Property Rights in a Social and Ecological Context

Case Studies and Design Applications

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15. Environment Crisis & Unsustainability in Himalayas: Lesson from the Degradation Process

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Edited by
Susan Hanna
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Property Rights and the Environment

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FROM: Narpat S. Jodha, ENVSP (NARPAT S. JODHA)

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SUBJECT: My Chapter in Beiger Institute-WB volume

I am sending by in-house mail a copy of my chapter contributed to Beiger Institute- World Bank publication "Property Rights in a Social and Ecological Context" (Eds. Susan Hanna and Mohan Munasinghe).There are two volumes, I: Social and Ecological Issues; II:Case Studies and Design Application. Beijer Institute will publish the 'academic" version of these volumes. The present ones are more policy oriented.

My chapter in Vol.II, is entitled "Environmental Crisis and Unsustainability in Himalayas: Lessons from the Degradation Process". The focus of the paper is on Himalayas, but the approach ,methodology and ideas presented therein have wider applicability to any fragile and marginal areas or the areas traditionally isolated but currently in the procss of integration with the main stream systems.

The main contribution or hilight of the paper is the following message: The indigenous or traditional resource management systems can offer a lot of leads for present day natural resource management strategies. But the usability of traditional elements (as indicatedby actual field evidence), is very much conditioned by identification or creation of present day- functional equivalents of the traditional circumstances. The paper illustrates this.I hope youm will find it interesting and useful

Narpat

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Environmental Crisis and Unsustainability in Himalayas: Lessons from the Degradation Process

Narpat S. Jodha

Abstract

As revealed by the persistent negative trends in the health and productivity of natural resources bases, the current pattern of resources use in the Himalayas is not sustainable. An understanding of the emerging unsustainability processes suggests that replacement of traditional conservation-oriented resources management systems by more extractive systems is responsible for the current situation. This change, interpreted as a part of the dynamics of nature and society interactions, helps in identification of objective circumstances and driving forces that induced or forced the communities to treat natural resources differently under the traditional and the present-day contexts.

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Because the reestablishment of traditional circumstances (manifested, for example, by semiclosed, subsistence-oriented communities with total dependence of sustenance on local resources), is not possible, this chapter suggests an approach to explore their present-day functional substitutes to help conservation and sustainable use of resources. In concrete terms, the issues addressed include how to alter resources users' and decisionmakers' perceptions and diagnoses of stakes in natural resources; how to ensure users' understanding of and sensitivity to [illegible]; and how to facilitate local control of community resources. All of these were key elements of traditional systems. This formulation is applicable to the situations beyond the Himalayan context.

Introduction: Previewing the Argument

The Policy Context

A major challenge faced by the national and international development agencies is rapid resources degradation and declining resources productivity, particularly in the ecological fragile resources zones, such as the Himalayas. Equally important problems are the limited effects of remedial measures on the process of decline and accentuation of resources degradation as a side effect of development and welfare interventions. Even the remedial measures incorporating rationale of traditional resources management systems (with high-sustainability potential under low-demand pressure on resources), failed to stick because of the changed demographic, institutional, and technological contexts.

This chapter attempts to explore the approaches that can be taken to identify present-day functional substitutes of the objective circumstances that induced or forced traditional communities to evolve and adopt measures conducive to sustainability of natural resources. For this, the Himalayan case is used here as an illustration, focusing on unsustainability of the current patterns of natural resources use in the Hindu Kush-Himalayan (HK-H) region, the factors contributing to this process, and possible approaches to arrest and reverse the current process of resources degradation. In a wider context, the Himalayan case reflects the changing dynamics of nature and society interactions, or the patterns of ecosystem and social system linkages that, in turn, are manifested through changing resources usage practices and the factors dictating them. An understanding of these dynamic processes is a first step toward evolving strategies for sustainable natural resources management.

As a part of such effort, even a quick look at the traditional resources use patterns and practices in the Himalayas reveals several usable lessons for reconciling resources conservation concerns and extraction needs in the present-day context. However, potentially usable rationales of traditional or indigenous resource management practices are not completely context free (Redford 1990) and hence easily transferable. Equally important are the objective circumstances and driving forces that induce or dictate the use of particular measures and practices for resources management. This suggests the need for exploring the present- day functional substitutes of the driving forces and incentive structures that characterized the traditional systems and facilitated balancing of resources conservation concerns and society's production needs.

The Dynamic Context of Nature-Society Interaction

For operational purposes, the whole dynamics of change or nature and society interactions can be seen as a two-way adaptation process. The latter implies adapting human needs and resources use practices to satisfy them to the features of natural resources bases and adapting or amending the latter to suit the former (Gadgil and Berkes 1991). In a given socioecological context, the nature and composition of adaptation measures, for example, those directed to rationing and diversifying needs, or those focused on manipulating and extracting resources to meet unrestrained demands, represent a society's responses to the objective circumstances created by specific features of natural resources on the one hand and the socioeconomic driving forces on the other.

Factors such as resources users' and decisionmakers' direct and total, or crucial, dependence on local resources, or their control of local resources, their close proximity and intimate functional knowledge of the resources, and so forth (as found in isolated or semiclosed indigenous and traditional communities, such as those in remote mountain areas) tend to make natural resources management systems largely ecology-driven (Berkes 1989; Ellen 1981; Jochim 1981). An absence of these features, as in the case of open and externally linked areas, generates resources use systems that more often are insensitive to the limitation of resources, are highly extractive, and are potentially unsustainable in their orientation as well as application. Dictated by a variety of internal and external driving forces, the extra active orientation of resources usage systems disrupts the ecosystem and social system linkages, which are not only functionally crucial for co-evolution of the two-way adaptation mechanisms, but also are helpful in balancing the resources conservation and production needs of a community.

Restoration of the aforementioned features (crucial dependence on local resources, close physical proximity, functional knowledge of the resources, and so on) that characterized traditional, semiclosed, isolated, small communities and facilitated evolution of effective ecosystem and social system links and sustainable management of natural resources, seems almost impossible in today's world with complex socioeconomic realities. The latter creates a variety of intersystem linkages, hierarchies, and interdependencies. These changes, in turn, create and widen the distance between resources, as well as resources users, and the decisionmaking about resources, between users of resources and final users of resources products, between creators of resources knowledge (research and development, for example) and users of knowledge, and between natural processes and social processes influencing the same resources base. Finally, they dilute or erode the local communities' concerns and abilities for sustainable resources use.

Closer examination of the traditional and present-day resources use systems and their underlying factors can help in identifying some present- day functional equivalents or substitutes for the aforementioned features (close proximity, direct total dependence, and so forth), on which a strategy for sustainable resources use can be built. The above formulation is illustrated by a situation observed in the selected areas of the HK-H region. This chapter presents a synthesis of the studies of microlevel situations, rather than a descriptive and statistical account of the variables in different administrative units covered by the studies. The essence of the argument presented in this chapter can apply to other ecosystems, where resources use patterns are conditioned by relative isolation or closed nature of a system, where users have close proximity to and knowledge of resources bases, and have direct dependence on, as well as local control over, the local resources.

