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SUSTAINABILITY OF THE HIMALAYAN FORESTS: SOME PERSPECTIVES

N. S. Jodha

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N. S. Jodha

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N. S. Jodha is the Head of the Mountain Farming Systems' Division,

International Centre for Integrated Mountain Development (ICIMOD),

G.P.O. Box 3226, Kathmandu, Nepal

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International Centre for Integrated Mountain Development (ICIMOD)

Kathmandu, Nepal

PREFACE

ICIMOD's approach to problem oriented research involves both knowledge reviews and field studies. The focused reviews and field studies conducted by the Mountain Farming Systems Division cover various aspects of agricultural development. Since early 1988, a series of 'state of the art' reviews of agricultural policies and programmes were sponsored by ICIMOD in different countries of the HKH Region. The purpose of these studies and the subsequent National Workshops in different countries was to understand some of the constraints and prospects of Mountain area development. These exercises were also aimed at acquiring comparative perspectives of development approaches and strategies in different countries.

This paper using the 'Mountain Perspective - Sustainability Framework' developed by the author focusses upon forest, in the context of being both a product and a component of the ecosystem. The paper was presented at the "Seminar on Economics of the Sustainable Use of Forest Resources" at the Centre for Science and Environment, New Delhi, India.

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Abstract

Forest, being both a product and a component of the ecosystem, the sustainability of the two is inseparable. In the context of attaining such a goal in the Himalayan forests it can be facilitated by designing and implementing forest interventions with mountain perspective. Comparison of the conventional and the mountain perspective based potential approaches to the Himalayan forests, indicates several gaps in the former. Removal of such gaps would involve far reaching changes in the field of both policy and technology relating to forest management. This paper presents some issues requiring serious attention.

Introduction

Despite their rapid extractions and degradation, the Himalayan forests still constitute the single largest forest tract in India. However, the pace and pattern of its extraction and associated consequences are causing serious concerns about the future of the forests and dependent sustenance systems of the people. This paper attempts to convey that the unsustainability problems of the Himalayan forests are largely due to disregard of mountain perspectives while dealing with forests in the mountains.

An important factor often ignored in the debate on sustainable use of forest resources is that forests, are both products and components in the context of inputs into the ecosystem. In other words, forests supply both : (i) directly extractable products (timber, fodder, fuel, food etc); and (ii) services in terms of contributions to bio-diversity, moisture circulation, nutrition circulation, and the make-up and the stability of the environmental and physical resource variables (Gadgil et al. 1983). Broadly speaking, (i) and (ii) respectively illustrate the 'product' and 'input' dimensions of the forest in an ecosystem context. Because of the interdependence of the two dimensions, sustainability of forests and the ecosystem are inseparable.

Sustainability in this context, would mean ability of forests to perform various functions over time without external biochemical, biophysical, and other forms of subsidisation. Forests, as a living natural resource, perform most of the functions simultaneously. The extent of each function, however, depends on biophysical and other resource base components of the forest in a given area. These facts do find mention in documents relating to forest policy etc. However, in practice, not only the forests' 'service functions' (as we call them), are pushed into the background, but even the 'product functions' are separated through various legal and administrative impositions. Accordingly, we designate different parts of forests as protected or reserved forest, commercial forest, community forest etc. By implication we also artificially fix their uses (e.g. forest for industrial raw material, forest for meeting sustenance needs of the communities etc). This sort of disintegration of the functions of the forest (a product of legal arrangements to guide forest extraction, separate people from the forest etc.), tend to misguide the whole approach towards sustainable use of forest resources. One starts thinking of sustaining specific uses of forests, in isolation from the totality. This is more so in mountain areas where not only the separation of the above "service functions" and "product functions" is more difficult, but different uses of forests are very much interdependent. The latter happens due to factors such as forest - farming linkages, upland-lowland interactions within a given valley, complementarities between land extensive and land intensive patterns of resource use etc. In order to understand the inseparability of the different functions of forests in mountain areas, we may reflect on what could be termed as mountain perspective.

