

**Comparative Analysis of Mountain Landuse Sustainability:
Case Studies from India and Canada**

James S. Gardner, A. John Sinclair and F. Berkes

**Natural Resources Institute
University of Manitoba
Winnipeg, Manitoba R3T 2N2**

Senior author:

**Fax (204) 261-1318
James_Gardner@UManitoba.Ca**

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1. Introduction

Mountain people typically have lived on the economic margins of society, making a living as woodcutters, herders, gatherers and small-scale agriculturalists. Yet, for many societies, mountains are at the centre of the universe. A number of mountains in Asia, such as Mount Kailas in Tibet, take on the character of the sacred mountain “which stands as a cosmic axis around which the universe is organized in Hindu and Buddhist cosmology” (Bernbaum 1996). In our Indian study area (Figure 1), the mountains around the source of the Beas River are of great cultural and historical significance as a site and inspiration of the Great Indian epics.

This suggests that the study of sustainability requires a broad approach, taking into account social and cultural matters, as well as the ecological and economic. We started the project with a special interest in the management of forested mountain environments, and in the use of participatory or people-oriented approaches to resource management. We adopted a view of sustainable development which explicitly included three elements: (1) the environmental imperative of living within ecological means, (2) the economic imperative of meeting basic material needs, and (3) the social imperative of meeting basic human and cultural needs. Such an approach to sustainable development is concerned with much more than maximizing resource yields. It covers a broad range of environmental values as well as economic and social needs, and opens up the scope of decision-making not only to a wider range of natural and social sciences but also to a range of stakeholders' interests affected by resource management decisions.

Under the overall goal of studying policy development for the sustainable use of forested mountain ecosystems, the objectives of this study were four-fold. We deal with each in turn and expand on the policy implications.

1) To develop integrated methodologies best suited for the comparative study of land resource management policies in forested mountain ecosystems;

2) To study the successes and failures of mountain environment resource management policies and their social, economic, and historical context as revealed in case studies;

3) To evaluate and develop criteria for assessing and monitoring sustainability in mountain environments and, in particular, for examining relevant cross-cultural dimensions of SD in these ecosystems; and

4) To communicate the policy implications of the study to the appropriate agencies and people concerned with resource management and sustainable development, and to interact with policy-makers.

2. Integrated Methodologies for Sustainable Development Research

The project was conceived as a team study partly because of the necessity to use **multidisciplinary** perspectives of geography, history, ecology, economics, sociology, and anthropology, as well as the applied areas of natural resources, forestry and agriculture. Team members and advisors combined expertise from a number of areas which required an **interdisciplinary** approach: policy development, common property resources, hazard management, livelihood security, women's studies, urban and regional planning, and remote sensing.

Using the terminology of Jantsch (1972), integrated methodologies developed for the project were more than a matter of bringing together disciplines without cooperation (multidisciplinary). They were integrative, and involved synthesis and coordination by higher-level concept (interdisciplinary). Perhaps the ultimate objective could have been a **transdisciplinary** synthesis of methodologies, the multi-level coordination of a system of new methodologies for the study of sustainability of forested mountain ecosystems.

Just as the disciplinary backgrounds of the researchers and project advisors had a bearing on the methodologies developed, the *nature* of the information available also had a major role in deciding on the study methods and findings. In the India case study, the local people had rich and diverse land and resource use systems; thus, the social component of the overall methodology was always in the foreground. The study was not based to any extent on researchable data bases; those applicable to the area were poor. There were no GIS data bases, and remote sensing data were restricted for use because of the proximity of the study area to restricted areas. Although forest inventories existed and were in fact used, agricultural land use inventories and demographic data from government sources were often at odds with local information, and the University of Manitoba researchers decided to rely on the University of Delhi team for their interpretation (Singh and Pandey 1995; Singh and Mishra 1995).

By contrast, the Canadian case study was characterized by the availability of a great profusion of mostly machine-researchable data sets, some 21 of them, out of which 16 were used. The list included no less than three GIS land use data sets which could be used for assessing the sustainability of forests. As well, two sets of aerial photographs (low and high altitude) were purchased and used to examine the development of logging roads and cutting areas in a selected tributary watershed. On the whole, relatively little of this large mass of information was used. By contrast, social data on land use and sustainability were difficult to come by. Information on the history of land use and recent policy changes under multiple use planning were available and in fact used. As well, Duffield carried out a repeat of his survey of signs and signals of sustainability to test the applicability of cross-cultural criteria, and to provide a bridge between the Indian and Canadian case studies (Duffield et al. 1998). But the simplicity of land use in the Canadian case and the lack of land resources used as communal property (as compared to some seven kinds in the Indian case) meant that these aspects of the study in British Columbia were rather abbreviated.

3. Evaluating Successes and Failures of Management Policies

The two cases provided a deductive approach for the study of sustainability: what were the successes and failures of resource management policies in these two forested mountain ecosystems in their social, economic, and historical context? As may be expected, the overall results of the sustainability analysis were not clear-cut in either case study. Land use practices in both case study areas seemed *generally* sustainable, but when a detailed overview of a multiplicity of biophysical, economic and social/cultural factors were undertaken, both seemed to have room for improvement in a number of areas.

