Increasing Understanding of Mountain Agriculture

The most important question is how do we move towards a system of sustainable management? How can we ensure the needs of a growing number of people and, at the same time, not destroy the environment? Sustainable management in the context of natural resources and farming systems refers to decisions and activities that enhance farm output per unit of natural resource, without degrading the resource base. How can this be achieved? Is it practically feasible? Given all the alarming signs that are emerging with respect to growing populations, the declining impact of the green revolution, and the degrading agricultural and natural resources' environment, sustainable management appears to be an extremely difficult task. While there are many serious obstacles to making this transition towards sustainable development of mountain agriculture, the problem appears to lie in the lack of knowledge and skills required for bringing about the needed changes.

Some consensus is beginning to emerge about the broad nature of factors determining sustainability of mountain agriculture. In general, these factors can be broadly grouped into two main categories: (a) non mountain-specific, which have commonalities with non-mountain areas and (b) mountain-specific factors. Moun-

tain-specific factors play a unique role in determining the sustainability of mountain agriculture, while the non-mountain specific ones are identifiable with general policy failures.

Non Mountain-specific Issues

One of the key dimensions affecting the sustainability of agriculture in mountain areas is the **scale of demand for resources.** Rapidly increasing demand, as a result of the **huge growth in population and the increase in livestock population in mountain areas,** is likely to threaten all efforts to ensure sustainability of mountain agriculture. If current trends in growth rates continue, most mountain areas in the Hindu Kush-Himalayas will double their population **in another 15 to 20 years.** This will further increase the pressure on already depleted and degraded natural resources and is unlikely to improve the prospects for sustainable mountain agriculture in the future (Banskota and Jodha 1990b, Sharma and Banskota 1992, Hongbin and Xingquing 1990, and Mulk 1990).

In most mountain areas, the livestock population is equal to, if not greater than, the human population. Current growth rates are clearly unsustainable in the context of widespread deforestation and overgrazing (Pound et al. 1992, Keatinge and Khan 1992, Dafu et al. 1990, and Shrestha and Katwal 1992).

Macro-policies are important instruments, not only for influencing the pace and pattern of development but also for generating micro-level activities. In the HKH Region, most of the negative trends in agriculture can be partly attributed to macro-level policies that were predominantly designed according to conventional practices or experiences in non-mountain areas (Banskota and Jodha 1992a and 1992b). This is true for resource allocation, factor/product pricing, taxation measures, infrastructural development, agricultural R&D, and the choice of technologies for various activities. **Resource extraction policies** are guided by short-term considerations of revenue maximisation rather than by regeneration and sustainable use of resources. Both mechanisms and procedures to extract resources of power potential (e.g., systems for contractors and auction arrangements for forests, irrigation, and development) have overlooked local mountain environmental and community considerations. 'Scale factors', particularly sensitive in mountain areas, are often disregarded as long as payments are forthcoming.

Public sector investments in infrastructure make very few provisions for ancillary activities which could facilitate fuller use of such infrastructure. They have also overlooked potential environmental problems due to infrastructural activities.

Case studies from China, Pakistan, and Himachal Pradesh in India emphasised the need for strong public investment programmes related to the development of basic infrastructure, such as roads and power, and strong support for technology improvements, marketing, and price incentives. Experience in Nepal, on the other hand, highlighted that, in the absence of a growing demand due to the inadequate growth of ancillary activities, even investments in basic infrastructure are unlikely to bring about major improvements in highland agriculture. Nepal's experience also under-

scored the importance of strong technical support if the comparative advantages of mountain areas are to be harnessed (Banskota and Jodha 1992b).

A comparative review of public sector investments in mountain areas suggested that large-scale investments in mountain areas (particularly infrastructure) become more easily justifiable when mountain areas have access to bigger markets in urban and plains' areas. Where this external demand is lacking, harnessing the comparative advantages of mountain areas is a different matter. The extent to which subsidies had a desirable impact on agricultural transformation needed more careful evaluation, as there were indications that subsidies had been used quite extensively in China, India, and Pakistan, whereas their merit had been questioned at times in Nepal. In view of the fact that comparative advantages in mountain areas are not uniform, in terms of either the activity or its scale of operations, the need to evaluate investment alternatives is urgent.