Mountain Perspective

By mountain perspective we mean explicit consideration of crucial mountain characteristics while designing and implementing public and private interventions in the mountain areas at both macro and micro-levels. The important mountain characteristics or conditions which separate mountain regions from other areas may be called mountain specificities (Jodha 1989a). They include (i) inaccessibility, (ii) fragility, (iii) marginality, (iv) diversity or heterogeneity (v) ecological and other niches and (vi) human adaptation mechanisms in mountain habitats. These mountain characteristics are interrelated, they have both biophysical and socioeconomic dimensions, and they exhibit considerable variations within the mountain regions. The Annex, extracted from Jodha (1989 a) briefly describes them.

The above mountain characteristics have a number of operational implications both in terms of the objective circumstances they create and consequent dependent patterns of activities they shape. These in turn can help in understanding why and how public and private interventions should be sensitized to mountain specificities for sustainability of mountain resources, their usage pattern, and their productivity (Jodha 1989a and 1989b).

A few such operational implications are presented in Table 1. The table illustrates the areas of complementarity between attributes of forests and operational implications of mountain specificities. Accordingly, forests while (i) performing their 'service functions' in an ecosystem (e.g. contributions to biodiversity or nutrition and moisture circulation) and (ii) creating production circumstances or directly usable products (e.g. land extensive resource use system or source of diverse biomass), help in responding to the mountain specificities and their implications. Viewed differently, the operational implications of mountain specificities (also interpreted as visible menifestation of different dimensions of mountain ecosystem/agro-ecosystem), help create and maintain circumstances conducive to the (i) and (ii) types of function of forests. The forms of convergence implied by Table 1, also constitute the basis for the inseparability of sustainability of mountain ecosystem and mountain forests. Thus, any intervention on either side, be it pace and pattern of forest extraction on the one hand, or technologies influencing the degree of diversity of mountain agriculture on the other, would affect the above mentioned sustainability.

Conventional and Mountain Perspective Based Approaches to Forests

The perspectives generated by the understanding of relationships exhibited by Table 1, can be translated into broad approaches towards policy and programme interventions in mountain areas. For general development strategies and sustainable agriculture in mountain areas, the approach has been discussed elsewhere (Jodha 1989a and 1989b). Regarding mountain forests this has been briefly indicated below. The first step towards this direction is to have a comparative view of major orientations or dominant features of conventional and mountain perspective based (potential) approaches to forest policies and management. Table 2 summaries some of the relevant details. Accordingly, one finds vast differences between the two approaches. The differences relate to practically every aspect such as : primary focus and concern; dominant products' usage/management systems; norms for valuation of products and compensation measures; focus and pattern of R & D for forests; and consequent sustainability prospects. A number of studies (Chamber et al. 1989; Gadgil 1989; Gadgil et al. 1983; Guha 1989; and Repetto 1988) present evidence on different aspects covered by Table 2.

Table 1: Complementarities Between Some Attributes of Forest as a Component of the Ecosystem and Some Operational Implications of Mountain Specificities[a]

Mountain specificities and their operational implications (objective circumstances; and dependent activity patterns)	Attributes of Forests as: Contributor to			Creator of Production Circumstances etc.			
	Bio-diversity	Nutrient/ Moisture Circula-tion	Resource/ Environ-ment Stability	Land Extensive System	Low External Input Needs	Source of Diverse Biomass	Source of Unique Product
Inaccessibility : Isolation, high cost of mobility; local resource focused activities.	x	x			x		
Fragility: High vulnerability to de-gradation; low intensity, (restrained) resource use.	x	x	x	x	x		
Marginality : Low potential, limited production possibilities; focus on low cost, low productivity, high stability		x		x	x	x	
Diversity : Location specific, multiple production opportunities; diversified, interlinked, local resource based activities.	x	x			x		
Niche : Potential for specific/unique activities; resource use options with comparative advantage.	x					x	x
Adaptation Mechanisms: Technological, institu-tional at devices, (e.g. ethno-ecology, collective resource management etc.)	x			x	x	x	x

a Only a few cases are presented here. See Jodha (1989a and 1989b) for further details. See Appendix A for brief description of mountain specificities.