A major difference between the two case study areas was the population density and, related to it, the intensity with which local resources were used. The Kullu District had a population density of 55 persons per sq km in 1991, lower than that for the Himachal Pradesh State or for India as a whole

(Singh and Chauhan 1995). In the two study villages, the amount of agricultural land averaged about one hectare per household, with another two to five hectares per household of communally used forest and grazing land. By contrast, the Canadian case study area had about 1.1 persons per sq km, lower than the Province of British Columbia average of 3.7 persons per sq km. In the Canadian case study, the population of the area was not agricultural (the forest industry was the single largest employer), so figures on the amount of farmland per household were not comparable.

In parallel with the 50-fold difference in population density, the differences between the two case study areas with respect to the *intensity* of land and resource use were clearly visible. This was pointed out by our project partner Mr. B.W. Pandey of the University of Delhi in his first trip to Canada to work with the Canadian team in July 1995. In the Canadian case study area, as Pandey immediately commented upon, there were no women gathering firewood in the forest; no children carrying bundles of fodder; no people who made their livelihood by herding. In fact, there were no animals grazing in the forest, except in pockets of land leased to ranchers (none in the study area). There was considerable firewood cutting, berry and mushroom gathering in the Nakusp forest. While these activities were fairly noticeable by British Columbia standards (for example, more than half of Nakusp households had stacks of firewood) and, along with tourism, provided a semblance of multiple-use of the mountain forest ecosystem, they nevertheless amounted to a very low intensity of use of the land by Kullu District standards.

A second major difference between the two case studies was that the people of the Kullu study area were tied to the land through village use areas. In these, they grew much of their own food, including grains, oil, vegetables, milk, mutton; gathered their own firewood, animal fodder and bedding; and even produced their own home-brew alcoholic drinks from local resources. They were impressively self-reliant (but not self-sufficient). Obviously there was a wage economy as well, depending largely on orchards and tourism. By contrast, the rural communities in the Canadian case study had nothing comparable to the community resource areas in Kullu Valley. The people of Nakusp lived largely in a wage economy, and met relatively few of their needs from their local environment. Even though many obtained firewood from the forest, gathered berries and mushrooms, cultivated small vegetable gardens, owned a few fruit trees, and carried out some fishing and hunting, their level of self-reliance was minor by the standards of the Kullu study area.

To use a dichotomy proposed by Dasmann (1988), the people of the Kullu area were “ecosystem people”, largely tied to their local resources, whereas those of the Nakusp area were “biosphere people”, largely independent of their local resources and tied instead to the global economy. The differences are striking, despite the fact that Kullu Valley villagers have come more and more under the influence of regional and global economics (Smaller 1997), and some Nakusp and surrounding area people have made a conscious effort to go back to the land. Part of this difference is due the fact that populations in the Kullu study area have been historically tied to the land, whereas relatively few families in the Nakusp area have multi-generational family history there; most of the population has been mobile, following jobs on the Canadian resource frontier.

3.1 The Kullu Valley - Manali Case Study, Himachal Pradesh, India

The Kullu Valley and the Manali area have escaped the excesses of environmental degradation well known elsewhere in the Himalaya. We concluded that one possible explanation for this is because

the historical land settlement provided the local people with relatively well-defined rights to resources. Since the villages have resource use areas and livelihoods are to a large extent tied to the land, we concluded that threats to biophysical sustainability in the study area were also threats to the economic and social wellbeing of the people. These threats included the replacement of biologically diverse traditional field crops with orchard monocultures; the heavy use of government-subsidized pesticides; and the loss of collective decision-making traditions in certain kinds of land use areas which had been privatized. Extensive illegal felling of trees was a major threat to the forest environment as well as to villagers' collective livelihoods. Local institutions as well as government agencies were struggling with these resource management problems, and in some cases blamed one another.

The Kullu case illustrated the importance of the historical and policy context. The framework of law which structured the use of resources in the Manali area and Kullu Valley is the 1886 Anderson settlement report and a later report prepared by A.H. Diack (Diack 1898). Under this settlement, village rights in the Kullu district appear to have been more generously defined than elsewhere. "Contrary to indications from other areas in India, the process of settlement of rights in Kullu and Mandi did not result in the termination of local people's rights, but rather their acceptance and formalisation." (ODA 1994). Anderson's report seemed to have a concern for village rights, noting that rights to forest resources were important to the livelihoods of villagers: "The people are dependent on these rights for their very existence, and extinction of the rights would be the most unjustifiable expropriation" (Anderson 1886, p. 7).

