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Livestock in Mixed Mountain Farming Systems

CENTRE NEWS

Livestock Trends in Mixed Mountain Farming Systems

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Raising livestock is an integral component of mountain farming systems. In the mixed crop-livestock farming system, there is a dynamic relationship between common property resources (CPRs; such as forests, water, and grazing land), livestock, and crops. Livestock depend to a certain extent on fodder and grass grown on CPRs as well as on crops and residues; at the same time the animals return fodder, grass, and crop residues to the CPRs and fields in the form of manure, and provide much needed draught power. Livestock are thus integral to the sustainability of hill and mountain farming.

Analyses of livestock population trends in the lower farming areas of the Hindu Kush-Himalayas (HKH) over the past 15 years show a general decline in the population of cattle in the Himalayan hill and mountain areas of China, India, Nepal, and Bhutan, and a rise in the number of stall-fed buffaloes in the Himalayan subtropical areas of India, Nepal, and Pakistan. This decline may reflect a decrease in both feed resources and the area of land available for open grazing, and the rise in stall-fed buffaloes and their increasing use as a source of meat and milk. Similarly, the sheep population is on the decline across the HKH region whereas the number of goats is increasing. Thus, overall, the role of buffaloes and goats in the livestock economy has increased, and they now contribute more to the generation of household cash income (Figure 1).

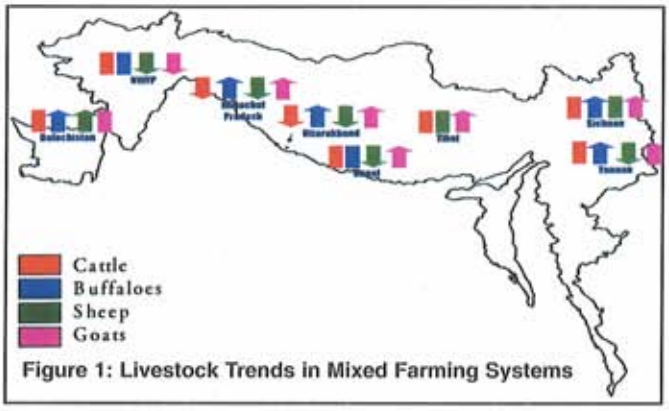


Figure 1: Livestock Trends in Mixed Farming Systems

Livestock production systems in inaccessible areas are of subsistence type and integrated into the farming system. In these places farmlands are dependent to a large extent on livestock for soil-fertility and animal draught power and livestock are highly dependent on the farmlands for crop residues as a feed resource. Most of the meat and milk produced is consumed at the household level (Figure 2). Varying degrees of commercialisation are taking place within the mixed crop-livestock farming system. In fact, livestock production systems are becoming quite dynamic in certain pocket areas in the mountains that have access to road networks and markets for milk (Figure 2).

Specialised systems are emerging in mountain areas where farmers with smallholdings close to the main roads practice commercial dairy farming with an

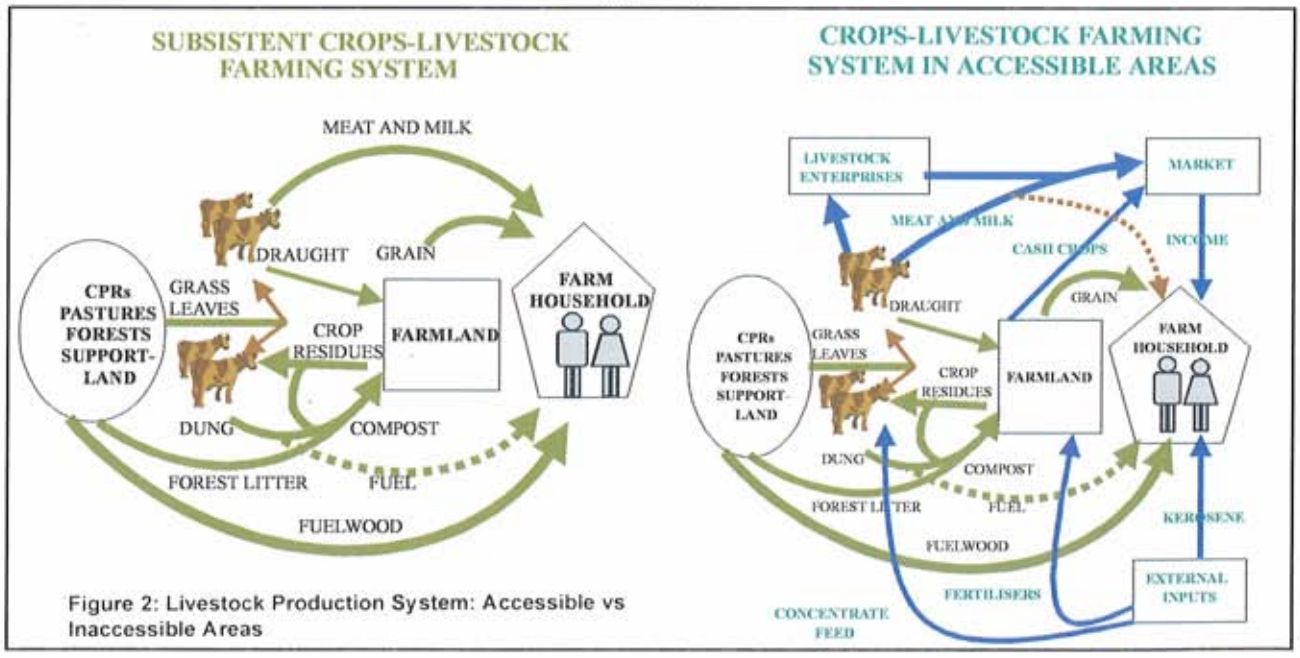


Figure 2: Livestock Production System: Accessible vs Inaccessible Areas

increased number of improved breed animals. Such places are often found on or close to roadheads where better veterinary health services exist. For example, in Himachal Pradesh the districts with a higher proportion of crossbred cows are the districts that have better access to veterinary health services (See Figures 3 & 4).

There is an increasing trend towards feeding animals with purchased concentrate feed - especially among farmers who raise improved cross-bred cows or improved buffaloes. The dependence of dairy animals on 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 fertiliser.

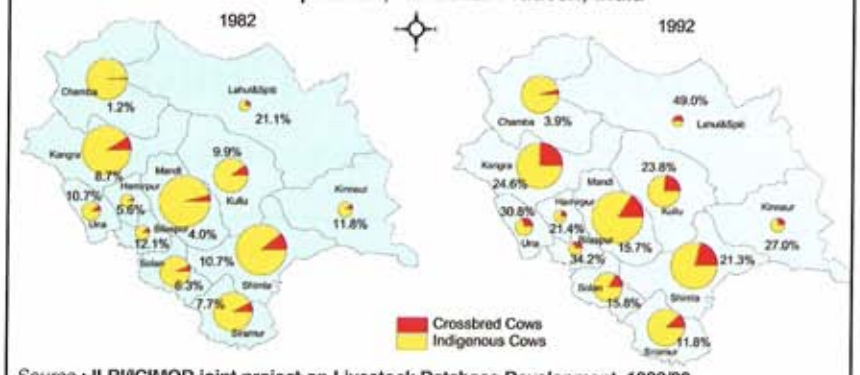
In the past, livestock development efforts have displayed a number of weaknesses. Official policies have been mainly top-down and official interventions have failed to build on or facilitate further consolidation of the farmers' own successes. The supply-driven official push towards improved cattle against the demand-driven experience with improved buffaloes in the Nepal hills is a case in point. Policy measures in the past have largely failed to recognise the prevailing ground realities and processes in the community areas targetted for development interventions.

Another weakness in the livestock development effort has been the narrow sectoral approach. For example, the problems of animal breeds, feed, and health cannot be solved through isolated interventions because they are interrelated and interdependent. Furthermore, programmes for livestock sector development have mainly benefited resource-rich farmers and were not targetted at disadvantaged groups such as women and marginal farmers.

Livestock research and development have also focussed, perhaps too much, on large ruminants. A continued focus on large ruminants (particularly milch animals) is justified to some extent, since milk plays a major role in providing cash income to rural households. However, there needs to be more diversification. Micro-livestock (small ruminants and poultry) should also be paid due attention. Small ruminants require less investment, are less risky, and are easily marketable. They are especially important for women and poor farmers. Small ruminants offer more autonomy in decision-making, and thus empower women.

Notwithstanding these weaknesses, farmers in mixed crop-livestock farming system areas that are accessible or in close proximity to roadheads have had some success with improved breeds. For example, improved Jersey cows in Himachal Pradesh and improved buffaloes in accessible hill areas of Nepal have helped raise household economies and contributed to improving the local environment. There are many positive lessons to be learned from the transformation processes taking place in some areas of the HKH.

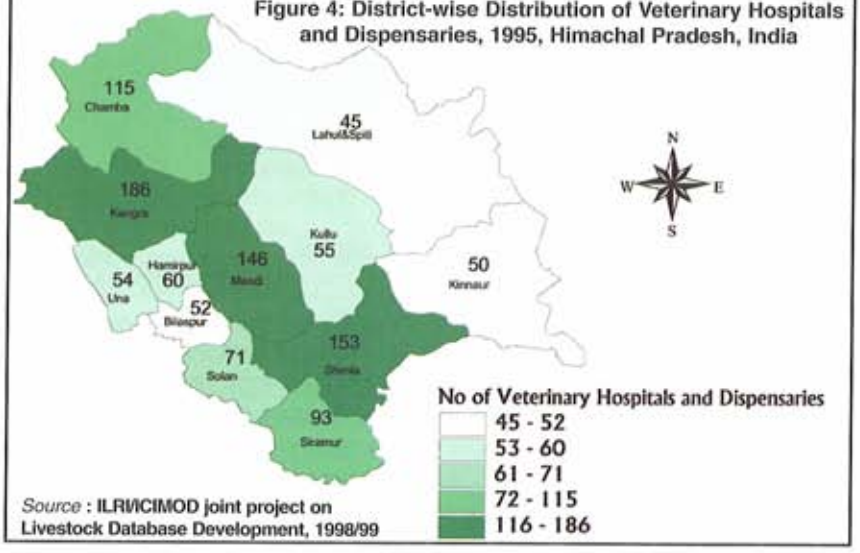
Figure 3: District-wise Proportion of Crossbred Cows in Total Cow Population, Himachal Pradesh, India



Source : **ILRI/ICIMOD joint project on Livestock Database Development, 1998/99**

Note: The size of the pie is proportional to Total Cow Population

Figure 4: District-wise Distribution of Veterinary Hospitals and Dispensaries, 1995, Himachal Pradesh, India



Source : **ILRI/ICIMOD joint project on Livestock Database Development, 1998/99**

Changing the Priority of Livestock R & D in Farming Areas of the Tibetan Autonomous Region