To reiterate, this chapter focuses on the foregoing circumstances (or their present-day functional substitutes) because the frequently advocated incorporation of the rationale of traditional resources use practices in present-day resources management systems is difficult unless the objective circumstances or driving forces conducive to such change are created. In this sense, the argument of this chapter may represent a small step toward the understanding of processes and approaches required for operational use of rich and progressively enlarging inventories of traditional knowledge for environmentally and socially sustainable patterns of natural resources use.

The Empirical Base of the Reasoning

The Geographical Context

The formulation of the issues and approaches presented by this chapter are based on the field level understanding received through studies, including action research on farming systems and resources use practices and attempted replication of successful mountain development experiences, in the selected areas of four countries, as a part of the work program of ICIMOD during 1988-93 (Jodha, Banskota, and Partap 1992; Jodha and Shrestha 1994). The areas studied included West Sichuan and Tibet in China, Himachal Pradesh and the hill areas of Uttar Pradesh states in India, the middle mountains of Nepal, and the North West Frontier province of Pakistan.

Resource Focus

The primary focus of the work at ICIMOD was on mountain and hill agriculture, covering all land-based activities, such as cropping, horticulture, animal husbandry, and forestry and their support systems. However, because of the interrelationship of mountain resources conditions represented by inaccessibility, fragility, marginality, and diversity, and their effects on mountain agriculture, the work encompassed the broader microlevel and macrolevel issues of natural resources management and changes therein. Accordingly, it focused on the totality of resources, including land (soil), vegetation, and water and other related aspects, such as mountain slopes and biodiversity, human adaptation experiences reflected through traditional practices, and mountain development interventions that accelerated indiscriminate usage intensification of fragile and diverse mountain resources.

Dominant Scenarios in HK-H: Emerging Indicators of Unsustainability

Early in the process of the fieldwork and knowledge reviews on mountain agriculture, some persistent negative trends characterizing most of the areas became evident. These verifiable or measurable negative changes, with varying degrees of visibility, which are described as indicators of unsustainability (Jodha 1990), relate to the resources base (for example, decline of topsoil and waterflows or reduced extent of agro- biodiversity), resource productivity (persistent decline in crop and animal yields, as well as in production of biomass), and resource management options and production practices (disappearance and infeasibility of various forms of diversification, facilitating resource regeneration, and disappearance of institutional arrangements to enforce resources conservation measures).

Although some negative changes, such as declines in yields, changes in the composition of vegetation in the forest, and so forth, are clearly visible, others are concealed by human responses to negative changes (for example, substitution of shallow-rooted crops for deep-rooted crops because of topsoil erosion, or increased dependence on chemical fertilizers following the reduced regeneration of organic matter as a result of declines in farming-forestry-livestock linkages). Furthermore, some of these changes are visible at macrolevels, whereas others are visible at microlevels.

Finally, by nature, some indicators of unsustainability represent a process of negative change, and others are negative consequences of the process. For instance, decline of diversification and resources regenerative practices following the promotion of new technology-based monocropping are "process types" of indicators. The decline in productivity following these changes is a "consequence type" of indicator. Table 15–1 summarizes the findings and observations relating to the above aspects reported by more than 45 studies conducted in different contexts by different researchers and agencies in different countries of Hindu Kush-Himalayan region over last two decades or so (Jodha and Shrestha 1994). ICIMOD's focus was on understanding the factors and processes contributing to unsustainability indicators in order to identify measures to reverse these trends. The key message of different studies (Shrestha 1992; Singh 1992; Dev 1992; Bajracharya 1992; Yanhua 1992; Shutain and Chunru 1989; Ruizhen and Yuan 1992; Hussain and Erenstein 1992) that are relevant to the theme of this chapter was the emergence of imbalance between ecological context and social and economic forces affecting use of mountain resources.

These persistent negative changes are indicators of unsustainability because they represent a situation where the production or resources use systems have failed to satisfy the conditions associated with sustainability, namely enhancing the performance (output, services, or range and quality of options) without depleting the resources base (Jodha 1995a).

In the final analysis, unsustainability is manifested by the ultimate consequences of the above trends, in terms of interrelated social and environmental effects with serious long-term negative implications. They are reflected through decisions and actions of the communities faced with unsustainability prospects, such as acceptance of inferior production and consumption options, an intense degree of "desperation" in resources use and production practices leading to over-extraction of the resources base, acceptance of external dependency (charity, subsidy, and so forth) as a normal basis of survival, and loss of resilience or capacity, in terms of culturally

determined collective sharing and caring mechanisms through group action, to deal with emergencies.

The consequences are reflected also through the worsening conditions of natural resources and production processes using these resources, such as loss of "systematic integrity," implying disappearance, or weakening, of resources regenerative, resources protective practices and measures, and intrasystemic and intersystemic linkages; ever-increasing biochemical and economic subsidization of the production processes to maintain the same or lower levels of performance; marginalization, decline, and disappearance of a production system or its component due to loss of its identity and efficacy in the changed context; and loss of recoupment capacities of the resource base. Jodha (1995a; 1995b) provides practical life situation examples of the change.

Viewed in the context of the thematic framework of nature and society interactions, the aforementioned negative changes reflect a complex of disruptions. Where social systems tend to behave independent of the imperatives of ecosystems, the two-way adaptation process is converted to a one-way adjustment where resources manipulation and extraction are stretched to meet increasing human demands rather than adjusting the latter to resources situation. This has led to a break down of resources regenerative, diversified production systems, indiscriminate resources use intensification (often maintained through a high level of chemical, biophysical, and economic subsidization), and depletion of environmental resources. The following section comments on the factors and processes contributing to this change.

Environmental Degradation and Unsustainability Processes

The factors and processes contributing to unsustainability indicators involve: (a) the specific features of mountain areas, which can be called "mountain specificities" (that is, an incredibly high degree of features such as fragility, inaccessibility, marginality, diversity, and so forth that separate mountains from other ecosystems); (b) the imperatives of mountain specificities, or rather the objective circumstances created by them; and (c) the human response to the above circumstances as reflected through resources use and management practices representing, in different contexts, both the elements supporting as well as disrupting the two-way adaptation processes (Jodha, Banskota, and Partap 1992). These aspects are summarized in Table 15–2.

Based on the synthesis of descriptive or quantitative accounts of different mountain areas reported in more than 50 studies. The details in Table 15–2 describe the situation in relatively broad terms. The concrete practices incorporating the rationale conveyed by the general features of the situations involved in Table 15–2 are too numerous and too varied to be meaningfully accommodated by this chapter Even a quick glance at traditional farming systems in mountain areas will furnish a range of examples on the aspects highlighted by Table 15–2 (Pant 1935; Price 1981; Guillet 1983; Bjonnes 1983; Hewitt 1988; Brush 1988; Whiteman 1988; Sanwal 1989; Carson 1992; Yanhua 1992; Jodha, Banskota, and Partap 1992; Jodha and Partap 1993; Jodha and Shrestha 1994).

However, the extent of the extent of traditional practices declines as one moves from relatively remote to more accessible villages, where improved accessibility and linkage with the outside world have influenced the traditional systems. The consequences of these changes were visible, and in most cases people realized and conveyed them as part of their concerns and vision of the future of their children (Jodha 1995b).