Inter-regional and intra-regional inequities also influence the prospects of sustainable development. The relatively low development priority accorded to mountain areas, vis-a-vis urban and plains' areas, was a common feature in the past. This inbuilt bias is reflected through the low levels of investment allocations to mountain areas and also within mountain areas. The distribution of benefits to different groups has also been equitable where spatial inequality has been corrected to some extent (Bhati et al. 1992).

Given the strength of environmental linkages between highlands and lowlands, continued deterioration of highland resources will ultimately affect lowland areas as well. It is, therefore, important that public investments pay greater attention to the issues of equitable distribution of investment resources.

A related issue is the real worth and value of resources' conservation in mountain areas. As the debate on subsidy programmes indicates, unless off-site impacts of mountain development are meaningfully analysed, investments in these mountain areas will continue to be treated as liabilities.

The final issue under distribution relates to intra - or inter-household equity. Though all households have diversified activities in the mountains, the degree of diversification (owing to resource differences) is not uniform. Common property resources, with their relatively equal access, have served to reduce inter-household inequities. However, the commons are rapidly declining. Development interventions designed without a proper understanding of gender issues will lead to further marginalisation of women.

Mountain Specific Components

An important gap in development interventions in the HKH Region is the inadequate consideration of mountain specificities and their implications. This is evident in the cases of overall development strategies, sectoral programmes, specific projects, and farm-level successes/initiatives. Case studies have revealed that successes and failures are largely associated with the consideration or disregard of mountain

specificities. This means essentially **understanding** the nature of **opportunities available** and the **type of constraints** that are operative. The **opportunities** concerned are **diversity, comparative advantage**, and **adaptation mechanisms**, while the major constraints are **inaccessibility, fragility, and marginality.** Policies can play a major role in either promoting the development or reducing the adverse impacts of both opportunities and constraints (Jodha et al. 1992).

Because of mountain specificities, the locational impacts of various investment decisions will be quite different. Locational factors influence the type and scale of investments. Types of investment are influenced by mountain specificities, either individually or in combination. Investments in roads for fragile areas result in huge maintenance costs later on. Diversity makes it imperative that area development programmes have a wide base of improved technology in order to have a beneficial impact upon different groups. Agroclimatic variations have important implications for agricultural development programmes. Understanding the importance of the impacts of mountain specificities is just beginning to influence work in mountain areas. As each investment requires supporting investments, options need to be much more carefully evaluated, especially in terms of ancillary activities. Many investment programmes have overlooked environmental fragility and marginality-related constraints (poor soil, short growing season, steep slopes, etc), and farmers' preferences and adaptation strategies that have evolved over the ages. Unless these are taken into account more seriously in future, investment failures and subsidy burdens are likely to increase.

Investment in infrastructure is vital. But it must be selective to make the best use of limited funds and other resources. Infrastructure, such as roads, can do little to help farmers when soils are poor. In contrast, roads provide good returns in areas with good land and agroclimatic conditions. Thus, unless each investment alternative is carefully considered vis-a-vis the mountain specificities of an area, the impacts of scarce investment resources are likely to be minimal.

Most mountain specificities are interrelated due to their common biophysical causes (e.g., fragility, inaccessibility, or diversity, and niche have common causes). Similarly, treatment of or disturbance to one characteristic may influence others. For example, road construction to improve accessibility may adversely affect the fragile rock alignments and vegetative cover of a tract. It may improve the conditions of marginal areas, but may also increase the rate of resources' extraction beyond their regeneration rate and cause unsustainability. The interrelationships of different mountain specificities and their implications serve as a compelling basis for an integrated approach to mountain development. This implies the need for clear identification and consideration of negative and positive externalities in designing and implementing development interventions.

In order to sensitise macro-level decisions to mountain specificities, greater focus on micro-level realities through understanding farmers' strategies and responses is needed. Farm/village-level documentation provides better insights into the dynamics of sustainability/unsustainability or the pace and pattern of change. Understanding

and quantification of mountain specificities, and people's adaptation to them at the local level, reveal more easily the farm-level and village-level differences in the performance and impact of development interventions.

In view of the increasing realisation of the usefulness of a traditional farming systems' rationale for evolving new and sustainable systems, and the importance of the farmer as the final actor in determining the success of development interventions, it will be useful for development agencies to be in touch with field realities through various types of field studies (e.g., detailed surveys, rapid rural appraisal, and case studies) and regular monitoring systems.