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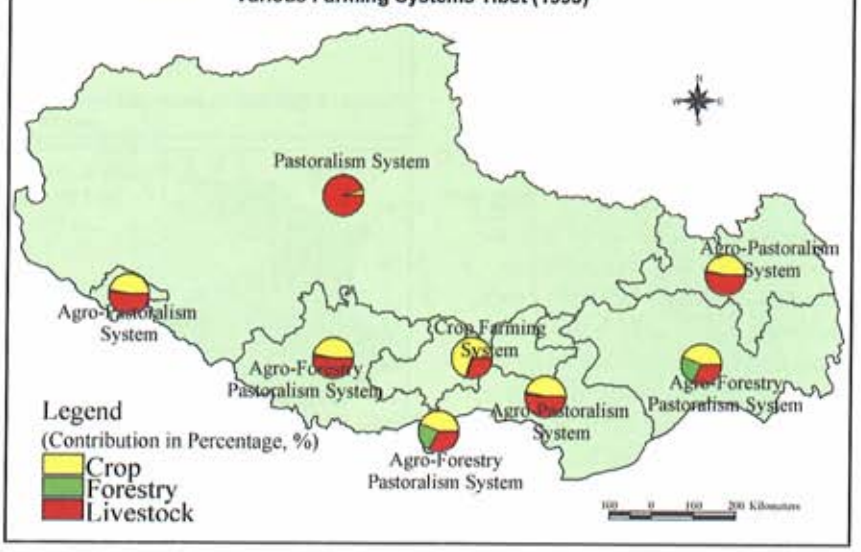
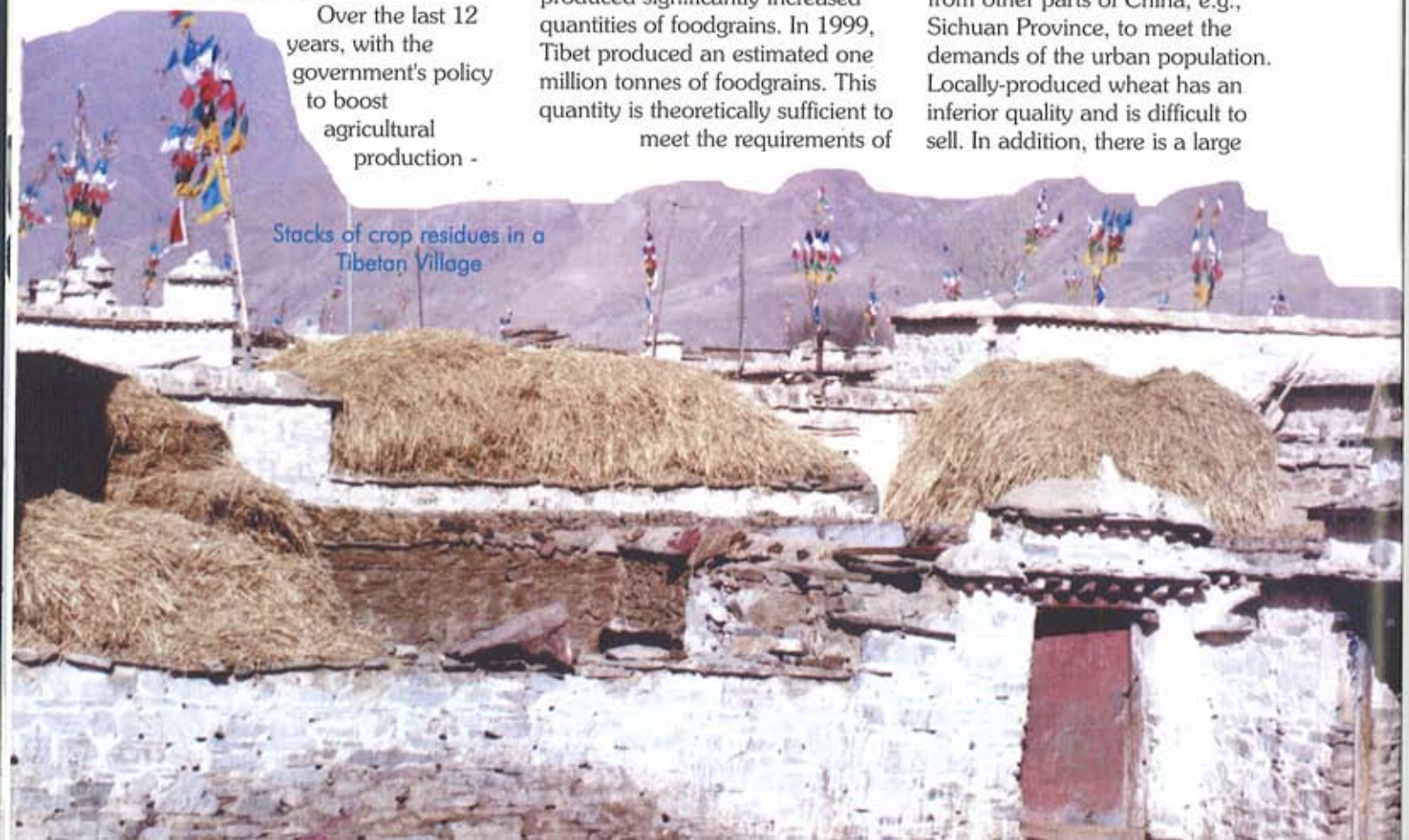
Recently, the government of the Tibetan Autonomous Region (TAR) has made a major policy shift towards the development of the livestock sector in crop-dominated areas of TAR. This shift was made in recognition of the considerable role that livestock can play in improving and sustaining crop-livestock production systems, resulting in improved livelihoods of the local people. The crop-dominated areas can be considered high-pressure areas, where the population density per unit of land is much higher than in other parts of Tibet, e.g., in purely pastoral areas. There is considerable scope and opportunity to develop livestock production in these areas (Figure 1).

Figure 1: Contribution of Crop, Livestock, and Forestry to Various Farming Systems Tibet (1995)



Over the last 12 years, with the government's policy to boost agricultural production - mainly grain crops, the crop-dominated areas of Tibet have produced significantly increased quantities of foodgrains. In 1999, Tibet produced an estimated one million tonnes of foodgrains. This quantity is theoretically sufficient to meet the requirements of the region, but better quality wheat flour and rice are still imported from other parts of China, e.g., Sichuan Province, to meet the demands of the urban population. Locally-produced wheat has an inferior quality and is difficult to sell. In addition, there is a large



Stacks of crop residues in a Tibetan Village

stock (estimated 1.2 million tonnes) of straw and crop residues. Crop residues are one of the most important sources of animal feed in crop-dominated areas in some areas comprising more than 80% of the total animal feed in winter. In central Tibet, however, only about 26% of crop residues are used as animal feed, the remainder are wasted or used as fuel.

This has raised the issue of finding the best way to use these crop residues and surplus grain for livestock raising to meet the high demand in urban areas for meat and milk products such as butter, cheese, and processed fresh milk. In addition, there are large areas of land that can be developed into artificial grasslands, and also scope for producing more fodder and forage through the introduction of multiple-cropping technologies to grow green manure and film technologies to grow high-yielding feed crops such as maize. Efficient use of crop residues and grain surplus can be achieved through appropriate and integrated development of crop-livestock farming systems. This, in turn, can lead to an improvement in the living conditions of the local people by generating cash income through the sale of animal products.

Currently, although there is a fast-growing demand for meat and dairy products, there is stagnation in livestock production in the pastoral areas of Tibet (which has been the major producer of livestock products until recent years) as a result of the limited carrying capacity of the rangelands and overgrazing. A large quantity of livestock products is imported from other regions of China and countries such as New Zealand and Australia. The crop-dominated areas of Tibet have a considerable potential for increasing livestock production. Firstly, these areas have access to roads thereby allowing easy access to the markets. Secondly, these areas have higher literacy rates and local farmers are more receptive to the adoption of new technologies. Thirdly, as a result of the accessibility and scope for market expansion, the potential for government and private sector investment in terms of credit to farmers for raising quality animals, processing feed at the household level, and establishing small-scale processing plants for value-adding is higher. In addition, crop-dominated areas have a higher land productivity, and thus a higher carrying capacity for both human and animal populations.

However, as yet there has been no systematic research on livestock development in crop-dominated areas or on crop-livestock interaction in these areas. Better knowledge is needed on how to make the best use of crop-residues for animal feed, organisation of farmers in small-scale dairy production, processing, and marketing of livestock products, readjustment of the cropping structure, and development of artificial grasslands. Research and development in these areas have a great potential in the Tibetan Autonomous Region of China.

ICIMOD's Partnership with ILRI to Strengthen Livestock Research in Mountain Farming Systems of the HKH Region

Following an MOU signed between the International Livestock Research Institute (ILRI) and ICIMOD in 1998, ILRI and ICIMOD have jointly undertaken the following collaborative studies to address livestock sectors in the HKH region under RCP-II.

1. Characterisation of livestock-based systems -This started in Mid-1998 with database inventory of Nepal, two Himalayan states of India, and Bhutan. Some mountain regions of China and Pakistan will be covered in 2000/2001.
2. Rapid appraisal of market-oriented smallholder dairy systems - This started in August 1999 in Nepal and two Himalayan states of India; Himachal Pradesh and UP Hills. This study will be extended to Bhutan and Pakistan in 2000/2001.

These studies will contribute firstly to increase knowledge on the present situation of the livestock sector in HKH; and secondly to improving understanding of how livestock can fit into a mountain-specific 'niche' as an income-generating option for improving the living standards of mountain people.

Early this year, an ILRI-ICIMOD team visited China, including Tibet, to explore further opportunities to carry out research on various aspects of the livestock sector with national institutions.

Characterising Small Diary Production Systems in the Uttar Pradesh Hills, India

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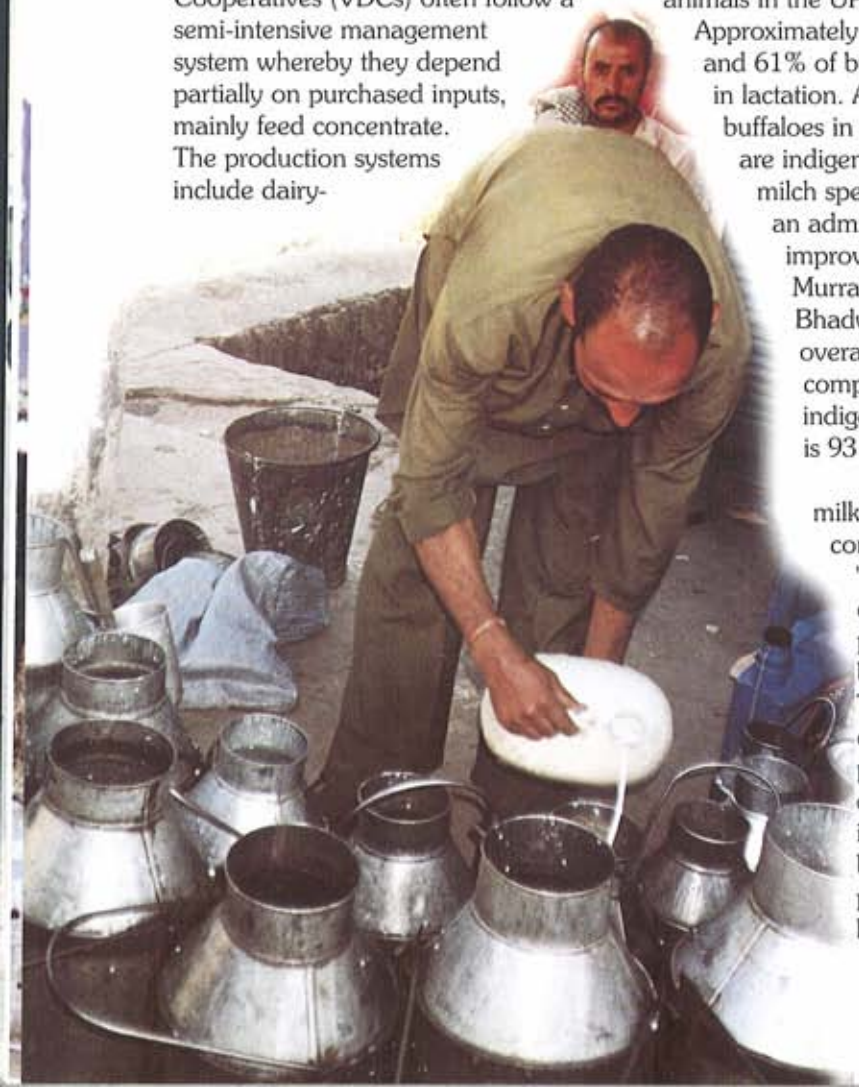
Dairy farming is an integral part of mountain agriculture. In the UP Hills in India, smallholders, who make up the overwhelming majority, have evolved two major systems of livestock management in mixed crop-livestock farming systems: sedentary and migratory. Almost all smallholder dairy farms in UP villages practise sedentary management. Under the sedentary system, livestock are kept in the village throughout the year. Cattle are allowed to graze in the daytime and are fed crop residues and tree leaves at night; buffaloes are mostly stall-fed.

Dairy farmers who are members of the Village Dairy Cooperatives (VDCs) often follow a semi-intensive management system whereby they depend partially on purchased inputs, mainly feed concentrate. The production systems include dairy-manure with buffaloes and dairy-manure-draught power with cattle. Dairy farming in the UP Hills, unlike in many mountain areas in the Hindu Kush-Himalayan (HKH) region, is not associated with meat production; a characteristic shared by many other mountain areas in India.