Traditional Patterns of Nature and Society Interactions

Traditional Systems

Based on the understanding provided by different accounts of situations in mountain areas, we can recapitulate the dynamics of ecosystems and social systems linkages and address issues such as what governs these linkages, how they operated in the traditional context, and how they are disrupted in the present-day context. The involved issues are summarized in Table 15–3. Although the context is mountain areas, the formulation and analysis presented may have general applicability to

traditional or indigenous communities with semiclosed situations.

Accordingly, the information in Table 15–3 indicates (a) the nature-dominated key objective circumstances under which small and relatively isolated communities lived and managed their natural resources (that is, most of the communities in remote areas prior to their integration with the mainstream though improved accessibility); (b) key driving forces and factors that shaped the societal responses to the said objective circumstances; (c) broad social responses in terms of concerns and adaptation strategies; (d) technological and institutional mechanisms evolved and adopted for implementing the said strategies; and (e) consequences of (b) to (d) in terms of evolution of nature and society interactions and sustainability of resources use.

The above features of traditional systems are contrasted with the changes following the physical, administrative, and market integration of hitherto semiclosed and isolated systems or areas with the mainstream situation, which despite several gains has adversely affected the traditional resources management system (Banskota 1989; Collier 1990; Jodha 1995a).

Table 15–3 is self-explanatory. However, its key highlights can be briefly summarized. The biophysical environment of communities characterized by high degree of inaccessibility imposed a certain degree of isolation and semi-closeness for them. In the absence of effective outside linkages, their sustenance or welfare depended totally or crucially on local resources. This made them adapt their requirements or resources use systems to the limitations and potentialities of local resources rather than attempt to manipulate or overextract resources to satisfy uncontrolled human needs. They had a high stake in the health and productivity of local natural resources. Close proximity to natural resources, local control of the resources, and intimate functional knowledge about them, again largely because of the closed nature of the system, helped the communities to evolve folk technologies and institutional arrangements and enforce them without external interference for protection, regeneration, and regulated use of the resources.

In the process, the gradually evolved attitudes and norms of socioeconomic behavior, relative to biophysical resources of the community, helped in linking social systems with ecological systems to ensure sustainable use of resources in a subsistence context (Guillet 1983; Hewitt 1988; Jochim 1981; Redford 1990).

The Changed Situation

With the changed circumstances, beginning with the increased integration of these areas and communities with mainstream areas, the ecology-driven social responses and resources management systems faced a rapid decline. Although the integration of isolated and indigenous areas may be justified on several grounds, the process of doing so, using the norms and procedures characterizing the mainstream, marginalized the areas and communities in question. As a result, although the biophysical context remained largely unchanged, the socioeconomic circumstances following integration changed rapidly (Bjonnes 1983; Ives and Messerli 1989; Jodha, Banskota, and Partap 1992; Gadgil and Guha 1992).

The local level ecosystem and social system linkages were disrupted because of an emergence of a complex of internal forces, chiefly population growth, and external forces. The pressure on resources encouraging their overextraction increased. The total dependence on local resources ceased to be a key driving force to sustain people's stake in resources stability. The positive effects of local autonomy or control over local resources, close proximity to resources, and functional knowledge of resources, which in the past helped in development of technologies and institutional responses, became marginalized. With the process of integration, the imposition from above, whether technologies or regulatory framework or resources planning decisions, became the rule.

In the changed circumstances, unlike in the past, local communities were left with neither sufficient lead time nor control over their resources and community affairs to amend or evolve their age-old coping strategies against change. Furthermore, they also did not have capacities or even incentives to resist internal and external forces released by their integration with stronger, external systems. Their knowledge system, social sanctions, and collective sharing system became less effective or less feasible, and in some cases less attractive, particularly to younger generations, in comparison

with externally supported arrangements, at least in the short run. As a final consequence, the whole complex of driving forces—their type and nature—and patterns of responses to them changed (Jodha 1995b).

Unutilized Elements of Traditional Systems

Although Table 15–3 highlights the key features of resources management systems under two situations, it also indicates the possibilities for picking up relevant elements from traditional systems for integration into present-day resources management strategies to reverse the unsustainability prospects in mountain areas described earlier. A brief inventory of such elements has been presented elsewhere (Jodha 1990; Jodha, Banskota, and Partap 1992). The important elements include the combination of product and resources concerns in production systems; a high extent of diversification and flexibility, and a focus on local resource regeneration and recycling.

However, follow-up efforts to the above findings through policy advocacy and action research, including work done under the institutional strengthening project of ICIMOD, indicated that despite recognition and appreciation of the rationale of traditional practices, their incorporation and application for actual decisions and action could not take place. The primary reason for this gap was found to be linked to a lack of circumstances and incentives structures, conducive to their adoption at different levels, ranging from policymaking to community action. Hence, the key challenge is how to create such circumstances. This is elaborated on in the next section.

Exploring Usable Elements from Traditional Resources Use Systems

Through a synthesis of the factors indicated by Table 15–4, some key elements of circumstances and processes can be identified that generated community concerns, commitments, and incentives for protection and regulated use of natural resources; enhanced community capacities, both technical and institutional, to appropriately respond to circumstances by combining production and protection-centered measures; motivated and facilitated enforcement of measures that helped in adapting community needs to resources, rather than manipulating and overextracting the latter to meet unrestrained demands.

Accordingly, three elements can be identified that individually or jointly contributed to the natural resources-friendly traditional management systems. They include (a) total dependence-driven stake in protection of natural resources; (b) close proximity and functional knowledge-driven approach to resource use; and (c) local (resources) control-determined sanctions and facilities governing the resources use. The following discussion elaborates on these elements, with a view to exploring some possibilities of reinstating the elements or identifying their present-day functional equivalents as parts of an incentive structure to facilitate sustainable resources use in mountain areas, in the changed context.

The key premise behind this exercise is that even when the isolation or semiclosed nature and physical proximity, as parts of the key objective circumstances characterizing the traditional communities, were the basis of the aforementioned elements (for example, stake and sensitivity toward natural resources), the latter's relevance and viability are not confined to small and isolated groups. By changing the forms of their manifestation and their operating mechanisms, these elements can be integrated into any resources management system and can prove effective in any context.

Dependence-Driven Community Stake in Resources Health

According to the information in Table 15–4, in the relatively less accessible mountain areas, exclusive or total dependence for sustenance on local resources was the key incentive behind communities' concern and follow-up actions leading to protection and regulated use of their natural resources. To reiterate, activities ranging from the combining of production and conservation measures to rationing and regulating of demand, including recycling and collective sharing, as well as adherence to social sanctions regulating resources use, can be linked to such uniqueness of the situation or the incentive system it created.

Reinstating such incentive or disincentive systems by creating exclusive dependence of

survival on local resources is neither desirable nor feasible in the context of the changed situation of mountains. However, other approaches can be explored to strengthen the total or crucial dependence-driven stake of a community in its natural resources base. Two possibilities can be indicated: by changing the "product context" of dependence and by changing the "scale context" of dependence.

Product Context

Changing the product context of dependence involves substituting, at the local community level, the traditional security of sustenance with the security of ecological "niche," or comparative advantage (due to specific high-value options) that is potentially available to the community through physical and market integration of its area with the mainstream systems. There are cases of transformed areas in the HK-H region and other mountain regions where niche-based gains have worked as new incentives for protection and regulated use of overall natural resources bases by the communities (Jodha and Shrestha 1994).