Table 2: The Dominant Features of : (i) Conventional Approach and (ii) Mountain Perspective Based (potential) Approach to Forest Management[a]

Conventional Approach	Mt. Perspective Based Approach
Primary Focus & Concern	
Forest treated as an isolated, revenue generating sector of a region; yield of selected key product (e.g. timber) focussed. product (e.g. timber) focused.	Forest as an integral component of the eco-systems; inseparability of the sustainability of the sustainability of the two; emphasis on both 'service' and 'product' functions of forests.
Dominant Products and Usage System	
Timber and other high value products; market-directed overextractions; insensitivity to negative side effects; isolated sectoralactivity run through legal and administrative superstructures.	Diversified biomass based, interlinked activity patterns, (e.g. farming-forestry linkages); compatibility with: ecosystem needs, people sustenance strategies, and user perspectives.
Valuation Norms/Yardsticks	
Market based narrow yardsticks for : pricing the products, compensating for extractions, determining investment and subsidies; unequal terms of exchange (compensations); insensitivity to local concerns.	Focus on health and stability of the total system and interlinked activities with concern for multiple externalities; compensation mechanisms also involve biophysical components.
Research and Development Approach	
'Extraction' oriented appraoch with focus on mono-culture of selected species with selected attributes (e.g. timber with high value); with little concern for folk knowledge, local needs.	Focus on : sustained bio-diversity and linkages, regeneration and conservation, local resource and people centred possibilities; effective use of folk knowledge (folk agronomy, ethnoecology etc.)
Sustainability Prospects	
Emergence of indicators of unsustainability (i.e. persistent negative changes in the health, productivity, usage pattern of forest).	Possibility of restoring sustainability by sensitivity forest interventions to mountain perspective (mountain specificities).

a For evidence on different aspects see, Chambers et al. (1989); Gadgil (1989); Guha (1989); and Repetto (1988).

Some Implications

The major policy implication of the details presented in Table 2 is that, in order to ensure sustainability of the Himalayan forests, it is essential to impart mountain perspective to forest interventions at different levels. To achieve this, forest usage and development will have to be treated as an integral part of overall resource use-pattern and people's sustenance strategies in the mountain areas. Work is in progress at ICIMOD to identify policy and programme implications of forest development and management with mountain perspective. In the following discussion we indicate a few of the issues emerging from the above work. In keeping with the focus of the present meeting i.e. economics of sustainable use of forest resources, the issues discussed below mainly relate to cost-benefit calculus of forest use and development.

Accordingly, one of the most important implication of forest policies and management based on mountain perspective, relates to the valuation of forest products. This forms the basis of decisions on the pace and pattern of forest exploitation and regeneration, pricing of forest products, and compensatory measures against extractions. As per the above approach, the total items (quantifiable and unquantifiable, measured and unmeasured, currently considered and disregarded) to be incorporated in to the cost-benefit calculus are much larger in number than the ones presently recognised. Attempting their inventory and classification, their valuations based on different yardsticks, and using them for decision-making, is a major task. Economist do recognise some of them, and call them externalities. They either ignore them or treat them inadequately. However, prescriptions for sustainable use of forest resources without consideration of these numerous externalities would be grossly unrealistic.

Even a simple exercise based on field observation in mountain areas would show that the total money value of forest products (fodder, animal bedding material subsequently recycled as farm yard manure, litter used as fuel, and other minor food and fibre items), collected over a period of 5 years, might far exceed the revenue from timber (the conventional final product of forest) harvested after, say, 30 years. Similarly, the conventional approach despite impressive procedures involving discount rates are insensitive to measurable gains accruing through farming forestry linkages (March 1987). In the same way, examination of forest product pricing, in the context of mountains, would indicate that the official prices of timber fail to cover the total cost of planting and maintaining the trees over as short a period as 20 years. In such a situation, expecting forest prices to cover the cost of negative externalities is a far cry.