However, these concerns for village rights still had to operate under the framework of the 1878 Indian Forest Act which was intended to affirm the state ownership of Indian forests and abridge village forest rights (Gadgil and Guha 1992). One method to define local rights, under the overall state ownership of forests, was to assign a forest area based on precolonial tributary use areas to each revenue village created by the settlement process. These forest rights were vested in the individual landholder and recorded at the time of the revenue settlement. The vesting of forest rights in the individual, rather than the village, made it difficult for a village to regulate the activities of their members (Gadgil and Guha 1992; ODA 1994). In law, the village was given a portion of a state forest, within which each landholder of the village could exercise recorded forest rights, but management, regulation and enforcement were to be carried out by the Forest Department. The result was a state forest divided into village forest rights areas, to be utilized as recorded by villagers, but managed by the state, as determined on the basis of the *de jure* property rights established in 1886.

The work done by the study team showed that, even though these rights were initially defined as *individual* rights by the colonial administration following the European tradition, they were in fact *practiced* as communal rights, following the Indian and Pahari tradition. Considering the importance of the diversity of *interdependent* uses of the local mountain environment, this shift in practice may help explain how a "tragedy of the commons" (Feeny et al. 1990) in the use of resources was avoided. Because of the interdependence of many kinds of livelihood activities, common property resources were the key to sustainability, and common property institutions made possible the complex of diverse and shifting relationships.

Historical photographs of the region are instructive in providing evidence on the question of the sustainability of the mountain forests of the Kullu area. Comparisons of photos over the past 100 years reveal stability in the basic distributions of land cover types. Plate 3 in Chapter 7 (Berkes and Gardner 1997) shows the forest cover near Chichoga. The extent and density of the forest cover in 1910-30 as shown in this photo may be compared with the 1994 photo in Plate 6, Chapter 3 (Berkes

and Gardner 1997). Historical forest cover maps from 1918, 1949 and 1977 and provides some indication of the dynamics of the Kullu forest, and show similar overall results of forest cover maintenance (Chapter 3, Berkes and Gardner 1997)..

3.2 Arrow Lakes - Nakusp Case Study, British Columbia, Canada

The Canadian case study followed the CORE (1995) land use strategy planning process carried out in the area in 1993-94. The CORE initiative had been predicated on the idea that resource demands have increased in British Columbia and that social values have shifted towards greater environmental protection (M'Gonigle and Wickwire 1989), requiring new resource management and decision-making processes that reflected the "full range of public values." The CORE exercise had included the analysis of timber supply sustainability in the area, as well as the sustainability of a range of other products and values related to the mountain forest; it defined sustainability as "the assurance that present land use decisions do not compromise the opportunities available to future generations" (CORE 1995).

The study team arrived in the case study area at a historical moment when the single-resource use approach was being replaced by another -- one adapted to address multiple resource demands. For about three decades, the area had been managed largely for one product: timber from the forest. The area had in fact a history of shifting single-resource focus, from mining to agriculture to hydroelectric development to timber. Historical data including maps and photographs document these various phases and the "boom-and-bust" economy that went with it.

The debate under the CORE process included the replacement of the single-resource focus with a planning process that allowed for the consideration of many resources and values: agriculture, mining, forestry, tourism, recreation, aesthetic and spiritual enjoyment, fish and wildlife conservation, watershed protection and biological diversity. The overall verdict of CORE (1995) was that resource use and management in the West Kootenay region had *not* been sustainable. Timber supply reviews conducted by the British Columbia Ministry of Forests had indicated that long-term harvest levels had to be reduced by as much as 50 percent in some areas to achieve sustainable timber yields. Anderson (1997) has subsequently calculated for the study area (which is a small part of the region considered by CORE) that current annual harvests needed to be reduced by about one-third to stretch out the timber supply into the future for long-term sustainable harvests (more details in Anderson 1997).

Population data for two key indicator species, woodland caribou and grizzly bear, suggested that their long-term survival in the study area may be threatened if current practices continue. The caribou are sensitive to the reduction of old growth forest, and very little was left of the oldest two age-classes of forest. Caribou sightings were made in uncut areas; in fact, the largest concentration was found in the largest block of old growth timber (Anderson 1997).

The grizzly bear, by contrast, is a habitat generalist not readily affected by forest cutting; it was, however, affected by the construction of logging roads that brought the bears into conflict with humans. Some other species of wildlife may have also been affected through loss of habitat quality as a result of extensive logging, since large clearcuts reduce landscape diversity. Yet other species, however, are attracted to newly cut areas which tend to be productive with berries and edible shrubs. One species which has actually increased in the area is osprey, a large fish-eating bird of prey, which has benefited from the creation of Arrow Lake reservoir.

On the whole CORE (1995) concluded that water quality in freshwater systems, which are critical for fish habitat as well as for human consumption, have shown continuous signs of deterioration. The study team's interpretation of the data indicates a decline in one valuable species of trout (bull trout), while the population of the dominant land-locked salmon species, the kokanee, has been sustainable. There was some evidence, based on resource managers' observations (for the lack of data), that clear-cutting in the tributary watersheds has caused siltation affecting some fish spawning areas and water quality in general. However, the analysis of the hydrological data has not shown a significant impact of forest cutting on water yields. Anderson (1997) has summarized the available biophysical data for the case study area to show those parameters which seem to be sustainable and those which are not.

