades to spend money on public environmental protection programmes." (Making the Polluter Pay Robert Stavins and Thomas Grumbly).

Keeping in view that neither market force nor the needs and aspirations of the local ethnic community can be denied thus balanced approach should be adopted which can be meaningful.

Recommendations:

1. Priorities can be given to form village co-operatives who can pull in funds from capital market in terms of subscription for equitable shares/fixed deposit schemes—which can offer reasonable funding for raising economically viable and ecological sound plantations and help in paying proper dividend to the investors.

2. World Bank's proposal to remove regulative hurdles in felling and removal of timber from plantations raised on forest land by local villagers, should be incorporated. Various regulatory problems like Transit Pass should be removed to avoid bureaucratic deadlocks.
3. For large scale projects corporate bodies, Forest department and fringe villagers has to be made party in launching the project. Monitoring and evaluation in terms of complying to a ecologically safe operative system should be carried out by the local community.
4. Village cooperatives can also be formed to deal with marketing of all NWFP.
5. If an export oriented policy be followed for timber products, all such exports should be carried out by private firms or corporate bodies and not through State Trading Corporation or any such public agency, exporting such products at a subsidized or lower rate for meeting trade deficits, debts, bilateral agreements with North countries. Thus agencies should aim to realize maximum benefit from the consumer nations in order to raise sufficient resource to cure all such dents caused by this biological erosion.

Promoting such selective use of marketbased mechanisms will require political courage. Some environmental advocates and legislators, however have long been hostile to the idea of weighing relative risks insisting that all environmental threats are of the highest order. But this absolutism is scientifically wrong and may prove politically shortsighted. Refusal to establish priorities among environmental problems has resulted in misdirection of efforts. Thus the South who is potentially harbouring the last residue of forest resource in this planet should make a meaningful utilization of this resource base should reap maximum benefit from the rich consumer nations both in economic and environmental terms with the common sense of making the polluter pay.

Acknowledgements

The authors thankfully acknowledge the kind assistance extended by Ms. Shyamashree Purakayastha, Mr. Subrata Pal Choudhury, Mr. Jayanta Mallick and Mr. Amit Das in compiling this write-up.

REFERENCES

- Bardhan Roy, B.K., (1993), *From Wasteland to Greenery*, PCED; Cal, 1993.
- Durst Patrick, B., (1995), Implementation of Agenda 21 and the Forest Principles in Asia & Pacific.
- Forest Change Detection Studies on Nine Districts of West Bengal through Digital Image Processing of Indian Remote Sensing Satellite Data between 1988 and 1991—FD West Bengal & RRSSC/ISRO, GOI.
- Hulscher W.S. (1995) Wood Energy Concepts, *Forest News: Tiger Paper*, Vol. XXII, No. 3.
- Malhotra K.C., Debal Deb, M. Dutta, T.S. Vasulu, G. Yadav & M. Adhikari (1990), Role of Non-Timber Forest Produce in Village Economy.
- Paul Seema, (1994), Barking the Wrong Tree, *The Telegraph*, February 8, 1994.
- Raychoudhury Anumita, (1993), Private Plantation Urged on Forest Land; *Down to Earth*, Vol. 2, No. 2, June 15, 1993.
- Satvins Robert and Thomas Grumbly (1995), Making the Polluter Pay.
- Wapener Paul, Ethics Dumped, *Down to Earth*, Vol. 4, No. 5, July 31, 1995.