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# Market Oriented Smallholder Dairy Farming as an Option for Improving the Livelihoods of Small and Marginal Farmers in the Hindu Kush – Himalaya\*

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## ABSTRACT

A rapid appraisal study carried out by ICIMOD and ILRI in collaboration with National Partner Institutions (NPIs) in four regions in the Hindu Kush Himalaya has demonstrated the fact that promotion of market oriented smallholder dairy farming in the hills/mountains can contribute positively to improving the livelihoods of small and marginal farmers, while conserving the fragile ecosystem. In the region, smallholder dairy farming is not a specialized enterprise, rather it is an integral part of mixed crops-livestock farming systems where a farm household owns one to two dairy animals along with other large and small animals on a small land holding ranging from 0.25 hectare to 1.00 hectare. Use of improved dairy animals and improved feed technologies have enabled smallholders to increase income and employment and improve family welfare including those of women and children. Based on the successful experience in some pocket areas it should be possible to replicate such model and experience in other degraded uplands of the hills/mountains for improving the livelihoods of small and poor farmers.

## INTRODUCTION

A GIS based analysis of livestock population dynamics in the HKH region carried out by ICIMOD and ILRI indicated that over the last 10 to 15 years, considerable changes are taking place in smallholder dairy structure and management systems in the areas with mixed mountain farming systems areas of dairy concentration. Recent changes in dairy animal population by species and breeds, infrastructure and market developments are notable. It appeared that dairy was the most dynamic aspect of livestock in the region; particularly where mixed farming systems dominated and which are accessible. In, such areas smallholder dairy farming is becoming a driving force behind the transformation of the rural economy. Such transformation has been made possible through establishment of markets for fresh milk, and development of milk co-operatives and milk collection centers from where milk is supplied by parastatal government organizations and private dairies to consumers in towns and cities. The transformation is more pronounced in areas near to roads. There are a lot of inaccessible areas where smallholder dairy farming is an integral part of farming systems and dairy is subsistent-oriented but with adequate market access for inputs and outputs, they also have the potential for rural transformation.

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However, there has been little attempt to gather knowledge about the specific nature of these changes, how these changes and transformations have affected the sustainability of the smallholder dairy production systems and lives of people. Furthermore, the constraints and opportunities of smallholder dairy development in the different areas of the HKH are not well known. Given such a backdrop, the International Centre for Integrated Mountain Development (ICIMOD) and the International Livestock Research Institute (ILRI) carried out field studies in four regions - Bhutan, Central Indian Himalaya (Uttaranchal), Western Indian Himalaya (Himanchal Pradesh), and Nepal. These field studies sought to identify the knowledge gap and priority areas for further research. These four study regions were taken as representative of the greater part of the HKH where mixed farming systems are common, although clearly there are some differences between these areas.

**The objectives of the study were:**

- To explore the trends and patterns of smallholder dairy development;
- To study the characteristics of smallholder dairy farming and post-production systems;
- To identify the key socio-economic, gender, and natural resource management issues related to smallholder dairy farming; and
- To identify key constraints, opportunities and development potentials.

**WHOLE MIXED MOUNTAIN FARMING SYSTEMS IN THE STUDY SITES**

The whole farm systems in the study sites are of an integrated crops-livestock farming in high-pressure areas which have high population density and small landholding mostly less than one hectare per farm family. These study sites -- one relatively inaccessible and another one accessible in each region are purposively selected for cross comparisons. Livestock production systems in relatively inaccessible areas are of subsistence type and integrated into the farming system. In these areas farmlands, to a large extent are dependent on livestock for soil-fertility and animal draught power and livestock are highly dependent on the farmlands for crop residues as a feed resource. Human beings transport fresh milk from these areas on their backs, walking upto 3 hours to milk collection centers, in many cases.

On the other hand the mixed crop livestock farming system in accessible areas are becoming quite dynamic due to road networks and markets for fresh milk. There is an increasing trend towards feeding animals with purchased concentrates especially among farmers who raise improved cross-bred cows or improved buffaloes. The dependence of dairy animals on common property resources (CPRs) is decreasing in these areas and stall-feeding is the key management practice. Linkages between crops, livestock, and forests have weakened. Farmers rely more and more on private lands to meet fodder needs, and there is a decline in the relative importance of farmyard manure (FYM)/compost in the nutrient management system. This decline has been compensated for, to some extent, by the use of chemical fertilizer.