Cattle and buffaloes are the only dairy species throughout the UP Hills. Use of goats, sheep, and yak as dairy animals is extremely rare. The population of cattle over the last three decades has decreased or remained stagnant, while that of buffaloes has recorded a remarkable increase. Cattle make up 52% and buffaloes 48% of the 1,100,839 dairy animals in the UP hills. Approximately 59% of cows and 61% of buffaloes are in lactation. All the buffaloes in the region are indigenous. This milch species is largely an admixture of improved type Murrah and Bhadwari. The overall average composition of indigenous cattle is 93 %.



Fresh whole milk is the most common of the 'unprocessed' dairy products sold by farmers. The most common processed dairy product is refined butterfat, popularly known as ghee. A few smallholder dairy farms sell ghee in the local market. However, it is rare for even market-oriented dairy farms, e.g., in VDCs and villages near market areas, to sell processed products.

Most of the inputs in smallholder dairy farming are internally mobilised. Feed - the most important input in animal husbandry - is produced within the system. Common property resources (CPRs) and cropland are the two sources of livestock feed in the area. In contrast, most market-oriented dairy farms in the VDCs purchase concentrate feed for their dairy animals. Farmers often depend on ethno-veterinary practices for the control and treatment of livestock disease.

A study funded by a joint ILRI-ICIMOD programme on *'market-oriented smallholder dairy production systems in the Hindu Kush-Himalayas'* was carried out in Nainital and Almora districts. Six villages in each of these districts were selected for the study. A dairy farm with an equivalent of four dairy cow units (DCUs) or less was classified as 'small', those with more than four but less than eight DCUs as 'medium, and those with more than eight DCUs as 'large'. An overwhelming majority (92%) of the smallholder dairy farms sampled were classified as small, and 8% as medium. None were large. The percentage of smallholders managing medium scale dairy production was higher in the VDCs located near urban areas, presumably reflecting the increased scope for income generation through milk sales. Small-scale dairy production is practised as a part of subsistence farming and medium-scale production under mixed dairy

farming. Large dairy farms are a form of specialised dairy farming that does not exist under the sedentary system of animal management. Management of large-scale production and specialised dairy farming does not seem feasible, given the specific mountain circumstances.

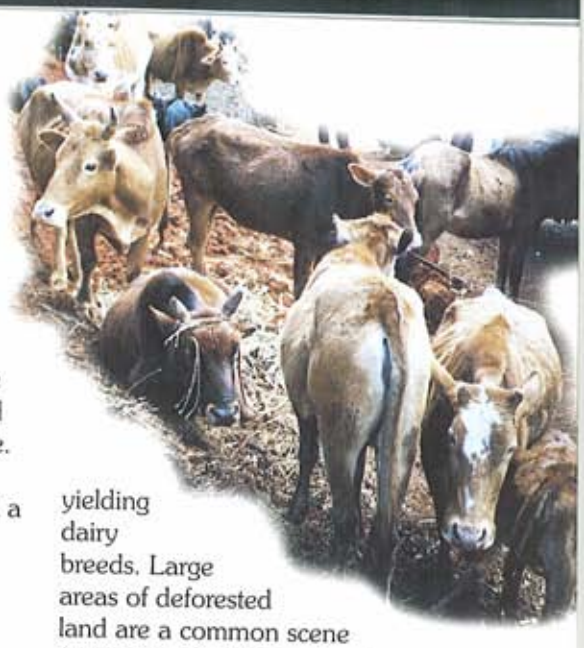
Many of the specific characteristics of a dairy farm depend upon the location, as do many factors related to the success and/or failure of a dairy such as composition and size of livestock, feeding, disease management, breeding, on-farm processing, and marketing of dairy products. The actual dairy production is influenced markedly by seasons, and availability and quality of feed.

On average, 58% of the total fodder biomass used in the villages was extracted from CPRs and 42% from croplands, but there were large differences in these percentages depending on the location. The contribution of CPRs to fodder supplies was 52% in the valleys, 57% in the villages situated at mid-altitudes, and 66% in the high-altitude villages. The CPRs make a crucial contribution, representing a rich repository of diverse green fodder species of very high nutritive value. Overall, however, livestock feed in the area is in a dismal state as the requirement in each village far supersedes the actual available fodder. The average shortage of green fodder is 26% and that of dry fodder as high as 77%. This situation is the major determinant of livestock performance in the region. Concentrate feed is generally fed to the animals in milk, and often given only to lactating buffaloes.

Self-containment is one of the most valuable features of mountain dairy production systems. Almost all the inputs used in a traditional dairy are produced within the system. Bedding material and most of the fodder come from forest/grassland ecosystems under the CPR regime. A proportion of dry fodder (crop residues), weeds, green grass, and a small amount of foodgrain as concentrate feed come from cultivated land. Bedding material, leftover fodder, and the dung voided at the stall are converted into manure and used to maintain soil fertility on the cultivated land. This is the traditional way of managing soil fertility in mountain agriculture.

Smallholder dairy practices are gender-specific. The contribution of mountain women to the dairy production system is enormous and that of men limited. In the UP Hills an average woman devotes as many as 1,779 hours (222 '8-hour days') to different dairy operations annually, as high as 85% of the total time devoted to all other operations. In contrast, an average man devotes only 315 hours annually.

The high degree of inaccessibility presents several difficulties with respect to managing the activities necessary for the success of a dairy farm. Smallholder farmers have to face difficulties arising out of limited mobility, poor communication, and isolation. This inherent feature of the mountains also restricts efficient management of the natural resources. The main biological constraints are the reduced area of forest and grazing land, changing floristic composition, and poor-yielding dairy breeds. Large areas of deforested land are a common scene in the UP Hills. The reduced area of good forest and grazing land cannot supply sufficient fodder for the livestock. Thus, the dairy animals are underfed and this leads to lower milk production. The main management-related constraints are unbalanced use of land (characterised by a low forest to cultivated land ratio, negligence of CPRs, and increased resource use intensities), improper livestock management, and inadequate feed. This can be summarised as: too small an area for grazing, reduced fodder supplies to livestock, and poor linkages between dairy, forestry, and farming.



Dairy farming is one of the most promising enterprises for smallholders in the UP Hills. The increasing trends in milk production, marketing, and consumption rates suggest the prospects for smallholder dairy farming are bright. Natural and livestock resource management; proper feeding, nutrition, and health management; and dairy-oriented education and training to smallholder dairy farmers hold the key to the sustainable development of dairy production systems in the hills.

Gender and Livestock Management in Mixed Farming Systems

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In mountain areas, contribution of labour is the most important factor in livestock management and production. Sex and age both play a critical role in determining labour allocation. Generally, women perform activities such as collecting green grasses/weeds (including fodder tree forage), feeding animals, grazing animals, cleaning animal sheds, and composting animal waste. Women milk the animals and prepare butter and ghee. Children of both sexes (although mostly female) graze the animals. Men make decisions regarding breeding of animals and marketing of animal products.

Table 1: Hours Spent by Males and Females in Animal Husbandry in Different Zones, Nepal (Hrs. per worker per day)

Zone	Marginal		Small		Medium		All	
	Male	Female	Male	Female	Male	Female	Male	Female
Low hills	0.92	3.69	1.55	4.97	3.80	6.03	1.95	4.74
Mid hills	0.71	3.01	1.78	3.79	2.49	5.01	1.89	4.05
High hills	0.50	1.51	0.42	2.46	0.25	3.69	0.40	2.49
All	0.77	3.11	1.10	3.46	3.49	5.16	1.47	3.85

Source: Meenakshi, Singh Ranveer, 1995. Role of Women in Different Systems of Hill Farming. A Study of Himachal Pradesh. Agro-economic Research Centre, HP University, Shimla, India.

Gender Division of Labour

In some areas, women put in more than 80% of the work required for the management of small ruminants such as goats. For example, a field study in the mid-hills of Tanahu District of Nepal shows that the labour contributed by women farmers, in comparison to men, was 90.6% for barn sanitation, 91.1% for watering, 87.7% for forage collection, and 67% for grazing; giving a total labour contribution of 84.1%. In contrast, the contribution of male farmers was only 15.9%. On average, a female spends 3.85 hrs. per day in animal related activities, which is more than two and a half times of the time devoted by a male (see Table 1). Data from Himachal Pradesh show that time spent by women on livestock management is close to three times more than that by men. On the other hand, labour spent on cereal crops, vegetables, and fruit does not show significant difference. In Nepal, women contribute 70% of the work in raising livestock and are more knowledgeable than men about treating sick animals. In spite of this, women are excluded from extension, marketing, credit, and other activities critical to increasing livestock productivity and income (HMG/ADB 1993).

Use of child labour is common in livestock feed/ fodder collection as well as in grazing. It is mostly female children, ranging from seven to 13 years, who are engaged in taking animals to graze in nearby forests and on support land. During the rainy season, the boys and girls of this age group are involved in cutting and carrying green grasses and field weeds from crop fields. Children are also engaged in collecting dung from common lands.

Women's needs (e.g., for time-saving technology) are not consi-dered when conducting research, nor is the extension education system tailored to women farmers. Despite the fact that women farmers contribute more to raising livestock, their knowledge and ideas on problems have hardly entered mainstream perception; it is only men who have a say.

Potential Options/Approaches

Formulate Policies with Women and Children Farmers in Mind

Sensitisation of local institutions regarding gender needs and the active involvement of women staff/

knowledgeable women farmers are essential if useful programme activities are to be formulated. Participatory approaches should be adopted, with explicit emphasis on the problems and potential of women and children.

Develop and Promote Drudgery-reducing Technologies for Women and Children

Outmigration and seasonal migration from the hills have resulted in a shortage of farm labour. Able-bodied men, particularly, have been migrating to cities and towns for off-farm employment. This is due to the increases in wages for labour outside the farm. Women, children, and the elderly are left to tend livestock; and rearing these livestock using the stallfeeding option demands labour. Approaches to overcoming labour constraints at the household level should consider labour-saving, time-saving, and drudgery-reducing technologies. Indeed, research and development in the livestock sector should make this a primary focus.

Improve Livestock Contribution to Gender Equity

Micro-livestock (small ruminants and poultry) have been contributing to direct income for women. The option of small ruminants offers more autonomy in decision-making, and thus empowerment to women. Women are more easily involved in the sale and purchase of goats and chickens. They make decisions and have more control over financial transactions with these classes of livestock than with large ruminants.

In view of women's significant role in livestock production, it is vital to address gender concerns in the sustainable management of livestock in mixed crop-livestock farming systems and in marketing. It is believed that, without the involvement of women farmers from the very beginning, no livestock development programme can be expected to succeed. Unfortunately, there have been only a few studies carried out on gender issues in relation to livestock systems in the Himalayan areas.