To compensate for our present incapacities to understand and internalise the externalities in cost benefit calculations of forest use, the following could be suggested. It might prove useful to supplement the conventional monetary accounting procedures by a system of compensation in "biophysical terms", as has already been tried in some irrigation projects in India. A simple example is, the provision of planting one or more trees for every tree removed. Planting of not only trees of the same genus, but also of the previously existing surrounding vegetation to maintain diversity and associated circumstances, may be insisted upon. This can help ensure control of negative externalities and harnessing of positive externalities of forest use without screening them through formal evaluation procedures. However, in the light of the increased pressure on land, regeneration of forest systems (implied by the above procedures) involving trees with long felling cycle etc. may be difficult. Therefore, the system needs to be made more intensive (i.e. time intensive). Hence, to respond to the need for higher intensity of production and utilisation of forest resources, the above "compensatory method" could be modified by exploring and subsituting slow growing species by fast growing ones of the same genus. This would mean acceptance of the rationale of the traditional system (implying concern for diversity, linkages etc.) without being constrained by its relative "time-extensive" character. Acceptance of the above biophysical compensatory measures against forest exploitation is an institutional problem. The possibility of having 'time-intensive' components for it on the other hand, is a technological problem. Thus, sustainability of the Himalayan forests poses both institutional and technological challenges. Availability of diverse plant genetic material, sustained work of forest researchers for the last several decades, and understanding of traditional systems and folk knowledge, provide enough raw material for devising location specific biophysical compensation measures. However, the key problem is our inability to integrate and use such information with the above perspective.

ANNEX

Mountain Specificities. The important conditions characterising mountain areas which, for operational purposes, separate mountain habitats from other areas are termed here as 'mountain specificities'. The important six mountain specificities, (some of which might be shared by other areas such as deserts in the plains) are as follows.

Inaccessibility. Due to slope, altitude, overall terrain conditions, and periodical seasonal hazards (e.g. landslides, snow storms etc.) inaccessibility is a well known feature of mountain areas. Its concrete manifestations are isolation, distance, poor communication, and limited mobility. Besides the dominant physical dimension, it has socio-cultural and economic dimensions, which are reflected by socioeconomic differentiation and inequity of access to resources, information, and opportunities. Inaccessibility, greatly help reinforce other conditions such as marginality and diversity as mentioned below.

Fragility. Mountain areas, due to altitude and steep slopes, in association with geologic, edaphic, and biotic factors, which limit the former's capacity to withstand even a small degree of disturbance, are known for their fragility. Their vulnerability to irreversible damages due to overuse or rapid changes, extends to physical land surface, vegetative resources, and even delicate economic life support systems of mountain communities. Consequently, when mountain resources and environment start deteriorating due to any disturbance, it happens at a fast rate. In most cases the damage is irreversible or reversible only over a long period. This factor is largely responsible for the vicious circle of 'poverty - resource degradation - poverty', in fragile ecological zones of mountain regions.

Marginality. 'Marginal' (in any context) is one which counts the least with reference to 'mainstream' situation. This may apply to physical and biological resources or conditions as well as to people and their sustenance systems. The basic factors which contribute to such status of any area or a community, are remoteness and physical isolation, fragile and low - productivity resources, and several man-made handicaps, which prevent one's participation in the 'mainstream' patterns of activities. The above basic factors, also lead to secondary patterns of relationship between 'mainstream' and 'marginal entities'. They are reflected through neglect and exploitation of the latter by the former. The mountain regions being marginal areas as against prime areas in most cases, share the above attributes of marginal entities and suffer consequences of such status in different ways.

Diversity or Heterogeneity. In their natural state, some degree of heterogeneity is a characteristic of all types of habitats. Soil type changes every 20 miles as they say. However, in mountain areas, one finds immense variations among and within eco-zones, even at short distances. This extreme degree of heterogeneity in mountains, is a function of interactions of different factors such as elevation, altitude, geologic and edaphic conditions, steepness and orientation of slopes, wind and precipitation, mountain mass, and relief of terrain. The biological adaptations (e.g. naturally suited plant types) and socioeconomic responses (e.g. cultural patterns, structure of economic activities etc.), to the above diversities, also acquire a measure of heterogeneity of their own. The 'diversity or heterogeneity' phenomenon, applies to all mountain characteristics discussed here.