Much less information was available to analyze social and economic sustainability in the Nakusp area. CORE (1995) holds the view that "economic and social indicators such as a reduction in resource industry jobs, lack of investor confidence, reduced community stability and conflicts among different resource users further emphasize a lack of sustainability, reflecting a general trend in Canadian resource-based communities."

4. Developing Criteria for Sustainability

The objective to evaluate and develop criteria for assessing and monitoring sustainability in mountain environments was met partly by the findings summarized above. The Kullu case study led to the conclusion that history and policy were important, and the study of land use and institutions provided insights into all three kinds of sustainability (ecological, economic, social). The Canadian case study also supported the importance of environmental history, but did not find any degree of local and community-based resource use. Instead, the findings brought out the importance of a regional multi-stakeholder process in a social setting characterized by a rapid change of values. The case study documented a major policy shift from a single-resource emphasis to multiple-use with the emergence of new environmental values. In the old management system, the forest industry used the forest with relatively little allowance for other uses of the land; under the new system, the forest industry was coming under the control of an increasingly more stringent Forest Practices Code and was under pressure to recognize and allow for other uses and for the expression of environmental values in the form of more protected areas, the conservation of species such as caribou and grizzly bear and of biodiversity in general.

Through the use of several data bases, the project was able to make an overall *quantitative* assessment of sustainability with respect to biogeophysical parameters of sustainability. Yet, the dilemma is in the choice of the *appropriate* parameters. After all, there are hundreds, perhaps thousands of possible measures of sustainability. The technical literature on sustainability indicators is very large and rapidly growing (Pinter et al 1995). Much of the work has been conceptual, and there is a dearth of locally generated measures. Since part of the project objective was to involve the local people in resource management and to examine cross-cultural dimensions of sustainability, we took the obvious but often neglected step of *asking the local people* what sustainability meant to them.

In the Kullu area case study, we asked villagers for locally identified “signs and signals which should be monitored in order to predict a good future,” with the idea that these “signs and signals” may be considered as a proxy for sustainability indicators. For cross-verification, we asked the same question to a sample of resource management professionals working in the area (Duffield et al. 1998). Similarly, in the Nakusp case study, we asked the same question to a sample of local stakeholders and a sample of resource management professionals. The large diversity of responses is organized into five clusters.

Forest Indicators. This grouping of indicators relates directly to the quantity and quality of forest: amount of cover, tree species diversity, forest density, and the availability of forest products. Forest cover was the single most frequently identified indicator by Kullu area villagers, followed by diversity and density, and the villagers placed relatively more emphasis on these items than did the managers. In the case of Nakusp area stakeholders and resource managers, there was relatively little emphasis on forest indicators; few stakeholders did mention old growth forest, and several managers mentioned forest-cover related indicators: protection of riparian habitat, land cover and ecosystem change, habitat fragmentation, and biodiversity loss.

Forest-Linked Indicators. Another cluster of indicators identified by the Kullu area villagers, and less frequently by the managers, captures ecosystem services provided by the natural capital of

forests. The number of snow avalanches and landslides, and consistent water flow (hydrology of streams, springs and rivers) were the two most frequent responses in this grouping, followed by clean water, scenic beauty of the area, control of erosion, and consistency of climate -- all of which relate to forest cover. Nakusp area stakeholders and managers made reference to non-timber forest products and scenic beauty, but made almost no specific references to avalanches, landslides and hydrology as indicators of sustainability.

Forest Management Indicators. The largest numbers of responses from Nakusp area managers, and slightly less so from the stakeholders, concerned management-related indicators: forest and land use rules and regulations, the harvest in relation to the allowable cut, silvicultural success, ecosystem-based management, and multiple-use. The largest numbers of responses from Kullu area managers, and somewhat less so from the villagers, concerned reforestation efforts, natural forest regeneration, and effectiveness of enforcement. Taking the two case studies together, Duffield et al. (1998) concluded that the pervasiveness of good management, using those indicators that provided feedback on the manager's ability to work for the sustainability of the forested mountain environment, was the most robust indicator that stood up to cross-cultural analysis.

Economic Indicators. In the Nakusp area, stakeholders emphasized the importance of economic growth and migration into the area, as related to economic development. Both stakeholders and managers mentioned tourism, economic diversification, local value-added, road and rail access, and job creation per unit amount of wood harvested -- all of them related to diversification and moving beyond a single-resource, extraction-based economy. In the Kullu area, villagers gave more weight to increased area under apple orchard and other cash crops, market access and roads, and tourism. Managers had little to say about those items but instead emphasized in the Kullu case, crop diversification (especially vegetable cash crops), agroforestry (including the diversification of fruit tree species and varieties), village cooperatives and credit availability.

Social and Community Health Indicators. In the Nakusp area, both stakeholders and managers considered local input into decision-making to be a major indicator. Stakeholders emphasized the importance of youth opportunity, community self-reliance, quality of life, sense of community, and access to services. These were less frequently mentioned by the managers, except for quality of life, including water quality issues. In the Kullu area, the major social and cultural indicators mentioned by the villagers included family planning, air and water quality, education and literacy for children, cultural health, women's rights, and forest conservation interest by young men. Managers did not mention education, literacy or women's rights, but they weighted family planning and air and water pollution more heavily than did the villagers.