For example, in areas such as Ningnan county in West Sichuan, China, where sericulture recently has become a lead activity with a high payoff and comparative advantage to the area, communities attempt to manage and protect hill slopes, shrubs, and waterflows on a priority basis because it helps in strengthening the sericulture activities. Other examples are in Himachal Pradesh in India, especially the apple zone, and the Ilam district of Nepal where multiple new activities are sustained through better management of natural resources in general. In areas where the mountain environment and landscape have become major tourist attractions, including the Alps and pockets of the Himalayas, the same logic of incentive through stake has helped in better management of natural resources by the communities. One can multiply such examples where a stake in the lead sector and lead activity, owing to biophysical and economic interlinkages, has induced and initiated a process of better management of overall resources by the communities. The exceptions to process include cases where niche is identified and harnessed, or extracted, without involving the local communities.

Scale Context

Changing the scale context of dependence implies that the phenomenon of local resources dependence, that is, a crucial if not a total dependence, as a source of stake becomes relevant and operational at a much higher or macro level, rather than at a small community level. In other words, in place of small isolated communities, the much wider social economic entities become the units in the context of which dependence-centered stakes are perceived and diagnosed and responded to.

For example, the sustenance of the hitherto isolated communities may not be completely ruined by the degradation of mountain resources. Because of external linkage, their degree of dependence on local resources is reduced today, but the bigger areas or ecologically integrated entities, sustained through biophysical and economic upland-lowland linkages, may have the problem owing to mismanagement of mountain resources by microentities. For example, in the changed context, the downstream areas, which also produce food surplus available to mountain areas and have a crucial dependence on the stable hydrology of mountain areas, may have a much stronger stake in the protection and regulated use of upland resources. The recurrent debates on "Himalayan waters"—blaming Nepalese farmers for Bangladesh floods—is one concrete manifestation of the issue. Any action conceived and implemented in such larger areas context will represent the perception and diagnosis of a stake at a higher scale.

It is not difficult to count many more examples of shifting product, or spatial context, and hence group context of dependence-driven stake in better natural resources management. But in both cases, because of enlarged size and increased diversity of user groups (stakeholders), dilution and diffusion of perception and diagnosis of stake to induce positive community responses poses a serious problem. In a diverse and widely spread group of resources users, perception of stake that is based on the understanding of association between cause (resource extraction) and consequence (resource degradation) cannot be uniform and strong enough to induce community responses for resources conservation (Rosser 1995).

In the case of small and isolated communities, their physical proximity and firsthand knowledge of the resources features shaped people's perception and diagnosis of stake. The present-day resources users normally do not have such facility.

Viewed in terms of the thematic framework of this chapter, the dilution and diffusion of perceptions of stake imply an absence of the circumstances facilitating co-evolution and smooth working of ecosystem and social system linkages. Although the ecological context remained relatively unchanged and spatially confined to specific areas, the social systems not only have expanded but have become more complex, owing to multiplicity of stake holders and external linkages, and have ceased to evolve by way of responding to feedback from below or to the ecological imperatives of the situation.

To explore the scope for altering the resources users' perceptions of stake in conservation of natural resources and to clarify the involved issues, it may be helpful to compare the present-day situation with the traditional situation. Two key differences are involved, relating to (a) an individual's time horizon, and (b) feedback mechanisms and sensitivities as they influence resources use practices.

Resource Users' Time Horizon

A community's perception of its stake in its natural resources base, as the biophysical foundation of the society, is determined largely by formers' concerns for long-term survival and welfare of community members. Although the community deals with the long-term concerns, most of its individual members may not do so, as long-term sustainability falls outside the realm of an individual's life cycle decisions, which are dictated by one's short planning horizon.

In this respect, the traditional peasant or pastoralist did not differ from present day resources users or even the serious scientists engaged in pursuit of sustainability-related issues. All individually have a short time horizon in the sense that their private, life cycle decisions and activities seldom go beyond the concerns for their grandchildren. Sustainability-related concerns are a mandate of the society as a collective entity. The latter collectively establishes social norms of behavior reflecting the community's long-term concerns, which in turn provide a framework for the conduct of individuals' short-term activities. Absence of such a framework and its enforcement, leads to the domination of short-sighted activities and to degradation of the production base of the society. This can explain the difference between traditional and present-day systems of natural resources use in the Himalayas.

Under traditional systems, the communities through trial and error over several generations evolved certain approaches to natural resources use and codified them into routine practices followed by the individual resources users, guided by their short-term considerations (Jodha 1995b; Davis 1993; Ostrom 1990; Guillet 1983). Examples may include cereal-legume mixed cropping sustaining soil fertility, farming and forestry linkages facilitating nutrient cycling directed to local resources regeneration and ecological balancing, and traditional forms of rural cooperation for collective sharing and product and resources recycling to help ration pressure on natural resources.

Routine adherence to these practices to fulfill short-term needs simultaneously satisfied the long-term conservation needs of resources, often without explicit and conscious concern for the latter on the part of individual resources users. Thus, the process aspect of sustainability got built into the folk agronomic practices, or resource use systems, and helped to ensure positive long-term effects of activities undertaken with short time horizons.

The present-day resources users unfortunately do not have or normally do not follow such norms of behavior involving usage of natural resources. Things have changed drastically in contrast to the traditional situation. In the present-day context, the local community has been replaced by the state, or its agencies, for designing and enforcing resources use norms to be followed by individuals or groups. The state is endowed with more resources, powers, and formal mechanisms to frame norms and enforce them.

However, despite all the resources and enhanced scientific, fiscal, and administrative capacities and means to understand the natural resources characteristics and approaches to manage them sustainably, the present-day decisionmakers have not been able to provide an

effective and widely usable framework, where short-term activities of individuals could be focused to achieve both short- and long-term goals of the society. The elaborate exercises on perspective planning, proactive policies, and wide range and hierarchy of incentives, support systems, and even coercive measures created to guide or dictate the people to undertake activities that are compatible with the long-term social concerns do not seem to have succeeded. An important reason behind this, in fact, is that in the mountain areas and elsewhere, in practice, the governments provide contradictory messages to different resources users (Jodha, Banskota, and Partap 1992). For instance, one provision of state intervention promotes protection of natural vegetation, but another in the same area subsidizes land use intensification through annual cropping; one provision calls for integrated resource use, but another effectively divides the mandates, support, and authority sector-wise.

Devoid of a mountain perspective (Rhoades 1988; Banskota and Jodha 1992), the state policies and programs focus more on enhancing supplies to meet rising demands, due to population growth and market forces, rather than adapt demands to resources limitations. Consequently, they promote indiscriminate use intensification and overextraction of natural resources. Even the declared intentions of resources conservation neither involve local people's perspectives nor get codified in agricultural technologies or rural development projects, because of the latter's product-centered rather than resource-centered focus. Thus, in the changed context of mountain areas, both the individual resources users and the state, representing the people as a collective entity, as facilitators of resource harnessing, seem to operate with a short planning horizon. To redress the situation, especially in the mountain context, a beginning can be made by sensitizing the policymakers to the nature-determined objective circumstances of mountain areas and imparting mountain perspective to development intervention, and involving the local communities and elements of traditional knowledge systems while designing and implementing development intervention. This will be considered in later sections.

