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Diversification of Mountain Agriculture

While indicators of unsustainability pervade the Hindu Kush-Himalayan region and characterise the dominant scenario of mountain agriculture (Jodha 1993; Shrestha 1992), some areas, such as the state of Himachal Pradesh in India, Ningnan County in China, and Ilam district in Nepal, have undergone rapid transformation because of the adoption and implementation of environmentally benign and mountain-specific development strategies. Mountain-specific Research and Development (R&D), harnessing the comparative advantages of high-value cash crops, the promotion of agro-based cottage industries, and off-farm employment are the focusses of development strategies being pursued in these areas.

Traditional cultivation of the large cardamom (*Amomum subulatum*) in the eastern Himalayan state of Sikkim in India is one example of harnessing the local mountain niche. Large cardamom, a native plant of the Sikkim Himalayas, is a perennial low-volume, high-value, non-perishable cash crop grown beneath the forest cover on marginal and barren lands. Sikkim's experience is unique, unlike the experiences of Himachal Pradesh, Ningnan County in China, and the Ilam district of Nepal where high-value cash crops were introduced from the outside. It is a unique example of the ecological and economic viability of a traditional farming system based on indigenously-evolved agroforestry practices. In this instance, the cash crop is domesticated and then developed commercially by the local farming community. As an indigenously-evolved niche-based farming practice it makes an interesting comparison with the practices triggered by the introduction of high-value production options in Himachal Pradesh (Sharma 1996).

The adoption of high-value cash-crop based farming systems compatible with local niche has helped mountain regions in two ways. First, by converting abundant marginal and barren lands into more productive lands and harnessing local niches. Second, by maintaining and improving the ecosystem and the environment of the region through promoting soil conservation and soil fertility. Thus, contrary to popular belief, evidence from these areas suggests that the process of development and conservation of the ecosystem can be mutually supportive and reinforcing. These areas have increasingly demonstrated the feasibility of minimising the environment and development trade-off and the possibility of breaking the cumulative causation between poverty and the environmental degradation cycle, leading to an increase in growth and sustainability linkages. The net result has been the availability of a broader range and a higher quality of livelihood options leading to a better quality of life (Partap 1995).

Diversifying the Options

Increasing options is one process that can be used, whether by a household or a firm, to diversify economic activities in order to improve living standards. Theoretically, several factors impact on the process of increasing options, viz., the availability of basic infrastructural facilities, level of skills and knowledge, and market and environmental factors. It is a moot point whether the increase in livelihood options is caused by distress conditions or by affluence and increase in incomes. In mountainous regions, households are involved in diverse livelihood options such as crops, livestock, agro-forestry, and cottage industries. Many of these options are of low quality and yield extremely low returns, obliging mountain people to carry on with a number of activities. The number of activities might also be higher in relatively more developed areas, but the underlying dynamics are totally different. For example, in such areas, additional activities are undertaken with a view to internalising the externalities; i.e., households specialising in horticulture might also keep cattle, adopt beekeeping, and also raise some crops. In contrast, the diverse activities pursued in backward areas are motivated by subsistence considerations; although households in these areas are not able to switch over to more productive livelihood options because of several constraints such as small landholdings, lack of food security, imperfect markets, lack of knowledge, risks associated with high-value cash crops, lack of measures to cover risks, and so on. In the absence of insurance against risk, the primary means of ensuring food security is by diversifying farming systems.

An understanding of the livelihood options and factors and processes contributing to agricultural transformation can provide useful policy insights for devising development interventions for improving the standards of living of mountain people. For example, food security considerations compounded by small landholdings, and production and marketing risks involved in growing high-value cash (HVC) crops may deter farmers from switching over to HVC crops. Adoption of these options may also involve multi-faceted economic and ecological trade-offs in the beginning and may be unsustainable in the long run. There is not much information about these trade-offs, in terms of their impact on natural resources, quality of life, and equity aspects. It is against this background that the present study was undertaken to study the two most prevalent farming systems, namely, the large cardamom-dominated and maize-potato dominated farming systems of the Sikkim Himalayas.

Objectives

The objectives of this study are as follow.

- To examine the economic transformation that took place over the last twenty years in terms of changes in land-use systems, cropping patterns, input use, and crop yields
- To document the household livelihood options in two major farming systems, namely,

the large cardamom-dominated farming system and the maize-potato dominated farming system, and assess their implications on the quality of life and the equity aspect

- To assess the sustainability implications of the two major farming systems in terms of ecology and environment
- To identify the factors and processes underlying the ongoing process of agricultural transformation

Hypotheses

In compliance with the objectives of the study, the following are the hypotheses for empirical testing.

- That households are guided by survival considerations while switching over to high-value cash crops
- That households practising subsistence farming adopt a large number of livelihood options to meet their basic needs and requirements
- That, in the process of transformation, there are improvements in human resources, reductions in family size, changes in the composition and number of animals, increasing substitution of natural resources with synthetic resources, and increased occupational diversification.

The paper begins with a briefing on the pace and pattern of economic transformation experienced in Sikkim over the past two decades. The implications of major livelihood options, such as crop production, cardamom growing and animal husbandary, which impinge directly upon the natural resource base, and their effect on quality of life and equity aspects are also discussed. Further comparisons are made between the large cardamom-dominated farming system and the maize-potato dominated farming system on the natural resource base such as soil, water, forests, and biodiversity. Finally, the main conclusions and the policy implications of the study are presented.