One conclusion from the "signs and signals" inquiry is that the two groups in each of the two case study areas had a great deal in common with one another. That is, villagers and resource management professionals in the Kullu area had a high degree of agreement, with perhaps a two-thirds overlap in their answers, regarding the signs and signals of sustainability. Similarly, stakeholders and resource management professionals in the Nakusp area had about a two-thirds overlap. In both cases,

the managers gave more emphasis to management-related indicators and less emphasis on economic and social indicators than did the local population.

A second conclusion is that there were no single, “key indicators” that applied to both areas, suggesting that meaningful indicators need to be area-specific. Indicators came in clusters, and the most robust cluster which stood up to cross-cultural analysis was the pervasiveness of good management, that is, using those indicators that provided feedback on management success.

A third conclusion is that all four groups of respondents in the two case studies suggested signs and signals that covered the ecological, economic and social aspects of sustainability. Did this mean that the local people and the local managers knew their sustainable development theory, or did it mean that sustainable development theory is on the right track in terms of what local people and local management practitioners in fact recognize as important? In either case, our study demonstrated the cross-cultural feasibility of *asking* the local people about sustainability and in fact generating sensible and meaningful indicators for a given area.

A fourth conclusion is that Kullu area villagers' rich and ecologically sophisticated responses in the clusters of Forest Indicators and Forest-Linked Indicators is evidence of the traditional ecological knowledge that they hold. It is related to the fact that they are on the land each day, and to their status as “ecosystem people” (Dasmann 1988). The responses give good account of their reliance on, and intimacy with, their forest environment. By contrast, Nakusp area stakeholders' weak contribution to indicators in these clusters may be reflective of their not being directly dependent on local resources. It may also be related to the fact that mountain slopes in Nakusp are no so steep as those in the Kullu area.

5. Policies for Forested Mountain Ecosystems

The project established contacts and working relationships with managers and policy-makers in both case study areas. In the Kullu area, a workshop was held in 1995 in Manali, one year after the main fieldwork, to verify results and to receive feedback. Organized by the Project's Chief Co-Investigator, Dr. R.B. Singh and his team, the Manali Workshop brought together resource managers from the national, state and local levels, representatives of the villages, NGOs, and members of the study team from both the University of Delhi and the University of Manitoba. Policy implications of the study were communicated to the appropriate organizations in 1996 as well, including the G.B. Pant Institute of Himalayan Environment and Development, the local tourism industry and local NGOs and agencies. In the case of the Nakusp area, the study team was working with the local and regional resource managers from the start of the case study in 1995. The follow-up fieldtrip in fall 1995 not only collected new information, but also resulted in contacts with 21 resource managers and decision-makers from Nakusp, Revelstoke, New Denver, Castlegar and Nelson, representing five provincial government agencies, several NGOs, and local industries.

As communicated to policy-makers and resource managers, and as analyzed in the scholarly papers of members of the study team, the implications of our findings for policy development and analysis may be considered under three overlapping headings: changing values and priorities in the use of forested mountain environments; ecosystem management with people as integral part of the system; and the co-management and public participation in management.

5.1 Changing Values and Priorities in Forest Use

A major change that has affected policy in recent years is a shift in social values towards greater environmental protection. This change has perhaps been most dramatic in the case of Canada, but a similar shift has also been occurring in India (Gadgil and Guha 1995). India and Canada share a number of common features in the area of natural resources management. For example, both countries have a colonial history in which products of public lands were treated as commodities; historically, utilitarian attitudes (Worster 1985) dominated the view of environment and resources; and much of the mountain forest environment has been government-owned and has been managed mainly for wood products, often ignoring other uses and ecological considerations.

Canada in general and British Columbia in particular have a history of rapid depletion of resources along a shifting resource frontier. The pattern of forest resource use has historically followed a sequence of exploitation from the more valuable to the less valuable species (Regier and Baskerville 1986). In India, similar waves of exploitation, by species and by area, can likewise be traced. Under British rule in India, there was a general shift from production of a wide variety of goods for local needs, to production of a few commodities for export (Gadgil and Thapar 1990).

Under a resource management paradigm that emphasized commodification and economic growth, the decades old “multiple-use sustained-yield” approach guided the managers of public forests in both Canada and India. However, an emerging forestry paradigm is challenging this traditional approach (Bengston 1994). Various called forest ecosystem management, sustainable forestry, or multi-value forest management, the emerging approach establishes that the recognition of “multiple values” must be at the root of decision making in forest management. Bengston (1994, p. 519) notes further that this is resulting in the consideration of a whole series of new questions such as, “What is the nature of forest values? Whose specific values are involved? How and why have forest values changed over time? What do changing forest values imply for ecosystem management?” Our research shows that resource users and managers in Canada are beginning to address the issue of recognizing multiple values within the decision making process. The CORE process in British Columbia attempted to bring stakeholders with varying forest values to the same discussion table. They achieved some success in motivating stakeholder participation in their process, and as a result, multiple use and forest protection values were injected into the decision making process. In this case, the architects of CORE looked to roundtable discussions as a way to identify values and incorporating them into the decision process. Other studies are underway in British Columbia and other Canadian provinces, to develop more detailed approaches and methodologies for identifying and incorporating a broader spectrum of “values” within the decision process. It is argued that the traditional stakeholders, including NGO’s, may not reflect all the values decision makers may want to take into account. There are two Model Forest programs operating in British Columbia, and both of them are undertaking studies regarding the host of questions noted above related to values. It is clear, however, that in the Canadian case the incorporation of “forest values” into forest management is truly “emerging”, and is likely to have a profound impact of future policy development.