Proximity-Based Feedback Mechanisms and Sensitivity to Natural Resources

Under the traditional resource use systems, the people's adherence to long-term concerns, as codified into short-term activities, was further reinforced by their firsthand functional knowledge and understanding of the natural resources. This was facilitated by their close proximity to resources. Because of proximity-based instant feedback, they more easily could perceive the risks of resource mismanagement and degradation. Understanding of the real costs involved in the process further sharpened their perceptions of stake in resources management and acted as a part of the incentive-disincentive system guiding their decisions and actions.

In today's context, owing to a wider spread of resources users, their diversity, and the emergence of a multiplicity of intermediaries between resources users and resources planners and decisionmakers, all of the factors facilitating understanding of stakes and using it as basis for resources management in the past have become largely dysfunctional. It hardly needs elaboration that the wider and more diverse the group context is, the less is the direct visibility of association between cause and consequences of resources mismanagement. This is more the case because of the lack of effective feedback arrangements to replace the traditional proximity-based spontaneous visibility of effects of resource mismanagement. As elaborated in the next section, the possible solution to the above problems lies in (a) enhancing resource users' and decisionmakers' sensitivity and understanding of the natural resources base by using modern means of information collection, synthesis, and dissemination (Jodha, Banskota, and Partap 1992), despite their physical distance from resources; (b) association of local communities in decisions relating to their natural resources (Proffenberger 1995); and (c) reorientation of fiscal and resource and product costing norms, to reflect the real worth of environmental costs of resources use (McNeely 1988; Munasinghe 1993).

Physical Proximity and Functional Knowledge as Facilitators

As previously mentioned, under traditional systems, a community's stake in its natural resources was an important driving force behind conservation-oriented resources management. Equally important was the role of site and season specific functional knowledge of the resources. This, in turn, was gained through a close proximity and access to resources. Comment has been made above on the complementary role of physical proximity and functional knowledge in enhancing and sharpening people's perceptions of their stake in better management of natural resources. The following discussion elaborates on the proximity and knowledge of resources as driving forces, or rather facilitators, of traditional resources management systems.

Proximity, direct access, and functional knowledge of local resources facilitated the evolution of environment friendly resources usage systems, folk technologies, demand management measures, and the institutional arrangements to facilitate their adoption and enforcement. The balancing of extensive and intensive types of land uses, various forms of resources use diversification and flexibility, resource regenerating, recycling practices, methods of resource upgrading (such as terracing), seasonal periodic restrictions on product gathering, and so forth are some of the concrete examples where closer understanding of resources features and availability of longer lead times for informal experimentation helped the communities.

Absence of any gap between decisionmaking and actual use of resources, as well as between resources users, or producers, and product users, again facilitated by proximity and access, helped in flexible approaches to resources management to meet site and season specific differences and contingencies. This also helped in adjusting people's requirements, such as animal grazing intensity and collection of food, fuel, and fodder, to the specific situation of the resources base. This is illustrated by restrictions on collection of specific products during specific periods, or from specific areas, and grazing rotations enforced by local communities in some villages even today.

Unlike in the past, the present-day resources use situation is characterized by several factors: (a) a wider spread of users of the resources products, owing to market integration, and an equally wide gap between producers (resources users) and products consumers (the final users, for example, of herbs, horticulture products, and hydropower from mountain areas); (b) disassociation between usership and ownership of resources, because of an increased number of absentee landlords in many areas; (c) disassociation of legal, fiscal, and administrative decisionmaking agencies from resource using agencies, such as farmers or the communities; and (d) distances and differences between technology developers and technology users.

The above circumstances restrict the scope for reinstating and strengthening the resources management practices that are closely tied to physical proximity, direct involvement, and accessibility to resources bases and their close firsthand knowledge. However, to take fuller advantage of the knowledge and understanding of resources bases for designing and implementing relevant usage and management systems, it is not necessary to re-create the traditional situation characterized by semiclosedness and physical proximity to resources.

One of the key contributions of physical proximity, direct involvement, and accessibility to resources bases has been in terms of generating sensitivity toward and understanding of resources bases, which in turn shaped people's responses leading to conservation-oriented resources use systems. In the present context, with better means of information acquisition, verification, and synthesis, as well as communication and dissemination, the above goals can also be achieved differently.

To benefit from the firsthand feel of the field situation and accumulated traditional knowledge about the resources and their usage systems, there are well-tested methods of involving local communities (for example, through RRA/PRA and others) in the process of collection, analysis, and utilization of information to create among diverse stake holders (policymakers to urban consumers) a sensitivity toward the natural resources.

The key constraint in this regard is that the aforementioned facilities and means have not been utilized for building sensitivity and understanding of the mountain resources to develop and adopt technological and institutional mea-

sures relevant to their conditions. The focus of policy and program interventions, whether agricultural research and development or integrated rural development, have lacked the mountain perspective, implying understanding and incorporation of imperatives of mountain specificities, such as incredibly high degrees of inaccessibility, fragility, diversity, marginality, and mountain niche, in the conception, design, and implementation of development and welfare activities in mountain areas (Jodha 1990). If these interventions and their dynamics are seen as a part of the broader social systems characterizing and influencing mountain areas, they once again reflect the rapidly vanishing links between social systems and ecosystems and their coevolution in mountain areas.

A beginning towards filling this gap can be made by initiating a process directed toward the following (Jodha, Banskota, and Partap 1992): (a) sensitization and reorientation of the decisionmakers to create a policy environment sensitive to mountain conditions; (b) involvement of the local communities in decisionmaking and actions relating to local resources, to ensure relevance of interventions to the field situations; (c) recognition and utilization of traditional knowledge systems by the formal research and development agencies engaged in development of technologies for these areas; (d) reorient the whole process of project planning, designing, and implementation by making it a bottom-up approach involving local communities and user groups.

Community Control and Resources Use Rationing

Regulation of resource use, rationing of pressure on resources, mobilization of community, and focused group action, which helped in sustainable use of natural resources in mountain areas in the past, were greatly facilitated by full control by communities of local resources. This was a positive consequence of isolation and semicloseness of communities, which prevented impositions from outside. As shown in Table 15–4, this sort of autonomy available to communities was conducive to evolution of both institutional and technological measures suited to local resources and survival needs. The close proximity and knowledge of local resources complemented the process.

With the integration of mountain areas with the mainstream, the state authority, executed through different agencies, was extended to hitherto semicloseed areas. In the name of development, welfare, social and political integration, and even national security in many cases the state usurped the resources and mandate that historically belonged to the people. With this process, both formal and informal control by communities over local resources weakened or disappeared. The same thing happened to the resources management arrangements supported by the community autonomy and social sanctions.

In such a situation, restoring of traditional autonomy and control over resources enjoyed by isolated communities does not look possible. Its revival may seriously conflict with the ruling culture and approach of the modern state that is oriented toward greater centralization. Even the genuine efforts by some states toward decentralization and participatory development may not go so far as providing the traditional type of autonomy to village communities and, thereby, disempower themselves or their bureaucracy. However, despite the above constraints, some form of diluted autonomy and functional control of local resources by local communities within the framework of overall legal control of the state is possible. Such possibilities are further strengthened by some emerging trends. First, it is increasingly realized that management and protection of local level resources through state agencies, such as forest departments, is progressively becoming more difficult and costly. On the other hand, involvement of local communities in the local resources management has improved the situation in many areas (World Bank 1995). Second, the awareness and mobilization of local communities for their rights and resources, enhanced through nongovernmental organizations (NGOs), are emerging features of communities even in less accessible areas. Successful negotiations of forest user groups and community irrigation groups, which are helped by NGOs, to acquire control of resources in countries like Nepal, India, and Pakistan is one case in point (Ostrom 1990; Husain 1992; Proffenberger 1995).

