

## V. RESOURCE INTENSIFICATION PROCESS : INCREASED HUMAN INTERVENTIONS

The causative factors or driving forces behind the process of resource intensification and consequent environmental risks in mountains are similar to the ones observed in other ecosystems (Blaikie and Brookfield 1987). Broadly speaking, they include human (and animal) population growth, trade and market-induced demand pressures and public interventions with general insensitivity to the imperatives of mountain specificities. The implications of these factors vis a vis mountain specificities and biophysical processes and flows have already been alluded to while commenting upon Table 3. In the following pages we simply describe the magnitude and role of these factors in resource intensification - induced environmental degradation.

### **Pressure on Mountain Resources**

The very first reason behind environmental degradation in mountains is the sheer scale of demand on mountain resources vis a vis their carrying capacities and abilities to regenerate. The forces behind the mounting demand include the factors discussed below.

## *The Population Factor*

One of the key factors to consider in the context of the scale of demand on mountain resources is the human population. Demand has increased rapidly because of the unprecedented growth in mountain populations, generating a threat to all efforts to bring about sustainable development of mountain areas. If the current growth rates continue, most mountain areas in the Hindu Kush-Himalayas will easily have doubled their population in another 15 to 20 years. This will further increase the pressure on natural resources and their use beyond their use capacities; reflected through extension of cropping to steep slopes and discontinuation of land extensive practices (Sharma and Banskota 1990). During the recent decades, population growth in some areas of the HKH Region has been unbearably high. Despite problems created by inaccessibility, marginality, and the inadequacy of facilities in the mountains, the 'health revolution' has contributed to this growth. On the other hand, traditional pressure management mechanisms, such as migration and the upgrading of resources, through terracing, irrigation, and crop technologies, have failed to keep pace with the growth in population. This has both current and future economic/environmental consequences. Against a background of stagnant production systems, inadequate infrastructural development, and the absence of alternative employment opportunities, people's sustenance strategies, in the context of mountain characteristics, place a high premium on the over-supply of labour, and this makes population increases inevitable in the mountains (Sharma and Banskota 1990). The qualitative changes in the population characteristics (i.e., reflected by increased individualism, factionalism, and commercial attitudes caused by market forces and survival pressures) also have had negative side-effects in terms of eroding the traditional institutional mechanisms (e.g., provision of common property resources and collective environmental security) in mountain areas (Jodha et al. 1990).

## *Livestock*

The increase in livestock numbers has also contributed to the increasing demands on natural resources. In most mountain areas, the livestock population is equal to, if not greater than, the human population. The increase in livestock has been an important response mechanism of mountain farmers to deteriorating economic and environmental conditions, but it is clear that current growth rates are unsustainable in the context of widespread deforestation and overgrazing in the HKH Region (Sharma and Banskota 1990 and Jodha 1990a).

## *Market Forces*

The pressure on resources through rapid human and animal population growth is further accentuated by market-induced demands. Governed initially by local revenue requirements and the desire to harness mountain 'niche', resource extraction ultimately becomes a function of distant demands and market signals. The latter, being insensitive to local circumstances and indifferent to its side-effects, accelerates the process of over-extraction. Evidence about deforestation for commercial use, mining activities, and the environmental insensitivity of hydropower and irrigation schemes from various areas in the HKH

Region corroborate this (Banskota and Jodha 1990a and 1990b, and Banskota 1989). At the micro-level, increased focus on cash cropping, especially horticulture and vegetable cropping in selected areas, has pushed staple food crops to more marginal, fragile slopes. Moreover, the 'servicing' of horticultural development (e.g., through wooden boxes for fruits and support sticks for several vegetables) has a high environmental cost in terms of deforestation (Banskota and Jodha 1990a).

An important dimension of market-induced resource extraction relates to the terms of exchange between mountain regions and the plains/urban areas that use the mountain products. The factor and product prices (to be elaborated later) are too low and they hardly reflect their real worth. This induces over-extraction of resources with no concern for long-term sustainability and side-effects.