The case study in India did not as closely document the steps forest managers were taking to incorporate multiple “forest values” into their decision processes. It is clear, however, that at the village level, people traditionally have tried to manage the forest in recognition of a number of values. Their relationship to the land in this regard is much different than that in the Canadian case study where

law and regulation tend to more closely control individual action. The India case study also revealed the existence of “stakeholder groups”, such as the *mahila mandal*, that were pressuring forest managers to consider their concerns and values. This was not, however, occurring within a structured process such as CORE.

The study did not consider if forest managers in the Kullu Valley were considering forest values issues in the same way as in Canada. We did recognize, as have others (Krishnaswamy 1995), that local communities are very active in self-initiated management of state-owned forest which reflects a host of local values including those identified in the Canadian case, multiple use and forest protection.

In the larger international context, the shift towards non-utilitarian values of the environment, in both India and Canada, may be seen to be closely related to two other major shifts in resource management thinking. The first is a resurgence of interest in communal and neo-traditional land use practices as part of a humans-in-ecosystem approach. The second concerns co-management as a framework for participatory approaches to resource use.

5.2 Ecosystem Management with People

According to the Ecological Society of America, ecosystem management can be defined as “management driven by explicit goals, executed by policies, protocols and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem structure and function” (ESA 1995). Ecosystem management does not focus primarily on *resources* but rather on the sustainability of ecosystem structures and processes necessary to *provide* these resources. According to ESA (1995), ecosystem management must include the following components: (1) long-term sustainability as a fundamental value, (2) operational goals, (3) sound ecological understanding, (4) understanding of complexity and interconnectedness, (5) recognition of dynamic nature of ecosystems, (6) attention to context and scale, (7) acknowledgment of humans as ecosystem components, and (8) commitment to adaptability and accountability. All of these measures, and ecosystem-based resource management in general, have policy implications.

Much of the older literature in environmental science and ecology only discusses humans as despoilers of ecosystems. However, as may be seen from the above, current views of ecosystem management acknowledges the role of human societies, not merely as despoilers but as integral components who must be engaged to achieve sustainable management goals. Of particular interest are *institutions* of resource management, such as common property institutions, that regulate the use of communally held mountain grazing commons (Berkes 1989), and the role of these institutions and the ecological knowledge behind them in understanding and responding to feedbacks from the ecosystem (Berkes and Folke 1998).

One of the areas in which ecosystem management becomes important is in biodiversity conservation (Khoshoo 1996). The concern is not merely with the preservation of wild animals and plants, or the conservation of crop genetic diversity, but to sustain ecosystem structure and function that will permit such conservation. One way in which ecosystem management can be approached in mountain ecosystems is through the management of watersheds. Watershed management is a well known idea, but there are relatively few applications of it in the Himalaya region (Bisht and Tiwari 1996). The basic idea is to conserve the vegetation cover in the upper parts of a watershed and to

regulate land use through the rest of the watershed in order to protect the downstream areas. Historically, the idea goes back at least to the ancient Greeks, and it appears in the conservation wisdom of many societies. For example, Hamilton (1995) refers to a 16th century Chinese print about “tree restoration for river conservation”. An early legal codification for the protection of mountain forests was that drawn up in 1872 for the Swiss Alps (Hamilton 1995).

In the Himalaya region, there has been a debate since the 1970s regarding the role of mountain forest destruction and flood disasters in the lowlands. Eckholm (1975) suggested that population growth and deforestation were linked to soil erosion and landslides in the hills, and this effect was extensive enough to cause periodic flood and sedimentation disasters in the Gangetic Plains and Bangladesh. The debate on the linkages between population, poverty, land use, deforestation on the one hand, and “natural” disasters on the other has attracted the attention of policy-makers and researchers for over two decades (Ives et al. 1987; Ives and Messerli 1989; Thompson and Warburton 1985). However, there is no agreement as to how impacts and biophysical processes interact at micro and macro-scales, and whether floods in the plains can be explained in terms of deforestation and erosion in the mountains.