However, without belittling the potential of the above possibilities that favor community control of local resources, it may be noted that

the envisaged transformation may not be an easy and straightforward task. There may be many hurdles in the process. In addition to their quantitative increases, the qualitative changes in mountain populations (Sharma and Banskota 1992), reflected through rapid erosion of community cohesion, weakening of the culture conducive to group action and collective sharing, rapid growth of individualistic tendencies, and economic differentiation of communities, may obstruct the effective use of restored community authority over local resources for regulating resources use.

The internal weaknesses of the present-day village communities, constraining the community initiatives for resources use regulation, may be complemented by external forces generated by market and political economies and manifested through a range of fiscal and pricing arrangements. An overextraction of mountain resources driven by the above forces may continue despite regulatory powers of the community. This calls for a gradual process of change, focused on the following steps: (a) making constant efforts for greater involvement of communities and user groups supported by NGOs for planning and implementation of resources management initiatives, use of resources regenerative technologies, and regulation of resources use (Daly and Cobb 1989; Cernea 1991); (b) taking examples from successful cases of participatory, decentralized resources management projects and focusing on their replication and mainstreaming (World Bank 1995); (c) helping build capacities and incentives for local communities to adapt to changed circumstances and reviving traditional practices for resources management in the changed contexts (Jodha, Banskota, and Partap 1992); (d) introducing different norms for products and resources pricing, reflecting their true worth or environmental cost by building on the conceptual leads provided by recent thinking in this area (Munasinghe 1993; Dasgupta and Mäler 1994; McNeely 1988); and (e) introducing biophysical measures of compensation for resources extraction, such as planting the same type of tree when one is cut for the timber market (Jodha and Shrestha 1994)

The suggestions for creating present-day functional equivalents of traditional circumstances presented in this chapter are indicative of the new possibilities. However, their design and implementation presumes fulfillment of several preconditions, including commitment of the decisionmakers and site specific preparations.

Conclusions and Policy Implications

Summing Up

Using the Himalayan case as an illustration, this chapter has tried to show that indifference or insensitivity of policymakers toward the imperatives of specific features of natural resources is the primary reason for overextraction and degradation of resources. The traditional communities under low pressure of demand managed the resources more sustainably. The rationale of traditional management systems is relevant in the present context as well. But, despite its relevance and frequent advocacy, the present-day resources management systems or development strategies in general have not been able to incorporate the elements of traditional systems. This is partly due to a lack of fuller recognition and internalization of traditional knowledge systems by policymakers and planners.

The main constraint to adoption of traditional elements, however, is the absence of objective circumstances conducive to their application. The traditional circumstances represented by relative isolation and closedness of systems, as well as subsistence orientation of production, are neither desirable nor feasible in the present-day context. Similarly, close physical proximity and total local control over local resources, as factors shaping resources management in the past, cannot be reinstated today.

Hence, one has to look for functional substitutes for the traditional circumstances that generated people's concerns and stakes in natural resources and responses thereto. This chapter has tried to indicate some of them. Accordingly, for the first element of traditional systems, namely dependence-driven stake in natural resources, it is suggested that the source of dependence be shifted from security of sustenance to security of niche. It also is suggested that the scale context of stake be changed from small, microlevel entities to macrolevel units. However, both the suggested changes imply a multiplicity and diversity of stakeholders, which lead to dilution and diffusion of perception and diagnosis of

stakes. To counter this problem, approaches have been suggested that generate sensitivity and feedback mechanism to help conservation-oriented responses of diverse user groups of natural resources and their products.

As functional substitutes for the second element of traditional systems, namely, physical proximity-based understanding and responses to ecological circumstances, reorientation is suggested of policy environment and program activities, which depend on closer and better understanding and sensitivity to natural resources and involve local communities in resource management decisions and actions. Finally, in place of the third element of traditional systems, namely total community autonomy, approaches have been discussed to enhance community control over local resources that can facilitate resources use regulation and participatory development.

Any progress in the above mentioned directions would mean a step toward rehabilitation of ecosystem and social system linkages, which is a key to sustainable resources management. However, the involved process of changes is faced with serious constraints. In the preceding sections, including Table 15–4, some of the key constraints and possible measures to handle them have been indicated. The suggestions made in this chapter are indicative of new possibilities of natural resources management in the changed context. However, their design and implementation presumes fulfillment of several preconditions, including commitment of policymakers and site specific preparations. They are recapitulated in terms of focused policy issues in the following section.

Policy Implications

The natural resources degradation in regions such as the Himalayas is the product of a mismatch between the features of a resources base and attributes of its usage systems. This fact seems to be ignored by development policies and programs, as well as the people using the resources, because of their overemphasis on production growth rather than the resources base that ensures production flows. Hence, there is a need for a strong resources focus of development interventions.

To reverse the unsustainability trends indicated by resources degradation, the product-centered interventions need to be balanced with the resource-centered measures. In this regard, the formal policies and programs can greatly benefit from the recognition and use of rationale or knowledge systems underlying the traditional resources management systems that ensured sustainability of resources and production under low- demand pressure in the past. By implementation, this means better recognition, documentation, and use of traditional knowledge systems by development interventions.

Because the traditional measures were not context free, their application in the current situation is seriously constrained by the changed demographic, institutional, economic, and technological circumstances. The objective circumstances (isolation, physical proximity, local resource control, and so forth) characterizing traditional management systems, created for the people of strong dependence-driven stake in the natural resources, ensured close understanding of the resources base and instant feedback on consequences of its mismanagement, and facilitated resources use and regulation through community sanctions. Reinstating the traditional circumstances shaping people's approach to resources use is not feasible in the present context. Hence, a major challenge for policy and operational work is to identify functional substitutes for the traditional circumstances conducive to sustainable resources management.

A useful approach to identify functional equivalents of the traditional circumstances is to focus on the functions they performed, rather than their forms, which are difficult to reinstate. Thus, the relative isolation or semiclosed nature of traditional communities helped generate (sustenance based) dependence-driven stake in resources. The changed product, or service, context and scale context of dependence can help generate new forms of users' dependence on resources and stakes therein, and facilitate sustainable management of resources in the changed circumstances. Similarly, sensitivity and understanding of resources that facilitate resource friendly usage systems can be promoted without re-creating the semiclosed systems. Similarly, enhanced local participation and planning from below can ensure sustainable resources management without traditional types of local autonomy. However, much more think-

ing has to be invested to multiply functional substitutes of traditional arrangements.

The key constraints to the above possibilities may be the existing perspectives and orientations of policymakers and development planners. They may not be very innovative and supportive of the new ideas that are based on learning from the traditional resources management systems. This calls for changing the overall perspectives on development goals and development processes.

The situation can be helped by designing and using the learning processes, whereby through concrete examples, such as a few field projects, the message and process of change can be demonstrated.