Table 2: Physical Achievements of Mahila Dairy Vikas (Women Dairy Development Project)

Particulars	VIII Five Year Plan 1992-1997	IX Five Year Plan 1997-2002 (Proposed)
Women Dairy Cooperative Societies	112	270
Self-help Groups	-	675
Women Members	2940	13500
Women Beneficiaries	5600	33750
Milk Procurement, thousand liters per day	5860	27745
First Aid Centres	112	-
Primary Health and Delivery Kit	-	675

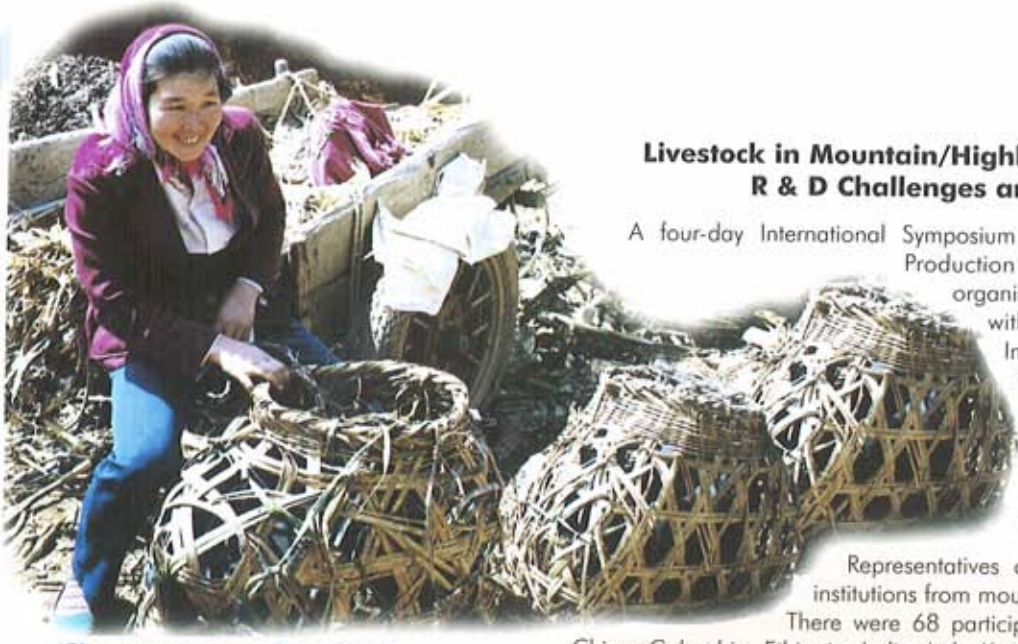
Source: GOI (Government of Uttar Pradesh). Draft Ninth Five Year Plan(1997-2002) and Annual Plan(1997-98), Vol.II. Uttaranchal Sub Plan. Lucknow: Government of Uttar Pradesh, Uttaranchal Vikas Vibhag.

Gender Equity and Changing Gender Roles

Recent surveys, however, indicate that there is an emerging trend of gender equity and changing gender roles.

Because of the heavy investment and rising cash income opportunities from improved dairy animals, male members of the family are taking on more of the workload for livestock management. In many areas, men are becoming more involved in the purchase of manufactured livestock feed and milking and even in fodder collection and feeding of animals. Also, decisions about investing in improved animal breeds are being made jointly, involving women in the decision-making process.

Although there have been some concerns regarding who gets to keep the cash from these activities, women are taking more responsibilities in the marketing of milk. In view of the significant role played by women in dairy farming, there has been increasing emphasis in promoting women's dairy in some areas of the HKH (see Table 2). Rapid surveys in the mid-hills of Nepal revealed that women were more knowledgeable about indigenous fodder grass species and fodder trees than men. They are also more knowledgeable about local treatment methods than men. On the other hand, men know more about introduced grass species and fodder trees as well as about



Chinese woman selling piglets.

modern veterinary treatment. This is mainly because institutional programmes are geared towards providing training and exposure opportunities for men rather than women. This clearly shows that institutional programmes engaged in the development of the livestock sector have to be much more conscious of including women in recognition of their major role and involvement in the sector.

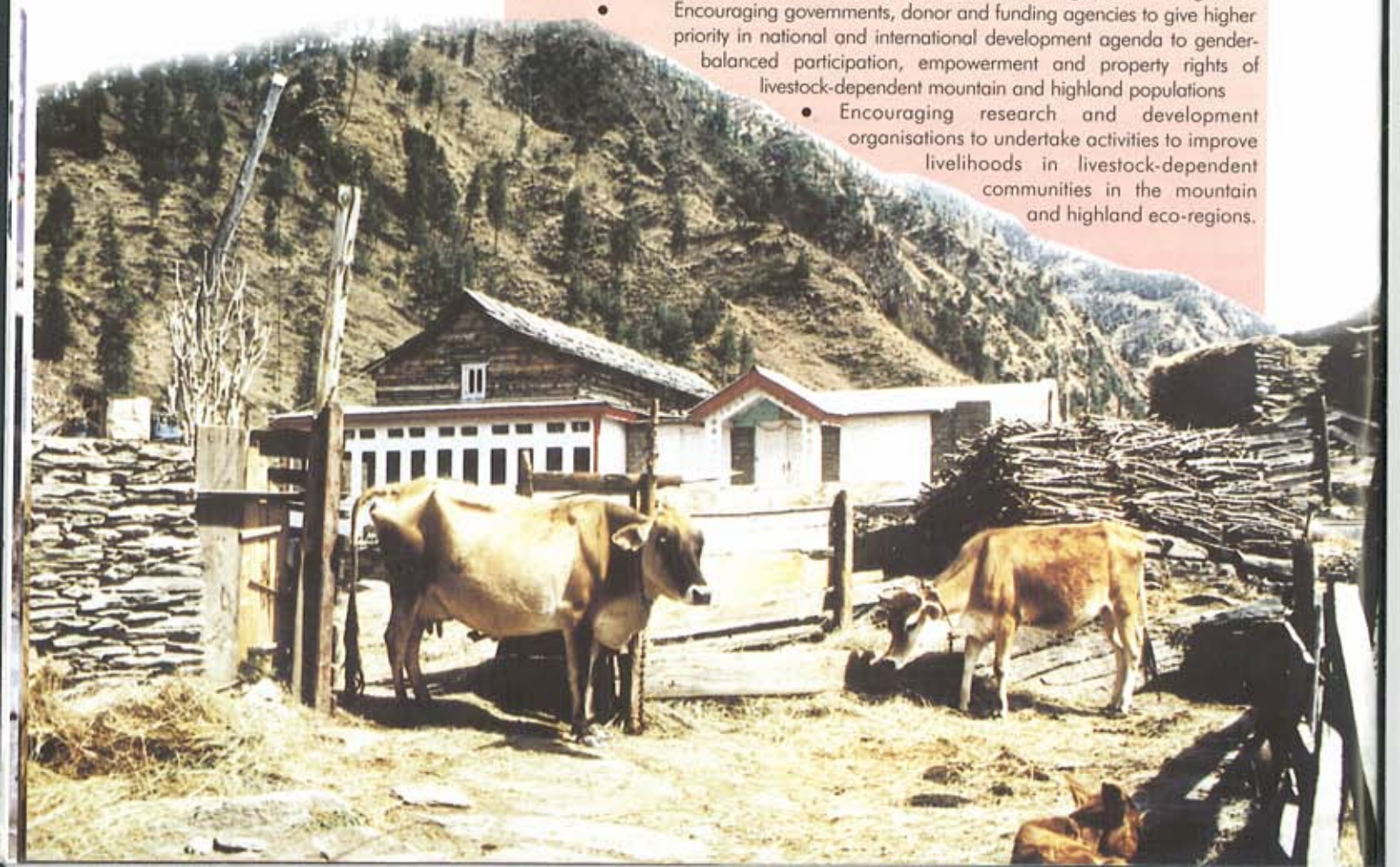
Livestock in Mountain/Highland Production Systems R & D Challenges and Call for Action

A four-day International Symposium on 'Livestock in Mountain/Highland Production Systems: R & D Challenges' was organised jointly by ICIMOD in partnership with International Livestock Research Institute (ILRI), the International Potato Centre (CIP), and the United Nations' Food and Agriculture Organisation (FAO) from Dec. 7-10, 1999 in Pokhara, Nepal to plan livestock research and development strategies for the next millennium.

Representatives of research, development and donor institutions from mountain regions attended the symposium. There were 68 participants from, Australia, Bhutan, Bolivia, China, Colombia, Ethiopia, India, Italy, Kenya, Nepal, Peru, and Thailand thereby representing six continents of the world. This forum also served as a part of the preparatory work for the International Year of the Mountains (IYM) -2002.

The main outcome of the symposium was the **"Pokhara Call for Action,"** which called for the following action to develop the livestock sector.

- Preparation of a global research and development agenda to improve livelihoods in livestock-dependent mountain and highland communities which emphasises the understanding of the dynamics of evolving pure and mixed livestock production systems, the strengthening of appropriate technologies and strategies, and the contribution of policies and capacity - building that link R & D, focussing on:
  - use and conservation of production resources
  - sustainable market-oriented livestock, production systems
  - post-production processes and
  - trade and regional integration
- Preparation of a livestock agenda for incorporation into the framework for the International Year of the Mountains in 2002
- Promotion of collaborations across the different mountain/highland eco-regions
- Encouraging governments, donor and funding agencies to give higher priority in national and international development agenda to gender-balanced participation, empowerment and property rights of livestock-dependent mountain and highland populations
- Encouraging research and development organisations to undertake activities to improve livelihoods in livestock-dependent communities in the mountain and highland eco-regions.



The Changing Profile of Small Dairy Holders in the Himachal Pradesh Himalayas, India

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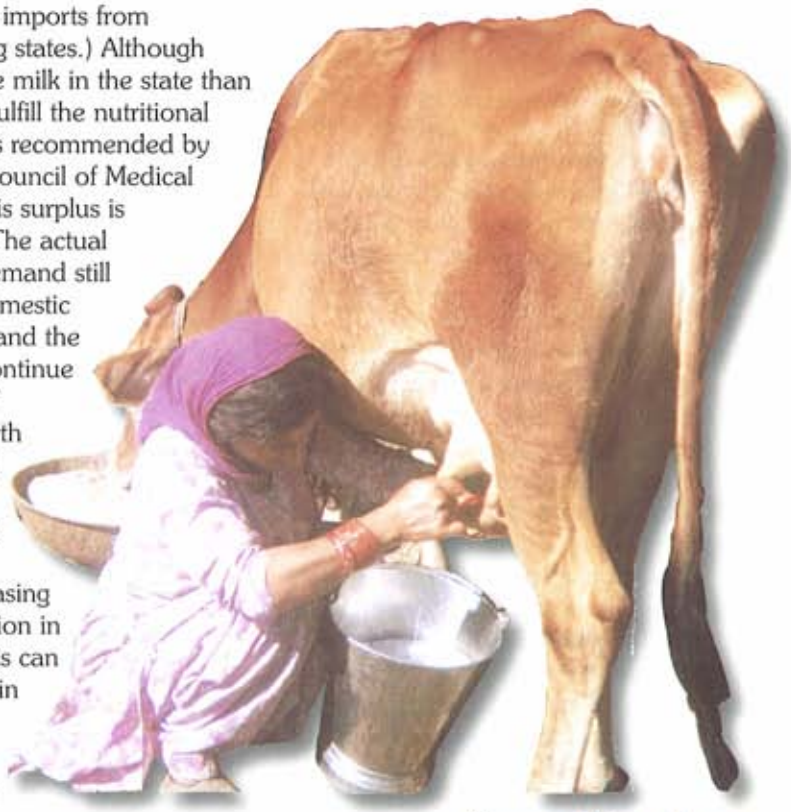
Dairy production is an integral part of smallholder farming in Himachal Pradesh. The recent trend towards the development of a market-oriented economy emphasised the importance of increased milk production, especially in areas falling in the vicinity of urban consumption centres. This has motivated farmers to replace local nondescript breeds of cows with cross-bred cows. Between 1982 and 1992 the total number of milch animals increased only slightly (less than 1% per annum), but the number of cross-bred cows increased by 17%during the same period. Cross-bred cows are preferred because of factors such as a longer lactation period, shorter gestation period, and higher lactation and yields. There has been a simultaneous increase in the related infrastructure, e.g., veterinary institutions and the Milk Federation.

The state government initiative on improved breeds was based on importing cattle and germplasm. Research and experience has shown that Jersey cross-bred with local animals, with up to 75% Jersey strain, is suitable - and this has become the practice adopted by dairy holders.

The efforts toward breed improvement and cattle management have resulted in increased availability of milk in the state. Himachal Pradesh is the third-ranking state in India with respect to milk availability. (This is not only the result of increased production, however; the figures include milk imports from neighbouring states.) Although there is more milk in the state than required to fulfill the nutritional requirements recommended by the Indian Council of Medical Research, this surplus is theoretical. The actual economic demand still surpasses domestic production, and the deficit will continue to increase if present growth rates prevail.