Ives and Messerli (1989) analyzed the available data and were not able to find evidence for a link between floods and deforestation. They concluded that there is probably not (yet) an ecocrisis in the Himalayas that may be explained by a causal chain of poverty-rising populations-diminishing forests-massive soil loss, reinforcing itself into a positive feedback loop or vicious circle. There are environmental problems in the Himalaya, the authors pointed out, but they may be considered old problems, related to two centuries of colonialism, and not recent and necessarily related to population increase. Ives and Messerli (1989) considered the mountain farmer not as part of the problem but as part of the solution. They challenged policy-makers to develop strategies for mountain regions that “are sensitive to the critical need for reduction in the disparity of access to resources and must incorporate indigenous knowledge and the direct contribution of local people” (Ives et al. 1987, p. 332).

The research reported here may be interpreted along these lines. The people of the Kullu area have long-standing rights of access to the Kullu forest, as well as certain customary (*de facto*) rights. Social institutions play a key role in interpreting and implementing these rights. Each village has a community resource use area, a commons. There are diverse interests and needs to be fulfilled from the village commons -- by gender, caste and ethnic group. Institutions such as the *mahila mandal* and village *mimbers* provide a mechanism or framework for the diverging interests to be expressed (Berkes et al. 1998). These commons institutions are not necessarily able to work out all resource management problems, nor do they necessarily produce equitable outcomes, as in the example of the dispute over cutting green conifer branches. However, commons institutions provide a flexible framework well suited for the rural people of the area to pursue their livelihoods. Thompson (1993) described Himalayan village institutions in which “transactions are parcelled out to what seem to be the appropriate cultural modes”, and this, he thought, was what conferred a high level of resilience on the Himalayan village. A key to this local management and resilience of livelihoods is local knowledge. Villagers in the Kullu Valley have a very detailed knowledge of forest and related ecosystem conditions, and this knowledge enables them to assess resource sustainability (Duffield et al. 1998).

This ability which the Kullu Valley villagers still possess, seems to have been lost in many areas of the Himalayas (Jodha 1998). In fact, Jodha (personal communication) considers Kullu Valley as an atypical case within the larger picture of poverty and environmental degradation in the greater

Himalaya region. Such losses of forest ecosystem knowledge may be attributed to loss of resource control by local villages. “In the name of development, welfare, social and political integration, and even national security in many cases, the state usurped the resources and mandates that historically belonged to the people” (Jodha 1998). To revive social system -- ecosystem links in the Himalaya, Jodha (1998) suggests the adoption of policy measures (a) to provide a stake or incentives for the local people to protect their natural resource base, (b) to use resources under the guidance of local functional knowledge, and (c) to restore local control to enable the effective use of local sanctions and limits in governing resource use.

Human effects on ecosystems can be both positive and negative from a sustainability point of view. Current trends in growth of population and resource demands will undoubtedly require more intensive and wiser management to support human needs in a sustainable way. The hypothesis linking population growth and deforestation with disastrous floods has been rejected (Ives and Messerli 1989), but there is still no agreement regarding interlinkages between human impacts and biophysical processes in the Himalaya. A promising initiative in this regard is the 1996 subprogramme of the International Hydrological Programme to address the Ecohydrology of High Mountain Areas based on the concern with disasters such as floods, mudflows and landslides, induced by biophysical processes in combination with human interventions. The subprogramme recognizes that there are socioeconomic aspects of ecohydrological problems, such as land use change. Thus, identifying land use patterns, dynamic changes, and engaging resource users in the development of management plans are key strategies for ecosystem management in the Himalaya. “Humans who are part of the ecosystems will, of necessity, define the future of these ecosystems” (ESA 1995).

5.3 Co-management and Public Participation

Forest co-management has become an important subject in British Columbia in the 1990s, but it is humbling for Canadians to consider that forest co-management in India goes back at least to the 1970s. In 1972, the West Bengal Forest Department launched an innovative pilot project in southwest Bengal to regenerate the degraded sal (*Shorea robusta*) forests by involving local people as partners in the management of forests, and by sharing the benefits of the rehabilitated forest with the local population. The overwhelming success of the pilot project encouraged the Department to extend the Joint Forest Management in other areas by establishing Forest Protection Committees (Malhotra 1995; Poffenberger 1996). This was co-management with financial incentives, but there are other joint management stories from India which do not involve monetary self-interest. For example, in 1993, the head priest in a major Hindu pilgrimage shrine in Badrinath in the Himalaya used his religious authority to encourage pilgrims to plant trees in the degraded slopes that surrounded the site. Not only all of the available seedlings (20,000) were planted, but the pilgrims also contributed to a fund which enabled the shrine to pay the local beggars to care of the trees (Bernbaum 1996).

We found no such striking examples of co-management in either of our two study areas. However, both study areas, especially the Kullu Valley case, should be considered in the context of greatly expanding international interest in co-management. Forest co-management has become a major movement in South Asia and Southeast Asia in recent years (Lynch and Talbott 1995). Both state forests and protected areas are involved in finding ways of encouraging people to behave in ways that are consistent with conservation objectives (Kothari et al. 1996). As well, debates over participatory

management have come to include gender issues (Agarwal 1994) and ethnic/tribal considerations (Chakravarti-Kaul 1996).