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Table 15–1: Negative Changes as Indicators of Emerging Unsustainability in Hindu Kush–Himalaya Region

Visibility of change	*Changes related to* [a]		
	Resource base	*Production flows*	*Resource use management practices/options*
Directly visible changes	Increased landslides and other forms of land degradation; abandoned terraces; per capita reduced availability and fragmentation of land; changed botanical composition of forest/ pasture. Reduced water flows for irrigation, domestic uses, and grinding mills.	Prolonged negative trend in yields of crop, livestock, etc.; increased input need per unit of production; increased time and distance involved in food, fodder, fuel gathering; reduced capacity and period of grinding and saw mills operated on water flow; lower per capita availability of agricultural products.	Reduced extent of fallowing, crop rotation, intercropping, diversified resources management practices; extension of plough to submarginal lands; replacement of social sanctions for resource use by legal measures; unbalanced and high intensity of input use, subsidization.
Changes concealed by responses to changes	Substitution of cattle by sheep and goats; deep-rooted crops by shallow-rooted ones; shift to nonlocal inputs. Substitution of water flow by fossil fuel for grinding mills; manure by chemical fertilizers.	Increased seasonal migration; introduction of externally supported public distribution systems (food, inputs); intensive cash cropping on limited areas.	Shifts in cropping pattern and composition of livestock; reduced diversity, increased specialization in mono-cropping; promotion of policies and programs with successful record outside, without evaluation.
Development initiatives, etc., processes with potentially negative consequences[b]	New systems without linkages to other diversified activities and regenerative processes; generating excessive dependence on outside resource (fertilizer and pesticide-based technologies, subsidies), ignoring traditional adaptation experiences (new irrigation structure); programs focused mainly on resource extraction.	Agricultural measures directed to short-term quick results; primarily production (as against resource)-centered approaches to development; service-centered activities (e.g., tourism) with negative side effects.	Indifference of program and policies to mountain specificities; focus on short term gains; high centralization; excessive, crucial dependence on external advice, ignoring traditional wisdom; generating permanent dependence on subsidies.

a. Most of the changes are interrelated and could fit into more than one block.

b. Changes under this category differ from those under the first two categories, in the sense that they are yet to take place, and their potential emergence could be understood by examining the involved resources use practices in relation to specific mountain characteristics. Thus, they represent the "process" dimension, rather than consequence dimension of unsustainability.

Source: Table is adapted from Jodha (1990) and Jodha and Shrestha (1994). It is based on data or descriptions by more than 45 studies from Nepal (18), China (15), India (7), Pakistan (3), Bhutan, Bangladesh, and Myanmar (1 each), as synthesized by Jodha and Shrestha (1994).

Table 15–2: Mountain Resource Characteristics, Their Imperatives, Objective Circumstances, and Driving Forces behind Human Response

Resource features and objective circumstances	*Imperatives and driving forces*	*Responses, resource use practices*
Inaccessibility (caused by physical, terrain factors) imposing high degree of isolation, poor mobility, and limited external linkages, semi-closeness.	Survival strategies with direct and total dependence on local resources and high stake in their protection, regulated use, and regeneration; local control of local resources, culture of self-management, evolution of systems from below based on closer proximity and knowledge of resource base.	Ecology-driven resource management, using conservation and protection technologies, and institutional arrangements, evolved with closer feel of the resources and enforced through local autonomy and control of local resources; rationing of demand pressure on resources, and restricting extraction levels in keeping with subsistence needs.
Fragility (caused by biophysical, topographic, adaphic characteristics) making resources highly vulnerable to irreversible degradation with small disturbance, restricting usage options, intensity levels.	High risk of rapid resource depletion owing to usage intensification inducing measures to balance extraction and conservation of production base, narrow range of production options (only land extensive users).	Technologies and usage practices combining intensive and extensive uses of natural resources, provision of institutional arrangements (e.g., common property resources) against overextraction of fragile and marginal resources, spatially and temporarily differentiated resource use [illegible], rationing, knowledge, and capacity-based resource upgrading (e.g., by terracing, agro-forestry, etc.).
Diversity (created by huge variations in biophysical features and elevations at shorter distances) creating opportunities for diversified and interlinked production and consumption activities.	Local knowledge, skill, and capacity-based diversification of resource use as a key element of both survival strategies and approach to sustainable productivity and health of natural resource base.	Spatially and temporarily diversified and interlinked activities with varying levels of intensification; diversification of demands to match the diversity of products and supplies, especially in a semi-closed situation.
Niche (created by unique agro-climatic, biophysical situations), imparting comparative advantage to mountain areas in some activities and products (forests, horticulture, herbs, hydropower, etc.)	Potential for trade-based external linkages restricted by levels of knowledge, capacities to harness, etc.	A limited range of diversified activities directed to petty trading to supplement subsistence activities; local demand and extraction facilities and capacities as key factors governing the exploitation of niche situations.
Implication	Adherence to two-way adaptation process.	Ecology-driven systems of resource use conducive to sustainability (under low-pressure population and external demand).

Source: The table is based on synthesis of accounts of concrete situations described in over 50 studies about mountain areas (Jodha and Shrestha 1994).

Table 15–3: Factors and Processes Associated with the Nature-society Interactions under Traditional and Present-Day Systems of Resource Use in Mountain Areas

Situation under traditional systems	*Situation under the present-day systems*
A. Basic objective circumstances 1. Greater degree of inaccessibility, isolation, and semi-closeness of systems; poor mobility and external linkages, etc. creating total and exclusive dependence on local resource base and high concern for its health and sustainable use.	1. Greater physical, administrative, and market integration of traditionally isolated areas and communities with the dominant, mainstream systems, reducing critical dependence of farmers on local resources and hence the degree of their stake in the conservation of the local resources.
B. Key driving forces/factors generated by (A) 1. Social survival and welfare strategies totally focused on local, diverse, fragile resources. 2. High collective stake in protection and regeneration of local natural resources. 3. Functional knowledge and closer understanding of limitations and potential of resources due to closer proximity and access to resources, little gap between resource user and resource itself. 4. Autonomy, local control over local resources (owing to absence of external impositions).	1. External linkages-based diversification of sources of sustenance, welfare, and development, reducing the extent of critical stake in local resource maintenance. 2. Role of functional resource knowledge marginalized because of imposition of generalized approaches from above for local resource management; wider gap between resource users and decisionmakers. 3. Erosion of local resource control, autonomy following the extension of mainstream, legal, administrative, and fiscal arrangements to formerly isolated areas.
C. Social responses (concerns and adaptations) dictated or facilitated by B 1. Adoption and enforcement of production and extraction systems adapted to natural resource features through diversified usage, controlled usage intensity, regenerating, upgrading, and developing the resources, depending on capacities and needs. 2. Controlling or rationing the demand pressure on resources through social and institutional sanctions, collective sharing, recycling, outmigration .etc.	1. Greater role of demand-driven measures leading to resource use intensification, over-exploitation with greater extractive capacities and technologies. 2. Increased role of (unregulated) external demands, which are insensitive to local resource limitation. 3. Resource upgrading measures more generalized and less location specific.
D. Mechanisms and means to execute social responses 1. Collectively evolved site- and season-specific norms of resource use facilitated by direct access and proximity to resources and little gap between decision makers and resource users. 2. Site, season, product, and resource component-specific folk technologies evolved over the generations, facilitated by functional knowledge and close proximity to resource base. 3. Formal and informal institutional arrangements guiding broad approach to resource management, access, and usage regulation, facilitated by group action or community participation, and autonomy and local control over local resources.	1. Largely externally evolved generalized rules guiding resource use, framed by legal and technical experts with little concern for local resource users' perspectives and limited knowledge of site specific situations. 2. High science-based modern research and development as a source of technologies, ignoring rationale of traditional practices; ignoring local resource perspectives. 3. Institutional interventions evolved, designed in incomparable situations and extended to these areas as a part of agricultural, rural development.