The rapid resource use intensification in the face of massive growth in demand emerges as the immediate cause of several indicators of emerging environmental risks (Table 4). The possible solutions lie in restraining and regulating the pressure of demand (or rather its underlying driving forces such as population growth) or in ensuring higher use intensity of resources without its degradation. The latter calls for high productivity technologies with potential for rapid resource regeneration and conservation, suited to mountain conditions. This, in turn, would necessitate imparting the mountain perspective into R and D policies (Rhoades 1990 and Jodha 1991).

### **Macro-economic Policies**

Macro-economic policies are not only instrumental in influencing the pace and pattern of development but also in conditioning the nature of activities that influence environmental stability and sustainability of mountain resources (Banskota et al. 1990). In the HKH Region, most of the negative trends, in several areas (Table 4), can be partly attributed to macro-level economic policies. The missing mountain perspective (i.e., lack of sufficient consideration of mountain specificities) is an important gap in these policies as most macro-level policies are not designed for the mountain context but according to conventional practices or experiences in non-mountain areas (Jodha 1990b and Banskota and Jodha 1990a and 1990b). This is so whether one looks at investment priorities and resource allocation, factor/product pricing and other fiscal measures, infrastructural development and agricultural R and D, or choice of scale and technologies for various activities (Banskota et al. 1990, Jodha 1990b, and Sanwal 1989). Some dimensions of macro-level policies that seem to have adversely affected the environment and hindered sustainable development in the mountains, evidence for which is available from different locations within the HKH Region, are briefly presented here.

#### *Resource Extraction Policies*

Notwithstanding the recent focus on the welfare of mountain people and on the need to reduce inter-regional inequities, historically speaking, the focus of macro-economic policies in the mountain areas has

been directed towards the extraction of mountain resources, largely for use in the non-mountain hinterland (plains) or in urban areas within the mountain regions. The additional short-term consideration has been revenue maximisation. A third dimension of the State's approach to mountain areas in the HKH Region has its origin in the geopolitics of the region. Depending upon the concerned country's security perceptions, the patterns and goals of intervention (e.g., development or deliberate stagnation, integration, or isolation) are decided. However, whichever of the three perspectives one looks at, the regeneration and sustainable use of resources and environmental stability have seldom been the major considerations in State policies (Banskota and Jodha 1990b and Sanwal 1989). Both the mechanisms and procedures for resource extraction (e.g., classification of forests, system of contractors, auction arrangements for harvesting of timber, development of irrigation and power potential without referring to the interests of local communities) are decided within this context. Similarly, product pricing and compensation mechanisms are guided by conventional yardsticks, rather than on the basis of the intrinsic worth of products and the sustainability implications of the pace and pattern of resource extraction. The phenomenal growth in the demand for mountain resources, induced by distant market signals and with complete disregard for the 'resource use intensification question' in fragile mountain ecosystems, can be attributed to the above policies (Banskota and Jodha 1990b, Banskota et al. 1990, Paranjpye 1988, and Bandhyopadhyay 1989).

#### *Public Sector Investment: Allocative Biases*

In keeping with the 'resource extraction' focus of development policies, the investment or resource allocation patterns in mountain areas acquire certain specific features. Accordingly, most of the public sector investment is on infrastructural development (e.g., roads) or on projects designed to harness mountain potentials (e.g., irrigation and hydropower). Unfortunately, in most cases, their gains in terms of helping mountain agriculture and other local activities as well as people's survival strategies are limited (MFS 1990a, 1990b, 1990c, 1990d and Banskota and Jodha 1990a and 1990b). Because of their scale and investment requirements, they leave little resources for ancillary activities that facilitate fuller use of the infrastructure and harnessing of diverse resource potential. Diversification and interlinkages of activities - the very preconditions (determined by mountain characteristics) for relevance and effectiveness of an intervention in these areas, are usually overlooked in investment allocations. Environmental auditing of investment decisions is, of course, a far cry.