## **METHODOLOGY**

At first, a three day planning workshop was organized in August 1999 involving ICIMOD, ILRI and identified national partners from the chosen countries and regions to share general understanding of smallholder dairy farming in the HKH and to discuss the data and information gaps in smallholder dairy production and marketing. During the workshop, the data/information gaps were identified and a common methodology to undertake the field studies was developed through participatory process. Following the workshop, each study team from Bhutan, Nepal, Himanchal Pradesh and Uttaranchal in each region carried out stakeholders meetings inviting researchers, extension workers, planners and policy makers including private dairy processors and small dairy farmers to discuss the critical issues of smallholder dairy systems in each of the regions. Thereafter, each team carried out fieldwork, with technical support from ICIMOD and ILRI.

In order to carry out the fieldwork, each study team in each region developed structured questionnaire and carried out rapid appraisal of smallholder dairy farmers in groups. Each group consisted of 6 to 10 farmers. In each region, the study team carried out the rapid appraisal of 8 to 10 such groups (4 to 5 groups in accessible study sites and the same number in relatively inaccessible sites). Similarly, consumer survey for milk demand was carried out for 100 to 150 households in main urban city/town of each region, located close by the smallholder dairy farming study sites, from where this city/town received the flow of fresh milk for processing and then for consumption.

Each study team systematically compiled and entered the data/information in computers for analysis. Simple statistical tools such as frequency of distribution, mean, standard deviation, percentage, graphs and economic analysis were used to analyze the data. Based on the analyzed data and qualitative information obtained from the rapid appraisal, each team prepared study reports for each region.

During 17 to 19 April 2001, a three-day meeting was organized to review and share the final results of the regional case studies and identify constraints, priority issues for research and development and policy recommendations. This paper provides a synthesis of the findings of the four regional case studies.

## **RESULTS AND DISCUSSION**

### **Current Situation**

Smallholder dairy sector is playing critical role in generating cash income in the hills of India and Nepal. It is not as advanced in Bhutan as in it is in Nepal, Central Indian Himalaya and Western Indian Himalaya, although a considerable scope for promotion of smallholder dairy in Bhutan was observed. In fact, government programme has pushed for crossbreed cows as dairy animals. Nevertheless, improved buffaloes are becoming popular among small farmers as dairy animals because of their adaptability to local feed resources and high milk fat content and salvage value especially in the hills of India and Nepal. In Bhutan it was observed that there is significant increase in crossbred cows in

certain pocket areas where smallholder dairy is popular. This is due mainly because of government programme.

Initially, smallholder dairy farming was promoted through marketing arrangement of parastatal government organizations such as Dairy Development Corporation (DDC)/Nepal and MilkFed (Himachal and Uttaranchal and Bhutan). These organizations have milk chilling and processing facilities and they have organized farmers groups or co-operatives to collect farmer's milk to be taken to chilling and then to processing centers. Nevertheless, these systems are presently, collecting hardly one-fourth of total marketable milk. Still a lot of milk is being channeled through informal sector and now private dairies with their own chilling and processing plants are becoming common thing in Nepal. Producers' share in consumer price is lowest with the sales of milk to the parastatal organizations. The operating costs of these organizations are high and many co-operatives for example in Himachal Pradesh are defunct or not functioning efficiently. The problem of smallholder dairy in Nepal has been exacerbated due to the import of cheap powder milk and the government's lack of monitoring in assuring quality of pastured milk for consumption. The parastatal organizations, which are heavily subsidized with government or donors aid money, could not contribute to dairy sector development to the extent they were expected to.

Animal feed, breed and, marketing and processing and its policy are critical issues across the HKH region for promoting smallholder dairy in mixed mountain farming systems areas. Shortage of feed during the dry period and the winter is serious problem affecting the milk productivity of dairy animals. Commonly, breed is of local types and milk productivity is low compared to crossbred animals. Product diversification appears to be a key issue in terms of low income from milk marketing and processing.

The studies show that demand for dairy products is likely to increase considerably in the future due to both increase in urban population and their income. Currently, Bhutan and Himachal Pradesh depend largely on imported milk and milk products from India and neighboring states, respectively; the deficit in Bhutan being much greater, e.g. approximately 70% of its demand is met from import. Therefore, the most pressing issue that needs to be addressed is how to enable smallholder dairy producers to participate in markets. Enabling greater participation of smallholder producers has positive implications on mountain economy in terms of farm employment and equitable income generation.