The major experience of the present project with public participation was through a multi-stakeholder decision-making process in the British Columbia case. Central to the recognition of forest values, ecosystem management and co-management is the effective involvement of people within the policy decision-making process. Often termed public participation, public involvement or multi-stakeholder decision-making, the focus in this process is on the diversity of people involved and the method of involvement. The application of a multi-stakeholder process has meant recognizing that groups other than the traditional forest stakeholders, such as urban-based people and groups that have less direct contact with the forest, deserve and want a voice when resource management decisions are being made.

Our case study shows that in British Columbia, public involvement in resource decision-making traditionally has occurred through legislated environmental assessment processes. This environmental assessment process requires some opportunity for public participation, usually before forest management licenses are given to private stakeholders. The process of public involvement in environmental assessment is well documented in the literature (Sinclair and Diduck 1995). In theory, it allows a variety of stakeholders to present their views on forest resource utilization plans. In British Columbia, however, the environmental assessment process is project-driven, like most others in Canada, affording little opportunity for stakeholders to be involved in the normative planning stages. It was clear from our work that a different type and level of public involvement is necessary to achieve sustainable forest management.

The British Columbia case study revealed one example of this different type of public participation, the CORE process. The CORE process involved some 24 parties in round table discussions. The CORE (1995) report explains that negotiation was used as a means of attempting to reach agreement among parties. Negotiation was carried out on the basis of *interests* rather than predetermined *positions*. This is in contrast to positional bargaining in which parties often perceive themselves as opponents, and bargain to achieve fixed all-or-nothing positions. Positional bargaining tends to result in win-lose outcomes in which one party gains at the expense of others, as one finds in environmental assessment hearings. In interest-based negotiation, by contrast, parties communicate their interests to one another and work toward “win-win” solutions that have a chance to provide a balance and accommodate many interests.

Using this approach, the CORE process attempted to involve stakeholders in normative planning about British Columbia forests before specific project decisions regarding allocation were made by forest managers. This is quite different from the type of involvement characteristic within environmental assessment. CORE was not, however, an unqualified success.

There were numerous questions raised by stakeholders about the process of involvement used by CORE, and there were concerns about the voices *not* heard. Further, as noted, the complete results of the process were not adopted by forest managers for making allocation decisions. In looking more closely at the stakeholder groups it also became evident during the case study that some exhibited problems typical of volunteer organizations, such as time availability for participation and “burn-out”, and none had more than informal ties to the decision processes and to resource managers outside of CORE. As a process, CORE was a good experiment. But the levels of involvement achieved are not being maintained by resource managers in decision-making, since the process has ended. This does not mean that people are not looking to influence such policy decisions, and in this regard CORE is a model worth exploring further.

In the case of India, the case study area did not offer opportunities to explore a model of public participation. Much of local resource management was enabled by the Anderson Settlement Report of 1886 which established legal rights of the local people to use resources. These rights were further extended and re-interpreted through the development of customary or *de facto* rights. Government policies have become more open over the years to decentralized, integrated, participatory resource management in India as elsewhere (Gadgil and Guha 1995; Poffenberger and McGean 1996), and the historical lesson of Kullu Valley is that such management does work. In areas in which the use of commons is multi-faceted and interdependent, the involvement of local people in resource management, both by law and by custom, is important. Public participation is a necessary but insufficient condition for achieving sustainability.

A number of different forms of participation were evident in the India case study (Davidson-Hunt 1997; Berkes et al. 1998). While the tradition of involving local people directly in the management, or co-management, of resources was found to be much more robust in India than in Canada, government recognition and involvement of stakeholders within resource planning and decision making had deeper roots in Canada. NGOs such as the *mahila mandal*, find it easier to just do things on the ground, whether recognized legally or not, than to get involved in the decision-making processes of government resource managers. They share with Canadian NGOs the frustration of not being a part of government decision-making, unless asked through informal means, and having little access to industry decision-making. In Canada, this frustration led, in part, to the CORE experiment. In both countries public participation and co-management will be judged by the people and values not considered in the decision process.

In conclusion, our case studies in India and Canada reveal that traditional resource policy development and implementation is being challenged on at least three fronts: changing values and priorities; ecosystem management with people; and co-management and public participation. As policies and programs are developed by government, our case studies show that there are clear initiatives emerging in each of these three areas that will likely transform the policy-making process and the resulting policies. This bodes well in terms of the creative approaches that will be necessary in moving toward policies and programs aimed at sustainable management. Clearly, more experiments like CORE that attempt to link people on the ground with resource managers and policy makers are needed to illuminate further more effective, efficient and fair modes of involvement.

In our research we attempted to get at the changes needed in specific policies and programs on the route to sustainable forest management. A variety of policies and programs exist in the Canadian context. However, a detailed analysis of these policies was beyond the scope of our study. In the case of India, we found it difficult to focus our research on specific policies while also working in small

villages. Even though we did not get to the level of analyzing specific policies, our findings nevertheless have implications for the policy development and analysis process. In this regard further research is called for to assess the successes of resource management policies in both India and Canada in recognizing changing values, ecosystem management and co-management.

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