Besides the structure of investment, low level of resource allocation to mountain areas also contributes to stagnation of mountain economies and consequent degradation of natural resources because poverty and environmental degradation are closely linked. The constraints imposed by inaccessibility, fragility, diversity, etc raise the overhead and operational costs of development and service activities in the mountains, both on per unit and per capita basis. These very factors that cry for larger-scale of investment in the mountains are used for discounting investment opportunities in the mountains by the conventional norms used in feasibility studies (Banskota and Jodha 1990b and Jodha 1990b). The consequence is persistent under-investment in mountain areas, leading to stagnation, poverty, and environmental degradation.

A related aspect of public sector investment is what may be called the 'development culture' associated with public interventions in the mountains. Accordingly, the important features of public policies for mountain areas are centralisation in decision-making, perpetual subsidisation of development activities, and substitution of traditional self-help and resource protection devices by formal State interventions. Although initiated as a part of the extension of generalised public interventions in rural areas (in the mountains and elsewhere), they have had several negative side effects including people's alienation from resources, resource degradation, increasing costs and subsidisation of development activities, and a variety of inequities (Sanwal 1989 and Jodha et al. 1990).

### *Technologies*

While science and technology have helped in resource-use intensification without undue environmental risks in different areas of the world, in the mountain areas, especially in the HKH Region, this has not been seriously tried. On the contrary, science and technology have been applied with little concern for their side effects. Examples such as the creation of massive power transmission lines and network of roads ignoring fragile rock alignments (Deoja and Thapa 1991), extraction of minerals (Bandyopadhyay 1989), generation of power through huge equipment and infrastructural facilities little sensitivity to their side effects (Paranjpye 1988), and introduction of new cropping systems emphasising mono-culture and narrow specialisation (Jodha 1991) abound, where modern science and technology have been applied indiscriminately. Often the primary goal here, as in other public interventions, is resource extraction and short-term gains. However, more than the goals, the very approach to development and use of scientific technologies for mountain areas needs to be questioned.

In most cases, technology, despite its irrelevance, is directly transferred to the mountains from the plains. In none of the countries of the HKH Region does the existing R and D infrastructure match with the requirements or proportionate importance of the mountain areas and their contribution to national economies. Even if some technology development work is carried out in the mountains, the objectives and approach are seldom in keeping with the imperatives of mountain specificities. Agricultural R and D offers the best example in this respect, where work on new technologies (e.g., choice of cultivars, their attributes, types of cropping system) completely disregard the imperatives of mountain specificities such as diversity, fragility, and inaccessibility (Jodha 1991).

The above features of public interventions that reveal their insensitivity to mountain specificities, are corroborated by reviews of selected public policies and programmes in Himachal Pradesh in India (MFS 1990a), West Sichuan and Xizang in China (MFS 1990b), Nepal (MFS 1990c), and the NWFP in Pakistan (MFS 1990d). The site-specific case studies of farming systems in the same areas, which also covered the processes and impacts of development interventions, revealed several changes (Table 4) that are less conducive to resource conservation and environmental stability (Jodha et al. 1990). Reversal of these policies can be initiated through conscious incorporation of the mountain perspective into public interventions. To support this reasoning the experience from the study areas indicated above may be

cited. The experiences of a few "success stories" from the HKH Region indicated some prospects of economic betterment without degrading the resource base and environment. These cases included the integration of traditional and modern technologies for mountain agriculture, institutional innovations conducive to participatory development with greater focus on stability and productivity of environmental resources, local, renewable resource-centred cottage industries, and local 'niche' - centred integrated area development initiatives. The common factor in nearly half a dozen successful cases of rural transformation covered by the above reviews was their (conscious or unconscious) incorporation of the mountain perspective into their programmes (Jodha et al. 1990).

To sum up, the role of public policies in enhancing environmental risk in the mountains can be stated as follows. Public policies and programmes are directed to (i) integration of mountain areas with the plains and urban areas through market and infrastructure, (ii) extraction of mountain potential through technology and lop-sided investment strategies, and (iii) substitution of (a) traditional diversified resource use systems by commercially and sectorally oriented, standardised arrangements and (b) traditional self-help by subsidisation, creating permanent dependency of mountain areas and people on external help. All of these contain seeds of environmental instability in one form or another.