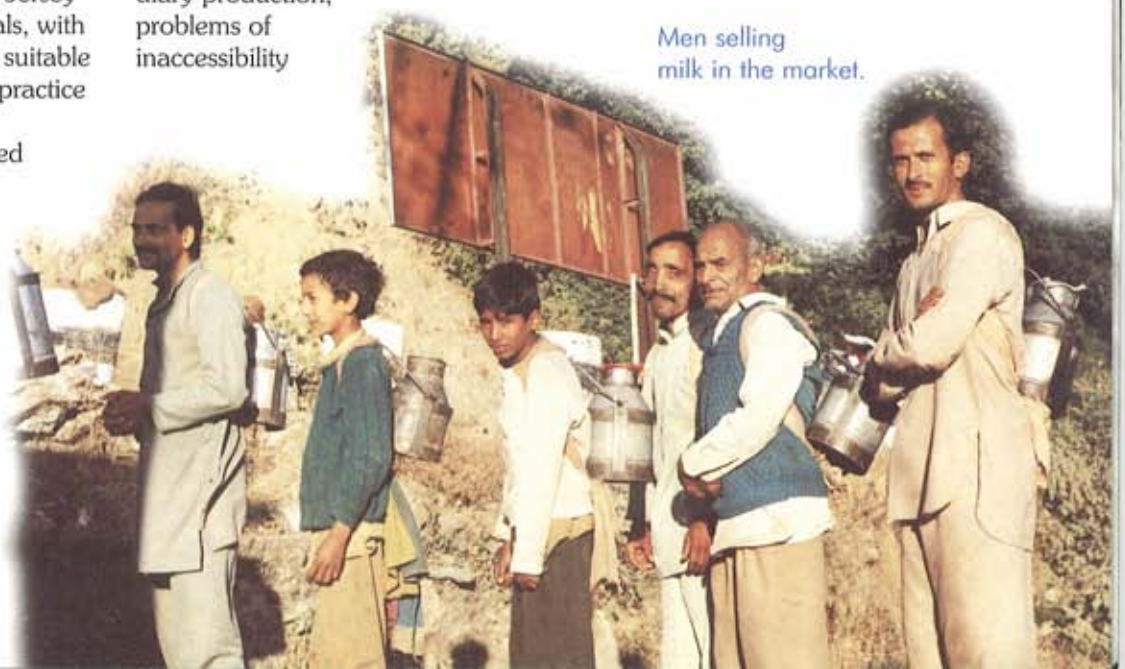
This indicates the value of further increasing milk production in the state. This can be achieved in part by upgrading cattle breeds and improved management practices.



Woman milking at home.

However, for the overall mountain areas to benefit from diary production, problems of inaccessibility have to be addressed so that the small sector dairy holders located in the interior areas are also able to market their products.

Men selling milk in the market.



Livestock and Forage Resources in Upper Mustang, Nepal

Yogendra Raut and Camille Richard, ICIMOD (yogi@icimod.org.np & camille@icimod.org.np)

Mustang is one of the remote northern districts of the high altitude trans-Himalayan region of Nepal, bordering the Tibetan Autonomous Region of China. Almost all parts of the district lie above 2,500m, with cold desiccating windy weather resulting in steppe vegetation. The district falls in the rain shadow areas of the Dhaulagiri mountains to the west and the Annapurna massif to the east.

Mustang is divided geographically into two sectors, Lower and Upper Mustang. This article mainly concentrates on livestock production systems in the farming areas of Upper Mustang.

Table 1: Livestock population of Upper Mustang

VDC	Cattle/Lulu	Goats	Sheep	Chauri	Dzopa	Horses	Mules	Donkeys
Chhusang	255	5113	35	20	245	119	477	94
Ghami	291	2962	776	109	239	268	107	105
Charang	251	3296	74	37	80	90	--	23
Lho-Manthang	700	3831	1346	672	14	322	9	163
Surkhang	279	7045	450	393	77	62	--	--
Chhonup	507	2911	1454	709	109	270	--	--
Chhoser	517	5236	2377	61	17	177	--	23
Total	2800	30394	6512	2001	781	1308	593	408

Note: Pure yak populations are small and included under "cattle/lulu". "Chauri" refers to female hybrids, "Dzopa" refers to male hybrids, which are mainly used for transportation.
Source: District Livestock Services Office, Mustang, 1992

Livestock Production Systems

Farm animals in Upper Mustang mainly consist of yak (*Bos grunniens*), *chauri/dzopa* (yak-cattle hybrid), cattle, horses, mules, sheep, and goats. Livestock raising is the only major source of cash income and also supplements agricultural and fuel needs for approximately 6,000 people (Table 1). Although the status of and access to rangelands varies greatly within Upper Mustang, it is apparent that rangeland conditions have slowly deteriorated during the last two decades. Following the closure to livestock of the border with the Tibetan Autonomous Region of China in the mid-1970s, the pressure on forage resources in Upper Mustang increased, particularly during the winter months. The problem is exacerbated by the drying climate. This has led to a heavy decline in yak and sheep farming in the area.

Mustang district as a whole is considered to be a food deficit area. There is a high ratio of population to cultivated land (Table 2) and a deficiency in all foodgrains - locally produced or imported. The situation is more severe in Upper Mustang, due to the more extreme climate which limits the season for cropping. Pack animals such as, horses, mules, donkeys, and *dzopa* are given a daily ration of 1 to 2 kg of foodgrains. An estimated 1,626 ha of cultivated land would have to be brought under irrigated cultivation to meet the demand for human consumption and livestock feed. The total cultivated land available in Upper Mustang (Table 2) is not sufficient to meet these requirements and grain must be imported from other regions, as practiced traditionally.

Supplementation of foodgrains is vital to maintain herds in Upper

Mustang and will continue to be so, given the importance of livestock in such marginal landscapes. Livestock are an important means of transport for goods from Lamjung and Pokhara, both for home consumption and for the growing population of tourists visiting the area. Dairy products from cattle and hybrids provide daily sustenance. Yak, sheep, and goat offer a cheap source of protein during the lean winter months. Sheep are also a sound investment for long-term risk aversion and a quick source of cash, despite their decline in recent years. Goats offer valuable wool that has potential for further development with the right market infrastructure. Notwithstanding their importance, livestock populations have stagnated in recent years due to a number of factors.

Table 2: Number of household, population and cultivated area of Upper Mustang

VDC	Household Number	Population	Cultivated Area (ha)
Chhusang	172	885	--
Ghami	152	797	200
Charang	114	550	140
Lho-Manthang	180	902	252
Surkhang	133	692	255
Chhonup	168	1490	248
Chhoser	181	780	225
Total	1100	6096	1320

Source: District Agriculture Office, Mustang, 1992

Livestock Constraints and Past Forage Development Efforts

Despite the local desire to increase livestock numbers, the major constraint remains the shortage of feed, especially in winter. Since the closure of the border, winter grazing has become an acute problem as animals can no longer access the snowfree pastures in the vast steppe region of Tibet. Herders now move their livestock among village pastures, some still risk crossing the border, despite the heavy fines levied if caught. The most affected areas in Upper Mustang are the border communities of Chhonup, Chhoser, and Lo Manthang. The problem is exacerbated by the glacial outbursts that inundate farmland and decrease the land available for hay production. In some areas, mortality rates for sheep, goats, and yak and yak/hybrids can be as high as 20% in bad years. Another major problem is the increasing decline in available labour as more and more able-bodied men and women seek opportunities in the lowlands. All these factors combine to create a situation in the region that is not conducive to livestock production.

To mitigate the problem of winter forage shortage, much attention was given in the 1980s and 1990s to exotic hay and pasture species such as white and red clover (*Trifolium repens* and *T. pratense*), cocksfoot (*Dactylis glomerata*), ryegrass (*Lolium perenne*), and alfalfa (*Medicago sativa*). These species only establish well if grown under irrigated conditions. However, given the shortage of water in the region, hay crops were not a high priority compared to food crops (which also provide livestock supplementation in winter) and failed. In addition, the pasture trials could not sustain the high grazing pressure in areas close to villages.

Potential for Native Forage Species in Farming Areas

The floral diversity of Upper Mustang is rich and has many species that are suitable as forage plants. Many native species are traditionally sown in farmland as hay or are harvested from adjacent bunds and village commons. These include *Medicago falcata, M. littoralis, M. truanculata, Pennisetum flaccidium, Elymus nutans*, and various species of *Poa*. Important species in the steppe rangelands include leguminous shrubs such as *Caragana gerardiana, C. brevispina*, and various species of *Astragalus*. Alpine rangelands provide valuable forage in the summer months, dominated by species of *Kobresia, Agrostis, Poa, Festuca*, and other *graminoids*. Numerous medicinal plants also function as forage, providing health benefits both to livestock and to the people they sustain.

The benefits of these species are that they are locally adapted to the environmental stresses and are locally known, and are therefore more likely to be adopted by a farmer who is short of the labour and resources needed to maintain high-input exotic hay crops. A programme for native seed development has been initiated in Upper Mustang by ICIMOD, in collaboration with the King Mahendra Trust for Nature Conservation and the Department of Livestock Services - HMG/N, as part of the Upper Mustang Biodiversity Conservation Project. However, focus on forage development in isolation will most likely not address the more critical issues of outmigration, inaccessibility to markets, and declining water resources in the area. In this project, the development of native forage species is merely part of a more dynamic process designed to build local capacity to identify and plan for innovations that decrease local dependency on the rangeland resource and improve livelihoods through alternative income schemes such as eco-tourism. In a marginal environment such as Mustang, the peoples' best chance for sustained livelihood is to diversify their economic base.

Publications Related to Livestock

Rasali, D. P.; Joshi, H. D.; & Shrestha, H. K. 1998. *Assessment of the infertility situation in cows and buffaloes in the western hills of Nepal.* (LARC working paper, 98/40). Pokhara: Lumle Agricultural Centre. 16p.

Singh, K. A.; Yadav, B. P. S.; & Goswami, S. N. 1996. *Forage Resource Management for Sustained Livestock Productivity in Himalayan Agro-ecosystems.* (ICAR research bulletin, 39). Barapani: ICAR Research Complex for NEH Region. 99p.

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Abdul Ghaffar Khan; Atiya Azim; & M. Aslam Khan. 1996. *Possible Sustainable Nutritional Strategies for Improving Ruminant Production in Dry and Cold Mountain Areas of Pakistan.* In: Mitza Mohammad Ashraf & Maqsood Anwar. (ed.). *Proceedings of the regional workshop on sustainable agriculture in dry and cold mountain areas.* 74-83p. Islambad, Pakistan: Rangeland Research Institute, National Agriculture Research Centre.

Gurung, D. B. 1996. *Twenty Years of Livestock Extension in the Hills of Western Nepal*: A Review of Lumle Agricultural Research Centre's Livestock Extension Activities, 1975-1995. Pokhara: Lumle Agricultural Centre. 21p.

Brower, B. A. 1987. *Livestock and Landscape*: The Sherpa Pastoral System in Sagarmatha (Mt. Everest) National Park, Nepal. Berkeley, CA: University of California. 337p.

Rasali, D. P.; Gurung, D. B.; & Yadav, E. R. 1998. *Performance Recording of Lactating Local and Crossbred Cows and Buffaloes of Various Exotic Breed Blood Levels Under Farmers' Management in the Western Hills (1995-97).* (LARC working paper, 98/39). Pokhara: Lumle Agricultural Centre. 14p.

Singh, V. 1998. *Draught Animal Power in Mountain Agriculture - A Study of Perspectives and Issues in the Central Himalayas, India.* 1998. MFS Discussion Paper 98/1. Kathmandu, Nepal: FAO-ICIMOD.

COMING SOON!!!