## **Emerging Trends and Implications of the Results**

### **Greater Participation:**

The smallholder dairy farming fits well in the present development paradigm of social equity in terms of sharing of development benefits among the majority of the villagers who participate in this enterprise. For example, in all study sites of the four regions, over 80% farm households had participated in smallholder dairy farming, each producer having more or less equal access to the market share in terms of income generation

opportunity. On an average, the annual gross economic benefits a farm family earned is estimated to be around USD 300 to 500 per dairy animal per year just from the sales of milk; 80% of this income is returns to family labor. This can be considered substantially a large amount compared to the national average per capita income (GDP) of these HKH countries that ranges from USD 220 to 350 per annum. Other values from manure used for crop production and salvage value of animal can be added to these economic benefits. Considering the fact that no other opportunities exist for income generation for family labor, the economic returns from smallholder dairy farming is indeed a significant amount.

### **Positive Impact on the Environment:**

Although, livestock in general depend largely on common property resources (CPRs) for their feed resources, in the high-pressured mixed crops farming areas where the smallholder dairy farming are concentrated, about 70 to 80% of the feed resources are from the private lands. An increasing share of feed is coming from the lowland-- plain areas, in the form of manufactured concentrate feeds. This has considerably reduced the pressure of dairy animals on natural resources particularly forests. The section below briefly discusses how the pressure on natural resources is declining and thus having positive impacts on the environment.

#### ***a) Increasing Number of Fodder Trees on Private Lands:***

The most notable trend over the last ten to fifteen years in the high pressure areas where the smallholder dairy farming is common, is the fact that there is an increasing trend of growing fodder trees and grasses on field bunds and private lands which were previously barren. This has increased the vegetation and soil covers, resulting in decreasing soil erosion and better conservation of soils.

Growing number of planted fodder trees on private land is demand driven. To meet nutritive fodder requirements of dairy animals during the winter and the dry seasons, local farmers are planting more of quality fodder trees and grasses on narrow field bunds and other wastelands, which were barren earlier. Planting of these trees is having two implications. Firstly, increased availability of green fodders to dairy animals, and secondly these trees and grasses have increased the soil binding capacity, thus minimizing soil run-offs or erosions having positive implications on the environment.

#### ***b) Changes in Management Strategies -- Increasing Trend of Stall Feeding:***

Along with the increases of fodder trees and grasses on private lands, there is an increasing trend of stall-feeding of dairy animals with cut - carry fodder, grasses, and crop residues and manufactured concentrate feeds. In the hills of Nepal, dairy animals are practically 100% stall-fed. In high pressure mixed crops farming areas of Himachal Pradesh and Uttaranchal stall-feeding is increasing, and about 50 to 70% of dairy animals are stall-fed. In Bhutan also the stall-feeding trend is increasing.

The stall-feeding has several advantages. Firstly, it can retain 100% manure to be used for crop production as fertilizer. Secondly, it enables close monitoring of the performance of animal. Finally, the greatest advantage is that dairy animals do not have to graze on forests or other open common property resources/lands (CPRs), thus decreased pressure on these precious natural resources.

***c) Increasing Use of Biogas – Substituting the Fuel Wood Requirements:***

The stall-feeding of dairy animals has encouraged farm households to construct household level biogas plants to make the best use of manure in two ways. First, in producing methane gas for cooking; and secondly in making use of manure sullaries for producing crops, vegetables and fruits. Having one biogas plant on a farm household has reduced the fuel wood requirements by about 70%. This has also reduced women's drudgery by about 50%. Women no longer have to travel long distances to the forests to collect firewoods as they did prior to having biogas option. Since the biogas cooking is smokeless, it has positive implications on women's health. In sum, it has reduced women's drudgery, improved their health because of the lack of smoke and has reduced pressure on eco-system.

**Gender Concerns:**

Women have played a key role in managing livestock and smallholder dairy animals in all four regions undertaken by this study. They are involved mainly in collecting fodder/grasses from CPRs and private lands, preparing homemade concentrate feed and feeding, milking and cleaning animal sheds and marketing (in some areas). While calculated in terms of hours spent in dairy animals management and care, women are found to spend 30 to 50% more time than the men do.

Although, women spend considerable time in dairy animals management, there is no clear indication that the smallholder dairy farming has empowered the women in terms of access and control of the income from dairy enterprise. Moreover, it is not clear whether they are involved in decision making on choices of dairy animals they raise, and veterinary and input delivery services they require. However, the data does show that the cash income from the sales of milk has indeed enabled the poor and marginal farm households to send their children to school and the landless farmers to buy food grains.

Interestingly a new trend was observed. In recent years, men are taking greater interest in managing improved dairy animals. This can be attributed to the high value of dairy animals especially of an improved crossbred cow, which costs USD 300 to 450. Such a cost no doubt compel men to spend an increasingly greater hours in management and care. This is a positive indication of some easing off of women from the present heavy workload. A death of an improved dairy animal can wipe out 30-80% of household economy. In case of a landless farmer, the loss could go as high as 100% of his/her household economic asset. This is a serious issue since the vast majority of smallholder dairy producers (>90%) do not have any animal insurance.