E. Consequences Ecology-driven natural resource management systems: 1. Evolved by the communities having high stake in sustainability of the resource base. 2. Facilitated by functional knowledge of resources, close proximity to resources, and community control over the local resources.	Resource usage system driven by uncontrolled pressure of demand: 1. Developed by experts with : local participation: 2. Enforced (rather nonenfo-) by formal state machinery.

Source: Table based on synthesis of inferences from different studies; in particular, Brush 19[illegible] Banskota 1989, Rieger 1981, Jochim 1981, Myers 1986, Price 1981, Jodha 1990, Rhoades 1988, Jodha and hrestha 1994, and Whiteman 1984, Carson 1992, Yanhua 1992, Gadgil and Guha 1992, Guillet 1983, Ives ar Messerli 1989. For more details, see Jodha 1990; Jodha and Shrestha 1994.

Table 15–4: Possibilities of Reorienting Current Resource Usage Systems in Mountain Areas by Incorporating Elements from Traditional Systems

Circumstances, driving forces, and response mechanisms characterizing traditional resource use systems	*Elements of traditional systems with scope for revival, reorientation, and substitution in the present-day context*	*Constraints to measures under "Elements" column and possible responses*
Total dependence-driven community stake in natural resource base: 1. Key factor: almost total and exclusive dependence on local resources for survival (in a semi-closed, isolated subsistence-oriented context), inducing protection, regeneration, and sustainable use of resources; the process was complemented by close proximity and functional knowledge of the resources that sharpened the community's perception and diagnosis of resource situation. 2. Infeasibility (and undesirability) of no. 1 in the changed context of reduced isolation and access to external sources, etc.	**Rediscovered areas of total and crucial dependence as sources of community stakes in natural resources:** 1. Change of product and service context of stake, i.e., substituting (traditional) sustenance security by security of "niche" (high-payoff products and services with comparative advantage to the local communities), and use them as lead sector influencing overall natural resource management (e.g., horticulture or tourism-led initiatives in mountains). 2. Change of spatial and socio-economic context of dependence as a source of stake, i.e., instead of an isolated community's sustenance (now met partly by external links), the crucial environmental products and services for larger entities (e.g., hydrological stability and productivity of total agro-ecological zone affected by resource mismanage-ment in small units (see text for illustrations).	**Constraints:** 1. Wider spread and diversity of resource users and other stakeholders *diffusing and diluting the perception and diagnosis of stakes*, reducing role of stake as incentives for resources management. 2. Lack of substitute arrangements comparable to traditional provisions such as (a) norms of routine resource use practices reconciling individuals' short planning horizon and the community's long time horizon; and (b) advantage of close proximity, first-hand knowledge of resource base. **Possible Responses:** 1. Reduce gap between resources as well as resource users and the resource planners, policymakers, development agencies, etc., by sensitizing the latter to mountain conditions. 2. Develop feedback mechanisms by involving local communities in resource-related decisions and actions. 3. Plan resource development and use with mountain perspective based on no. 1 and no. 2.

Close proximity, direct access to resources and their functional knowledge:	Functional substitutes for close proximity and first-hand knowledge of resource base:	Constraints:
1. Generated understanding and sensitivity to resource situation and its variability; helped in developing relevant folk technologies; encouraged institutional arrangements for resource use regulation (intensity, diversification, common property regimes, etc.); reduced gap between resource user and decisionmaker, producer, and produce consumer, and helped in regulating pressure on resources. 2. After integration with the mainstream (external systems), leading to distance between the resource and resource planners; multiplicity and diversity of resource users and pluralization of perception of stakes and marginalization of traditional knowledge systems, and physical proximity, dependent approaches are not feasible.	1. Focus on sensitivity (in place of proximity) to resource situation, as the latter contributed to evolution of resource management measures mainly by generating sensitivity toward the resources; reorient and sensitize policymakers and development agencies (even market forces) to make them understand imperatives of mountain resources and act accordingly. 2. Evolve feedback mechanisms (about resource situation) by involving local communities as a substitute for instant feedback provided by physical proximity; 3. Fill in knowledge gaps by collection, synthesis, and application of resource-related information on using facilities offered by information technologies and communications.	1. The culture of development interventions that emphasizes the extension, and imposition of measures developed for other areas; ignoring local resource base and its imperatives, local knowledge systems, and people's perspectives. 2. Missing mountain perspective of mountain development approaches. **Possible Responses**—Possible approach starts with reorientation of overall strategy of development interventions and resource management. Specific steps may include: 1. Sensitization and reorientation of relevant decisionmaking agencies about resource characteristics and their diversities. 2. Involvement of local communities in design, planning, and implementation of interventions involving resource management, i.e., bottom-up approach. 3. Recognition and use of traditional knowledge systems, and reorientation of research and development systems focusing on on-farm research, farmer participation, and bottom-up farming system research to help integration of knowledge generating processes rather than knowledge only.

Autonomy and community command over local resources:	**Restoring community management of local resources:**	Constraints:
1. A product of isolation or semi-closedness of areas and communities that facilitated effective community ownership of resources; helped in designing and enforcing resource use regulations; reduced gaps between decisionmakers and resource users; encouraged community participation and group actions; and helped in resource use rationing, collective sharing, resource recycling, and protection against pressure of (possible) external demand. 2. The local community control over resources and capacity to design and enforce usage regulation have vanished or weakened with the integration of isolated areas with the mainstream. Revival of the system conflicts with "centralization" and top-down approaches of the mainstream decisionmakers, governed more by the interests and perspectives of the mainstream.	1. Build on the emerging trends toward decentralization, community-based development, participatory and bottom-up approaches to development. Experiences of user group and NGO initiatives, etc., can help provide functional substitute arrangements for traditional community control of resources. 2. Take leads from successful experiences, community forestry, community irrigation systems, and other grassroots-level participatory initiatives, facilitate their replication and mainstreaming.	1. Loss of traditional collective sharing systems and culture of group action, emergence of social and economic differentiation and individualistic tendencies. 2. The states, agreeing to decentralization, community participation, etc., may not imply local control of resources: states' tendency to use community as a convenient agent (rather than an autonomous body) with little powers and capacities for rationing of demand on local resources or for pricing of products. 3. Market pressure (distant demand) may prove more powerful than community initiatives in adapting demand to resources features rather than the other way around. **Possible Responses:** 1. Exploration and use of constant possibilities to manage above constraints through (a) greater autonomy to communities and user groups, and (b) association of local communities with resource-related decisions. 2. Initiatives on product and resource pricing reflecting their true worth and sharing gains with local communities; introduction of biophysical measures for compensation for natural resource extraction.

Source: Author.