Livestock in Mountain and Highland Production Systems: Challenges for Sustainable Development

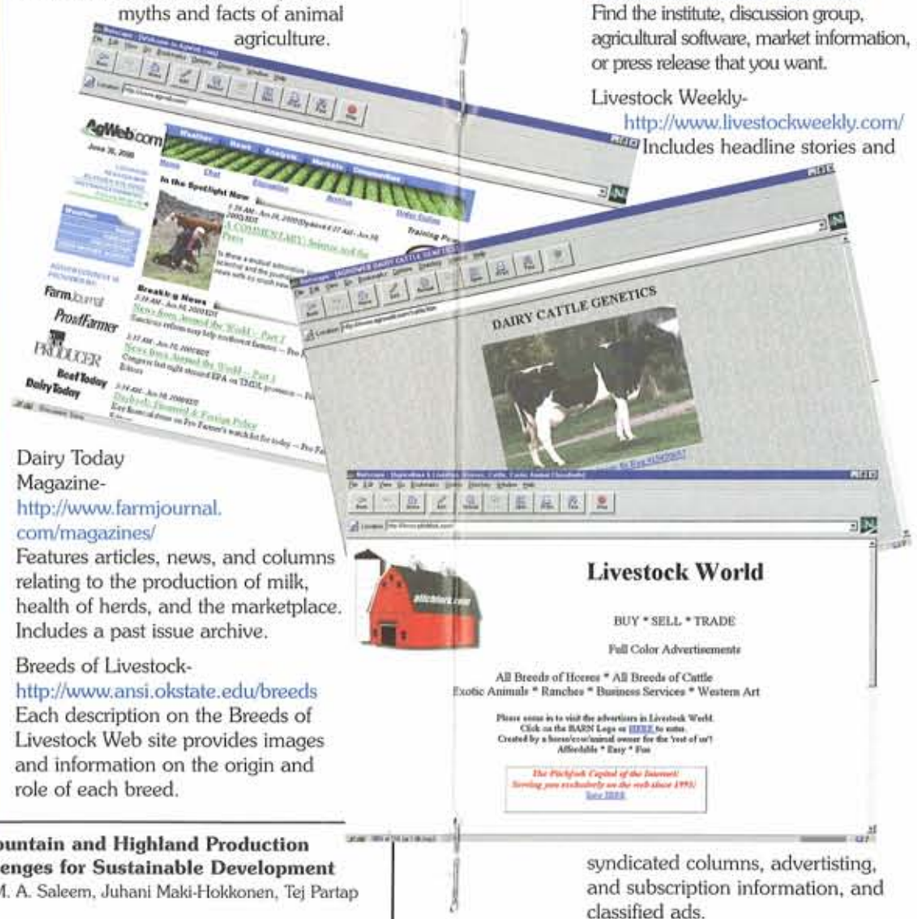
Editors: P. M. Tulachan, M. A. Saleem, Juhani Maki-Hokkonen, Tej Partap

The proceedings of the international symposium on "Livestock in Mountain/Highland Production Systems: R & D Challenges into the Next Millennium" that was held from Dec. 7-10, 1999 at Pokhara, Nepal consists of four parts and twenty-one chapters. Part I consists of two chapters. The first chapter covers the background and progression of the symposium and includes the most important outcome of the symposium- 'Pokhara call for action'. The second chapter gives a general overview of the symposium and recapitulates all the issues and challenges brought forth during the plenary sessions and working group discussions. Part II discusses the roles of livestock in mountain/highland production systems. Part III contains chapters on livestock in high-pressure mountain/highland production systems, one each on Andes, African Highlands and HKH regions. The theme of Part IV is the sustainability concerns of livestock-based livelihoods. Part IV discusses the multiple benefits of livestock such as food-security, draught animal power, dairies and biogas in different mountainous regions.

Websites Related to Livestock

AgroWeb - Dairy Cattle Genetics-
http://www.agroweb.com/cattle.htm
Deals in dairy cattle genetics, listing embryos and other genetic sites.

Animal Industry Foundation-
http://www.aif.org/
Offers brief organisational background with activity highlights and explores myths and facts of animal agriculture.



Dairy Today Magazine-
http://www.farmjournal.com/magazines/
Features articles, news, and columns relating to the production of milk, health of herds, and the marketplace. Includes a past issue archive.

Breeds of Livestock-
http://www.ansi.okstate.edu/breeds
Each description on the Breeds of Livestock Web site provides images and information on the origin and role of each breed.

Farm Journal Today-
http://www.FarmJournal.com/
Updated daily, this publication for dairy, beef and pork farmers offers discussion forums and advice on farm management.

Livestock Virtual Library-
http://www.ansi.okstate.edu/library/
Find the institute, discussion group, agricultural software, market information, or press release that you want.

Livestock Weekly-
http://www.livestockweekly.com/
Includes headline stories and syndicated columns, advertisting, and subscription information, and classified ads.

LivestockBreeder.com-
http://www.livestockbreeders.com/
Directory dedicated to breeders and buyers of alpacas, cattle, goats, llamas, horses, poultry and exotic animals. Check the classified.

Livestock World-
http://www.pitchfork.com/
Breeders of rare livestock species, such as camels, pygmy goats, and miniature sheep, advertise their stock for sale.

Partner Institutions in Livestock in Mountain Farming Systems

BHUTAN

National Jersey Breeding Centre
P.O. Samtse, Bhutan
Fax: 975-5-365427
Tel: 975-5-365261

Natural Resources Training Institute (NRTI)
Lobeysa, P.O. Wangdue Phodrang
Tel: 975-2-481338, 975-2-481337
Fax: 975-2-481326
Email: nrti-pri@druknet

CHINA

Tibet Academy of Agriculture and Animal Husbandry Sciences (TAAAS)
No. 111, Western Jinzhu Road
Lhasa, Tibet, ZIP-850002
Tel: 891-6813313/6839400
Email: taaas@public.ls.xz.cn

INDIA

Agro-Economic Research Centre
Himachal Pradesh University
Shimla-171005, India
Tel: 91-177-230269/230457
Fax: 91-177-231769

Department of Animal Science,
GB Pant University of Agriculture and Technology, Hill Campus,
Ranichauri-249199, Tehri Garhwal,
Tel: 91-1376-52123
Fax: 91-1376-52128/52150

NEPAL

Local Initiatives for Biodiversity Research and Development (LIBIRD), P.O. Box 324,
Bastolathar, Pokhara
Tel: 977-61-26834
Fax: 977-61-26834

Lumle Agriculture Research Station (LARC)
Lumle, P.O. Box # 1
Pokhara, Kaski
Tel: 977-61-29456
Fax: 977-61-21587
Email: dirlac@mos.com.np

Nepal Agricultural Research Council (NARC)
Khumaltaar, Lalitpur
P. O. Box 1950, Kathmandu
Tel: 977-1-521423/532921
Fax: 977-1-521197

Tribhuvan University, Institute of Agriculture and Animal Sciences
Rampur Campus, Rampur Chitwan,
P.O. Box 984
Fax: 977-1-538163
Tel: 977-1-538163

INTERNATIONAL

Himal Andes Initiatives,
Independencia 461, Miraflores, Lima 18, Peru
Tel: 511-444-3396
Fax: 511-444-7894

Global Mountain Programme
International Centre for Potato (CIP),
Apartado-1558, Lima 12, Peru
Tel: 511-349-6017
Fax: 511-349-5783

Food and Agriculture Organisation (FAO)
Animal Production and Health Div.
Viale delle Terme di Caracalla
I-00100 Rome
Tel: 39-06-57053091
Fax: 39-06-57055749

FAO Regional Office for Asia and the Pacific
Maliwan Mansion, 39 Phra Atit Road
Bangkok-10200
Tel: 66-2-2817844
Fax: 66-2-2800445

Swiss Development Cooperation - Nepal
(SDC-Nepal), Ekanta Kuna,
Lalitpur, Kathmandu, NEPAL
Tel: 977-1-524927
Fax: 977-1-525538

System-wide Livestock Programme, International Livestock Research Institute
P. O. Box 5689, Addis Ababa,
Ethiopia
Tel: +251-1-613215
Fax: +251-1-611892

Tibet Academy of Agricultural and Animal Sciences

Trainees and resource persons pose for a photograph in front of the TAAAS building

The Tibet Academy of Agricultural and Animal Sciences (TAAAS) is an academy located within the Tibetan Autonomous Region (TAR) Government. Its primary functions are basic and applied research in agriculture and animal husbandry. Although it was founded in 1995, it includes research institutes that were originally founded in 1952.

TAAAS has 587 employees, out of which 409 are actively employed, while the others are retired. Eighty-seven employees have mid- and senior-level professional titles (e.g., professor, associate professor, and engineer), including 4 national-level titles, accredited by the Central (Beijing) Government; and three with titles accredited by TAR.

TAAAS includes six administrative divisions (International Collaboration and Training Center, Division of Science and Technology Management, Division of Agro-industry Development, Division of Finance, Division of Personality and Division of Administration), and 4 professional research institutes, (Vegetable and Flower Research Institute, Agriculture Research Institute, Animal Husbandry Research Institute, and Central Laboratory), each institute with a director holding a senior research title. Three of the four institutes are located near by the TAAAS central office, and the fourth (Animal Husbandry) is located 14km from the TAAAS headquarter in the eastern part of Lhasa city. There were two centres recently established, namely Research Center for Tibet Natural Resources and Environmental Management and Tibetan Center for GIS Application and Training. Since its establishment in 1995, TAAAS has undertaken 80 research projects.

TAAAS has a comprehensive coverage of 37 disciplines, ranging from basic to applied research in agriculture and animal husbandry. One third of all work by TAAAS is applied, and the academy is aiming to reach TAR Government target of 40% agro-economic growth contributed by application of agro-technologies by the year 2005. As is the case nationally, all research, education and extension are being linked to form a cohesive whole.

TAAAS has 60-70 employees working in field-based extension work, through 19 extension/ demonstration stations throughout TAR. Each station has 3-5 staff with a vehicle and basic equipment to support their work. In each case, the local authority provides office facilities, may be a county or village government. The TAR Government's Department of Agriculture and Animal Husbandry provides operational funding for all extension stations, while TAAAS itself provides staffing and equipment. Various Universities and colleges also provide support.

TAAAS' training activities have involved some 100,000 farmers to date. Exchanges have been conducted with some 5 countries so far, as well as with provinces in China. TAAAS has participated directly or indirectly in a range of donor-funded projects, including a major UN-funded Himalayan area conservation project, and UN/FAO-funded projects in high-altitude animal husbandry.

The total TAAAS budget is 11 million RMB (approximately USD 1.3 million), including all project and operating expenses. The fiscal year corresponds to the calendar year.

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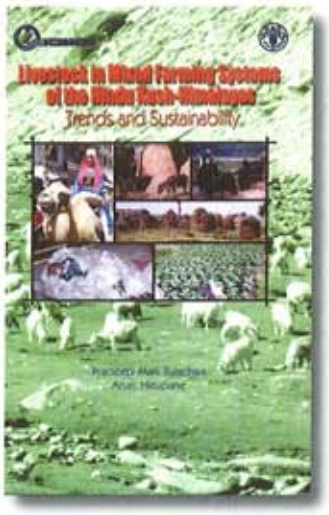
TAAAS & ICIMOD join hands in conducting GIS/RS Training

Livestock in Mixed Farming Systems of the Hindu Kush-Himalayas

Trends and Sustainability

Pradeep Man Tulachan and **Arun Neupane**

Published by ICIMOD, Kathmandu and FAO, Rome. Price: US$ 15.00. 116 pp.



The Hindu Kush-Himalayan (HKH) region, like many other highland and mountain areas, is inhabited predominantly by livestock-dependent communities. Livestock are an integral part of mountain farming systems and play a critical role in sustaining local livelihoods. This, however, has not been sufficiently appreciated as is evident from the scant literature on this vital sector. When the mountains are gradually breaking the barriers of marginality and heading towards occupying a significant global place, the negligence of a sector central to their land-based economies is a matter of great concern. This book under review comes as a soothing breath for all who rightly appreciate the vital role of livestock in sustainable development of the mountains.

Although the book is small, the authors have attempted to squeeze the whole ocean into a jug. In seven chapters, the book covers virtually all aspects about livestock as well as the several crisis it is currently facing in the HKH region. In the Preface, the former Director General of ICIMOD, Egbert Pelinck, underlines the importance of livestock: "*Perhaps the role of livestock is understood best by those who farm the mixed crop-livestock systems in the Himalayas where the land is often steep and fragile. Land-use planners and policy-makers have tended to neglect this important component of the farming system, despite the fact that livestock contributes in many ways to the sustainable livelihood of mountain households.*"

Not only does the book present various facets of the livestock sector but also elaborates on how various changes, transformations, and transitions taking place in mountain ecosystems during recent years are affecting the sustainability of livestock production systems.