### **Opportunities for Greater Income and Employment:**

With both the increase of population and their income along with awareness of health benefits, demand for milk and milk products is increasing at an exponential rate. This trend is likely to continue in the future. Demand estimates made in hill/mountain regions in Bhutan, Nepal, Western Indian Himalayas (Himachal Pradesh) and Central Indian Himalayas (Uttaranchal) suggest that in ten years all these areas will have considerable deficits in milk and milk products, unless appropriate measures are taken to increase milk production by 2 to 3 folds.

This evidently suggests that there is a great scope for promoting smallholder dairy farming as an integral part of present mixed crops-livestock farming systems in the hill/mountain areas. Its development can enhance farm employment and income and saving of valuable foreign exchange currently being spent on the importation of dairy products, immensely.

The likely increases in demand for livestock products such as milk and milk products in a significant way provide a great future possibility to involve more of small and marginal farmers in smallholder dairy farming. With increased participation of these smallholders and landless people in the smallholder dairy farming a significant difference can be made in the mountain livelihoods and environment. For example, in Nepal the estimated demand by the year 2015 for urban and rural areas combined is about 2297 million liters of fresh milk. A smallholder producer having one to two dairy animals can supply on an average 5-litre milk a day amounting to 1800 liters annually. This means in order to produce 2297 million liters of milk annually, there need to be the participation of about 1,276,111 smallholder dairy producers having one dairy animal.

### **Opportunities for the Private Sector Involvement:**

Initially, public sector has played a critical role in organizing small producers groups and buying milk for processing and marketing. Along with public sector, the private sector has emerged strongly in fresh milk collection, chilling and processing. As the private sector has its capacity enhanced and is playing increasingly larger role in dairy sector development in terms of milk collection, processing and marketing, the government should focus on formulating conducive policy environment to promote the private sector to benefit the smallholder dairy producers. The other critical role the public sector, the government should be playing is in assuring the quality of dairy products for the benefits of the consumers. On the other hand, the private sector should focus more on dairy product diversification with increasing value additions. The dairy animal is an extremely valuable asset and its untimely death can cause great economic loss to poor and marginal farmers. In this context, the government can facilitate the private sector to develop sound animal insurance schemes and implement them to promote smallholder dairy farming among poor farmers.

## **Opportunities for Replications:**

With the development of infrastructures and the opening of the market opportunities, some high-pressure areas of mixed crops-livestock farming systems in the Himalaya have demonstrated the fact that the smallholder dairy farming can provide opportunities to small and marginal farms for income earnings and employment. While doing so they can also conserve the environment by judicious land management systems of growing fodder trees and grasses on field bunds, community and private lands, thus increasing the soil coverage. Such practices will conserve soil runoffs, thus preventing soil erosion and landslides resulting to positive impacts on the environment.

Nevertheless, there remain a vast majority of the areas in the HKH, which are both inaccessible and accessible, and do not have readymade market opportunities. These areas have degraded and unattended uplands prone to soil erosion and landslides. Basically these degraded uplands are marginal lands, and fodder trees and grasses can grow on these lands much better than food grain or other cash crops. Therefore, the greatest challenge for the mountain developers is how to promote smallholder dairy farming in these mountain uplands to increase both farm income and employment on equitable basis. The degraded upland areas can productively be used to grow fodder trees and grasses in the form of agroforestry - grassland systems integrated with smallholder dairy farming as is operating successfully in some areas having similar agro-climatic and bio-physical environment.

## **CONCLUSION**

Based on the successful experience in some pocket areas of the HKH smallholder dairy farming as an integral component of the mixed mountain farming systems, it should be possible to replicate such models and experiences in other degraded upland areas of the hills/mountains. While doing so, maximum participation of poor and marginal farmers should be ensured. Promotion of market oriented smallholder dairy farming integrated with agroforestry-grassland systems in upland hill/mountain areas can improve the livelihoods of small and marginal livestock dependent farmers along with the conservation of environment. However, there are several constraints/issues such as credit, animal health and insurance, market development and value additions. These constraints as policy issues should be addressed critically in order to explore the development potentials of small dairy enterprise. Initial facilitation for delivery of appropriate technological options such as agro-forestry-grassland systems, and linking to market opportunities in a small way could improve the living conditions of poor and marginal livestock dependent farmers.

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