'Niche' or Comparative Advantage. Owing to their specific environmental and resource related features, mountains provide a 'niche' for specific activities or products. At the operational level, mountains may have comparative advantage over the plains in these activities. Examples may include : specific valley serving as habitat for special medicinal plants, mountains acting as source of unique products (e.g. some fruits, flowers, minerals etc.), and mountains serving as well known sources of hydro-power production. Thus, 'niche' has both physical and biological dimensions. Though not comparable to biophysical niches, it is not difficult to identify some specific socio-cultural characteristics of mountain communities (e.g. their social organisation, attitudes etc.), which may impart some added advantage to them in activities such as management of collective goods and community resources. In practice, however, niche or comparative advantage may remain dormant unless circumstances are created to harness it. On the other hand, if certain developments lead to elimination of 'exclusiveness' characterising a situation or resource base, the comparative advantage may cease to exist. Production of special hill crops (e.g. flowers, mushrooms, medicinal plants etc.) in the plains by creating artificial environments or by help of research, is one such example, where the comparative advantage of mountain is lost. However, mountains, owing to their heterogeneity, have several, often narrow, but specific niches, which are harnessed by local communities, through their diversified activities. The modern development programmes often lead to their elimination or over-exploitation.

Human Adaptation - Mechanisms. Mountains, through their heterogeneity and diversity even at the very micro-level, offer a complex of constraints and opportunities. Mountain communities through trial and error over the generations, have evolved their own adaptation mechanisms. Accordingly, the mountain characteristics are either modified (e.g. through terracing and irrigation) to suit their needs or activities are designed to adjust to the requirements of mountain conditions (e.g. by zone specific combination of activities crops etc.). Adaptation mechanisms or experiences are reflected through formal and informal arrangements for management of resources, diversified and interlinked activities, to harness micro-niches of specific eco-zones, and effective use of upland - lowland links. However, with the changed circumstances such as increased population pressure, increased role of market forces, and side effects of public policies and programmes, a number of adaptation mechanisms are losing their feasibility and efficacy. (Note : Extracted from Jodha [1989a]. Refer to the same for references and illustrations)

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ICIMOD is the first international centre in the field of mountain development. Founded out of widespread recognition of environmental degradation of mountain habitats and the increasing proverty of mountain communities, ICIMOD is concerned with the search for more effective development responses to promote the sustained well being of mountain people.

The Centre was established in 1983, and commenced professional activities in 1984. Though international in its concerns, ICIMOD focuses on the specific, complex, and practical problems of the Hindu Kush-Himalayan Region which covers all or part of eight Sovereign States.

ICIMOD serves as a multidisciplinary documentation centre on integrated mountain development; a focal point for the mobilisation, conduct, and coordination of applied and problem-solving research activities; a focal point for training on integrated mountain development, with special emphasis on the assessment of training needs, the development of relevant training materials based directly on field case studies; and a consultative centre providing expert services on mountain development and resource management.

Mountain Farming Systems constitutes one of the four thematic research and development programmes at ICIMOD. The programme deals with agriculture defined broadly to cover all land-based activities (cropping, horticulture, forestry, livestock farming, etc) and their support systems. Currently the major focus of the programme is on the factors and processes contributing to the sustainability/unsustainability of mountain agriculture. This is carried out by examining (through both knowledge reviews and field studies) the sensitivity of public and private interventions to specific mountain conditions. The explicit consideration of the latter conditions can alone assure a mountain perspective to public policies and programmes in the agricultural sector.

Director: Dr. E.F. Tacke Deputy Director: Dr. R.P. Yadav

International Centre for Integrated Mountain Development

G.P.O. Box 3226, Kathmandu, Nepal

Telex : 2439 ICIMOD NP Cable : ICIMOD NEPAL

Telephone : (977-1) 525313 Fax : (977-1) 524509