Nature-subsidised solar-powered mountain agro-ecosystems are unique examples of mixed crop-livestock farming systems. Livestock are interwoven with mountain farming in such a way that they infuse an ecological integrity into the whole system. The book presents the central theme of livestock's eco-friendliness and the many socioeconomic gains livestock accrues to mountain communities, thus addressing the less addressed issues relating to this sector.

Various facets of the mountain livestock that the book makes inquiries into are: livestock population and composition, smallholder dairy production systems, soil-plant-animal relationships, gender and livestock, livestock sector development experiences, and strategies for sustainable management of livestock. What is noteworthy is that the authors analyse livestock with a holistic point of view, linking them with all components of mountain farming systems and local specificities. The picture of livestock as a unitary whole as depicted by authors is generally missing in most books on the subjects. Sustainability of one component catalyses sustainability processes in the whole system. The authors must be congratulated for their successful efforts in articulating this philosophy in the context of mountains' sustainability.

Inventories are based on general reconnaissance, informal interviews, and group discussions with farmers' groups, animal traders, smallholder dairy farmers, women farmers, milk cooperatives, field-based technicians, and key informants. The authors' own rich experiences of the mountain areas of the HKH region and their interest and commitment to the subject make the whole exercise stimulating and philosophical. Inclusion of boxes, maps, and flow diagrams in the text add to an additional depth. A good selection of color photographs portray diverse situations/ cultural activities revolving round livestock.

The book under review was fortunately released on the occasion of an International Symposium on "Livestock in Mountain/Highland Production Systems: Research and Development Challenges into the Next Millennium" held from 7 to 10 December 1999, in Pokhara, Nepal. It was presented to all the participants from almost all mountain/highland regions of the world. Brought out at the threshold of the third millennium, this book, is an enormous contribution to meeting research and development challenges relating to livestock and mountains in the new millennium.

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Reviewed by:
Dr. Vir Singh
GB Pant University of Agriculture & Technology, Hill Campus Ranichauri - 249 199, Tehri Garhwal, India

Centre News

The First ICIMOD Advance

Under the new leadership of Dr. Gabriel Campbell and Dr. Binayak Bhadra, ICIMOD commenced a series of 'ICIMOD Advances' on 10 May 2000 to chart out a concrete course of action towards building a more effective institution together. About 60 ICIMOD staff gathered in the hills of Godavari - ICIMOD's new training centre. Facilitated by Mr. Ravi Pradhan and Mr. Anil Chitrakar, the group reflected over a three-day period upon many aspects critical for taking ICIMOD forward.

On the third day, the group was joined by all other staff for the final presentation, sharing, and tree plantation. A one-day follow-up programme for those who could not attend the first group 'Advance' and a further one-day programme in Nepali for staff of GS 3 and below was organised on 5 and 6 July respectively. The participants of the one-day programme underwent a more condensed programme and the results of their 'advances' were incorporated into the action plans.

The entire proceedings have been amalgamated into a report and steps have already been initiated for implementation and/or analysis of the suggested action plans.

THE LAUNCH

The main part of the launch was a session dedicated to an appreciative inquiry into personal best or personal achievements. First, the entire group worked in pairs by

meeting and introducing their partners and discovering their personal best and future aspirations. The groups then identified collective patterns regarding the personal best stories.

Second, they met in smaller groups to inquire into the best achievements of ICIMOD, the key turning points, and the factors and practices that helped create these achievements. Each group presented the results of their appreciative inquiry in a 'marketplace' format, where people walked around to learn and engage in a dialogue.

LOOKING FORWARD

Small groups examined ICIMOD from the perspectives of key stakeholder groups such as governments, NGO, donors, mountain people, and partners/researchers. What did these groups value about ICIMOD, and what are they seeking from ICIMOD (as seen through the eyes of the staff)? The results were presented and discussed in the plenary.

The same groups engaged in a process to envision the future for ICIMOD by focusing on the following ideas:

- the kind of institution ICIMOD will have become by 2015;
- the kind of programmes and activities it is doing or will have done; and
- the kind of impact and difference it will have made in the mountain region.

The groups imagined that the BBC was doing a story on a very successful ICIMOD in the year 2015 and wrote/drew/sketched their presentations. These results were also presented in a 'marketplace'. A plenary session was then devoted to a short discussion in which participants tried to identify the critical factors for success in the future in terms of programme management, internal work processes, and organisational culture.

CRITICAL PROGRAMME AND PROCESS AREAS

This part of the Advance was dedicated to discussing and reflecting on the critical programme and process areas for ICIMOD. The exercise assessed current reality, i.e., what is working well and what is not working well, and also what must be addressed in the coming 12 months.

Each group discussed and came up with a set of critical programme and process areas that were seen as critical factors for success. These were categorised and prioritised and put up for display to the whole group.

This was followed by discussion on changes and improvements that were needed in the next 12 months as well as ways to move forward. The degree of consensus was evaluated for each of the seven areas identified: gender, communication/ information, reaching the poor, fund raising and cost recovery, collaborations/ planning/ monitoring, administrative processes, and personnel. There was an overall consensus to move ahead with speed on most of these themes.

In another short exercise where each individual rated the commitment of staff - 38% were perceived to be at the top two levels of "help it happen" and "make it happen", while 27% % were perceived to be in "genuine compliance", 16% in "grudging compliance", 16% in apathy, and 8% in the "secret saboteur" category.

ACTION PLANS/NEXT STEPS

Each functional group identified five things that could be done to improve the quality and effectiveness of their team work as well as inter-departmental cooperation within ICIMOD.

The remainder of the time was dedicated to action planning and determining the next steps by specifying who, what, and by when.

Main Programme and Process Areas that were Discussed

- Communication / Information / Knowledge
- Reaching the Poor
- Gender
- Fund Raising/Cost Recovery
- Collaboration, Planning, and Monitoring
- Administrative Processes/ Streamlining
- Personnel - Benefits, Reward, Salary, and Policies
- 12 Month Action Plans on the Above 7 Topic Areas

FOLLOW UP

Several working committees have been established as a follow up to the action plans that were recommended to look into aspects such as communications/ information/ knowledge; reaching the poor; gender and organisational development; cost recovery, savings, and budgeting including funding from the private sector; planning and programme monitoring; and collaboration and database monitoring. On the administrative side, the directorate has already started to take action on streamlining administrative procedures. Based on the recommendations, revisions have been made in relation to services such as procurement, travel, and financial expenditure. These will be reviewed by the management team and the auditors before circulating them for wider review and implementation. Other procedures and policies are also being reviewed. Administrative improvements, including wider organisational issues, will be an integral part of the organisational change process that will be ongoing as ICIMOD continues to create a more collaborative and effective culture.

New Support to the Centre

Project Name	Project Donor	Project Period	Amount
Rapid Globalisation and Fragile Mountains: Sustainability and Livelihood Security Implications in the Himalayas	MacArthur Foundation	July 2000 to June 2001	US$ 75,000
Participatory Disaster Management Programme in Nepal	Government of Japan through UNDP	July 2000 to June 2003	US$ 360,000

Workshops, Seminars, and Training Programmes

A National **'Hands-on' Training for the Application of GIS and Remote Sensing to Slope Instability Analysis and Hazard Mapping** was held from 19 March to 13 April in Peshawar, NWFP, Pakistan. This was held in collaboration with the University of Peshawar (Dept., of Geology and Dept.. of Geography) and the Pakistan Forest Institute at the latter's GIS Laboratory. There were altogether 21 participants from the two depart-ments of the University of Peshawar, National Centre of Excellence of Geology of Pakistan, Pakistan Forest Institute, Dept., of Geography of the University of Balochistan, Islamabad Model College for Girls, and the Water Resources Research Institute of Islamabad. Mr. Mohammad Jamal Nasir, Mr. Mohammad Asim Yousa-fzai, and Dr. Iftikhar Ahmad Abbasi, from the University of Peshawar, were the key resource persons.

The training focussed on the use of GIS/RS tools for integrating biophysical and socioeconomic information on a spatial basis for slope instability analysis and hazard mapping, planning, and decision-making. The course dealt with the application of RS/GIS for landslide distribution analysis, landslide activity and landslide density analysis, qualitative landslide hazard analysis, bivariate statistical analysis, deterministic landslide analysis, and geomorphological hazard analysis. The course concluded with a case study on 'GIS for landslide hazard mapping in the Muree area, Pakistan'. The training consisted of 20% lectures with visual materials, 60% hands-on-exercises, and about 20% smaller group project work, including field work and hands-on-exercises based on new data collection.

The closing was attended by Dr. J. Gabriel Campbell, DG of ICIMOD, Dr. Zafar Altaf, ICIMOD Board Member of Pakistan, Dr. Qasim Jan, VC of the University of Peshawar, and Dr. Musarat Hussen, VC of the University of Engineering & Technology.
(Contact person: PK Mool
email: mool@icimod.org.np)

The national training course on the **'Application of GIS and Remote Sensing to Assessment, Monitoring and Management of Mountain Natural Resources'** was conducted from 10 April to 5 May at the Natural Resources Training Institute (NRTI), Lobesa, Bhutan. Nine professionals from seven different organisations of Bhutan participated in the training. The field work for the project was carried out in Punakha valley. The GIS unit of Ministry of Agriculture (MoA) provided the necessary maps and digital data. The trainees carried out project work on 'Forest Harvesting Plan', 'Forest Conservation from Settlement Growth Encroachment' and 'Land Cover Change along the Phochu River after the 1994 Flood'. Dr. Moe Myint and Birendra Bajracharya were the resource persons from MENRIS. Mr. D.B. Gurung and Mr. G. P. Sharma from NRTI, and Ms. Deki Wangmo from the GIS unit of MoA assisted during the training. The closing ceremony of the training was chaired by Dr. Gabriel Campbell, DG, ICIMOD, and Dasho Sangay Thinlay, Secretary of MoA, was also present on the occasion.
(Contact person: Basanta Shrestha
email: basanta@icimod.org.np)

Dr. Campbell awarding certificate to trainee on completion of the National Training in GIS and Remote Sensing held in Peshawar.

The second part of the National training course on **'Application of GIS and RS to Planning for Mountain Agriculture and Land Use Management'** was held at TAAAS from 15 - 26 May. This course was the last one of the series under the Dutch-funded project: 'Strengthening GIS capabilities in the HKH region'. The first part of the course had been conducted in June 1999. After that, TAAAS embarked on a case study on GIS application in Duilong Deqing County. The database acquired in the process could be used for some of the practical sessions and the project module.

The participants of the second training carried out the following projects (in groups):

- updating the 1995 land use map with the 1998 satellite image;
- analysis of township-level socio-economic data of Duilong County;
- analysis of land use changes - 1990-1995; and
- agro-ecological zonation.

(Contact person: Peter Bitter
email: peter@icimod.org.np)

The Third Annual Review and Planning Workshop of the **Project on Appropriate Technologies for Soil Conserving Farming Systems** was held from 6-9 June in Chengdu, Sichuan Province, China. The workshop consisted of two parts: in-house meeting from 6 to 7 June and field trip from 8-10 June. The workshop was attended by 19 formal participants and 5 observers; national coordinators (NCI), policy makers, NGO representatives, ADB representative, and ICIMOD staff.

During the workshop, the progress of the Project in each of the five participating countries was reviewed and the problems were discussed and resolved. Each NCI also prepared its annual work plan and finalised it based on comments and suggestions from the participants. During the workshop, it was agreed that the fourth and final workshop will be held in late May 2001 in Kathmandu, Nepal, which will coincide with the International Conference on Sloping Agricultural Land Technology (SALT). The latter will

be attended by all the participating countries, representatives of international agricultural research institutes that have carried out research on soil and water conservation, and representatives of donor agencies. Coverage regarding the Workshop was given in 3 important local newspapers and the local TV. The latest feedback from the Chengdu Institute of Biology indicates that many people are showing interest and willingness to adopt the technologies demonstrated.
(Contact person: Tang Ya, email: tangya@ icimod.org.np)

A two-week long '**Hands-on Participatory Training of Technicians on Construction of Rooftop Water Harvesting Systems**' for drinking water commenced on 7 July in Kavre Palanchok District, Nepal. The training was organised by the Water Harvesting Project of ICIMOD together with the People and Resource Dynamics Project. Close collaboration with the District Development Committee (DDC) of Kavre Palanchok and strong support from the Village Development Committees of Kavre Palanchok and Dolakha districts (Yarsha Watershed) as well as the local beneficiaries were also sought. The HMG/FINNIDA Rural Water Supply and Sanitation Support Programme (RWSSSP) was another important partner which provided trainers for this training. The team leader of RWSSSP, Mr. Kari Lomperi, was one of the key speakers in the Inaugural Session. Dr. Gabriel Campbell gave the Inaugural Address and the DDC Chairman, Mr. Krishna Prashad Sapkota, shared some important observations.

There were altogether 20 trainees among which 2 were from the Public Health Engineering Dept.. Bhutan, 6 from Yarsha Khola watershed, and 12 from different VDCs of Kavre Palanchok district. During the training 13 rooftop water-harvesting systems were built; 10 at the household level, 2 for temples, and 1 for a local high school. Each system included installation of HDPE gutter system and construction of a 2,000 litres capacity ferro-cement jar. Each household participated by providing unskilled labour and some building material. It has been found that collection and storage of rainwater at the household level has been very successful not only in improving the health of the people - particularly children - and reducing the drudgery of women and children, but also in improving the income level of the people by facilitating the cultivation of off-season vegetables, fruits, and also supporting dairy farming.
(Contact person: SR Chalise/S Sial email: mnr@ icimod. org.np)

Summer Schools in Tibet

The following two summer schools were organised in Tibet under the Dutch - funded project on Institutional Capacity Building for Sustainable Highland Agriculture in the Tibetan Autonomous Region of P. R. China.

- Summer school-cum-training programme in the Tibet School of Agricultural Technology Extension, Lhasa, 24 -28 April 2000 (26 participants).
- Summer school on sustainable highland agriculture perspectives and experiences for agricultural researchers and college teachers in the Tibet Agricultural and Animal Husbandry College. Nyingchi, Tibet, 1-15 May (26 participants).

A national-level training on **Participatory Action Research in Rangeland Development and Conservation** was conducted in the pastoral region of Hongyuan County, Aba Prefecture, Sichuan Province, China, from July 4-17, 2000. Thirty participants attended the training, ranging from Provincial government to local township extension staff. The training gave participants the opportunity to learn about the interdisciplinary nature of rangelands and the people dependent on these resources, within an agro-ecosystem framework. This was achieved through participatory exercises on: rangeland ecology; resource tenure; stakeholder identification and gender analysis; participatory planning tools; designing rangeland and livestock monitoring systems based on indigenous know-edge; and evaluating organisational "readiness" to deliver socially-equitable rangeland development packages. The training culminated in an action plan for each trainee to apply in his or her own projects and programmes.
(Contact person: Camille Richard email: camille@ icimod. org.np)

Under the Pan Tibet Project, ICIMOD was commissioned by TAAAS to provide Internet capacity building inputs in the form of a training workshop and support for internship at ICIMOD. The **Internet workshop** took place from May 22nd - June 2nd, 2000, at TAAAS headquarters in Lhasa. There were altogether 16 official participants and 4 guests from various organisations; the Tibet University, TAAAS, Tibet Agriculture and Animal Husbandry College, Tibet Academy of Social Science, Tibet Traditional Medicine College, Tibet Science & Technology Commission, and the Government of Lhasa City.

The principal objective of the two-week workshop was to build capacities

of institutions in the Tibet Autonomous Region in information and communication technologies, enabling them to share information through the medium of Internet based Web Sites, which they started to design and develop during the workshop. The feedback was all very positive, and indicated a high level of satisfaction with the workshop and a commitment to use the skills gained.

(Contact person: Shahid Akhtar, email: shahid@ icimod.org.np)

The Electronic Networking Project (ENP) for Sustainable Development in the Hindu Kush-Himalayas (1st April 1997 to 30th June 2000)

The objective of the ENP project, supported by the International Development and Research Centre (IDRC), was to build capacities and develop a network of "like-minded" researchers, development administrators, practitioners, planners, and policy-makers from government agencies, university departments, research institutions, and NGOs. The network shared human, technical, and information resources, focussing on socioeconomic, agricultural, environmental, and sustainable development sectors. The Internet was the principal medium. The project's pilot phase was implemented in Nepal and capacities in using Internet-based technologies were successfully built in several countries of the region. Brief descriptions of these activities are given below.

NEPAL

NepalNet: In the first two-year phase, a network of 34 organisations was formed, which collectively established the NepalNet web-site <http://www.panasia.org.sg/nepalnet>. This site has become a well-known portal for information on sustainable development in Nepal, generating more than 100,000 hits each month. NepalNet was subsequently handed over to the Nepal Internet Users Group (NIUG), which worked closely with ENP to institutionalise NepalNet within NIUG. The NIUG now seeks to involve INGOs in the network.. NepalNet has been made available within Nepal on NIUG's free access Intranet service - Indreni.

Gender Networking in Nepal: A small grant was allocated, on 30 June 2000, to the Women's Rights Advocacy Programme (WRAP) to begin testing an Internet-based information service and network in Nepal, specifically on gender issues. The pilot exercise will involve an experiment to create an Internet-based network and building capacities for gender networking in Nepal and a feasibility study for the long-term sustainability and development of the pilot network and website.

Information and Communication Technology Policy: The National Planning Commission of Nepal received funding from Pan Asia R & D Grants programme to develop a national Information and Communication Technology Policy (ICT) Policy and Strategy. The ENP Team assisted in the overall planning. An agreement was reached between ICIMOD and NPC for ICIMOD to assist in managing and administering the policy formulation exercise. Six background research papers were commissioned to local researchers/institutions. The draft policy-cum-strategy was presented at a National Stakeholders Workshop in July 2000.

BANGLADESH - A Regional Workshop was held in April 1999 on 'Internet: South Asia Realities and Opportunities'. Participants were from Bangladesh, Nepal, Pakistan, and India - influential figures from Government Offices, Internet Service Providers (ISPs), Regulatory Bodies, Industry and the Private Sector. The outcome should contribute to policy and strategy formulation in the region.

INDIA - Two regional training workshops were organised in North India on 'Internet Technologies and Web Publishing'. The first was held in Palampur, Himachal Pradesh, from January 16th - 23rd 2000, the second in Shillong from March 26th - April 2nd, 2000. The workshops were attended by participants from NGOs, research institutions and GOs working in the mountain areas. The longer-term objective was to promote fora for on-line sharing of information in remote parts of India.

BHUTAN - An ICT capacity-building training was carried out by ICIMOD in collaboration with the Royal Institute of Management (RIM), Thimphu. Three courses and 3 awareness-raising workshops were held in September - November 1999, and a final assessment mission and '2-day refresher course' in April 2000. RIM now has an Internet Resource Centre, and is incorporating ICT topics in its diploma and short-term courses. RIM, with 300 students and as the major institution providing training in information science to Government Departments, has emerged as the leading organisation providing ICT-related training.

PAKISTAN - The ENP team was involved in the planning and backstopping (coordination and consultancy support) for a project to provide Internet service in the Northern Areas of Pakistan, through the establishment of a POP in Gilgit. The number of subscribers has reached 118. Further activities include training in web design for NGOs, INGOs and GOs working in the Northern Areas.

CHINA - The project "Building Capacity in Tibet Autonomous Region, China" was launched at the beginning of 2000. Materials, including a Chinese language CD-ROM, were prepared for a workshop in Lhasa. Judging the response, the workshop was successful and provided a base from which several partner organisations of IDRC's Pan-Tibet project could go on to develop websites, share development information, and communicate on-line.

CENTRAL ASIA - The ENP team also conceived and submitted a proposal to the Swiss Development Corporation to help build individual and institutional capacities in Internet technologies in the five Central Asian Republics - Kazakhstan, Kyrghyzstan, Tadjkistan, Turkmenistan and Uzbekistan. The workshop will be offered at the International University of Kyrghyzstan from 18 to 29 September 2000.

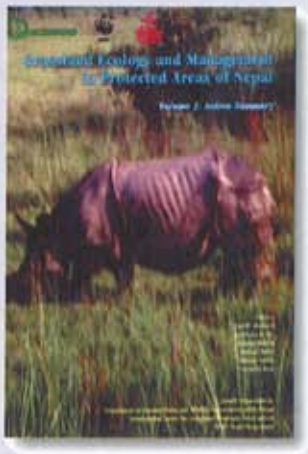
"This is the second largest development, after the Karakorum Highway in Northern Pakistan. Your bold step of extending Internet services to the northern areas will be recognised by all nations. It is true that this facility will help improve education, health, and economy." Mr. Khalid Nadeem, Aga Khan Cultural Service

"There is no doubt that the Internet facility has made a tremendous difference in my life in Gilgit. I am very thankful to ICIMOD, IDRC, and of course Comsats for taking such a bold initiative." Mr. Mujeeb Ur Rehman

"I am in-charge of the Gilgit Eye Hospital, and the introduction of Internet has definitely brought some significant positive changes for us." Mr. James Ryan

Recent ICIMOD Publications

Documents that were published from April to July are given below with abstracts. The three prices quoted for each publication are applicable to Developed Countries, Developing Countries, and ICIMOD's Regional Member Countries respectively. For institutions actively involved in sustainable development of the Hindu Kush-Himalayas, relevant publications can be provided free of charge.



Richard, C.; Sah, J. P.; & Basnet, K. (eds). 2000. **Grassland Ecology and Management in Protected Areas of Nepal**, Volume 1: Action Summary. 102p. ISBN 92-9115-166-1/92-9115-135-1, Price: US$ 20.00, 15.00, & 10.00

A workshop on Grassland Ecology and Management in Protected Areas of Nepal was organized jointly by HMG/N's Department of National Parks and Wildlife Conservation (DNPWC), ICIMOD, and the WWF Nepal Programme, from March 15-19, 1999, at Royal Bardia National Park, Nepal. The goal of the workshop was to summarise the major grassland ecological research work conducted to date and devise effective research and management strategies for grasslands in PAs in the mountain and *Terai* areas of Nepal.

This report presents the proceedings of the workshop in three volumes. Volume I is the Workshop Action Summary and contains a brief summary of the papers presented in Volumes II and III, as well as a summary and synthesis of the workshop findings and recommendations.

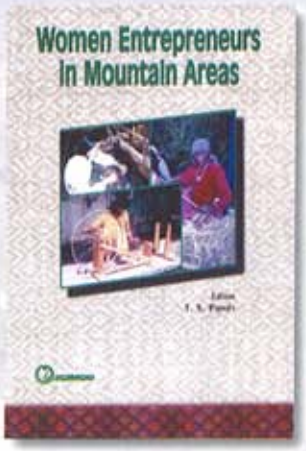
Shrestha, B., & Pradhan, S., 2000. **Kathmandu Valley GIS Database: Bridging the Data Gap: An Interactive CD-ROM**, Price: US $ 75.00 (HKH Region), 150.00 (Outside the HKH)

This study attempts to build a comprehensive GIS Database of the Kathmandu Valley with an aim to bridge the important data gaps. The study employs a fresh approach in constructing a GIS database with available maps and integrates many different kinds of satellite imageries. The maps visualise the different scenarios and raise awareness of existing digital database. The application presented increases awareness about the usefulness of digital database and demonstrates what can be achieved with GIS and related technologies. The database thus developed adds to the information availability of the Kathmandu Valley and will hopefully assist different stakeholders engaged in planning and management of the Valley.

Furthermore, the study advocates a building block approach to development, management, and revision of database in a complementary way and it hopes to avoid duplication of efforts in costly production of digital data. The study aims to sensitise senior executives and decision-makers about the need for a sound policy on database sharing, development, and standards. Such a policy, at the national level known as National Spatial Database Infrastructure (NSDI), should evolve in order to benefit from the prevailing GIS technology. In using GIS and related technologies, the study facilitated the establishment of a concrete Spatial Data Infrastructure of the Kathmandu Valley.

Bhatia, A. (ed.) 2000. **Participatory Forest Management: Implications for Policy and Human Resources' Development in the Hindu-Kush Himalayas**, Vol. VI Pakistan. 79p. ISBN 92-9115-970-0/92-9115-054-1, Price: 20.00, 15.00, & 10.00

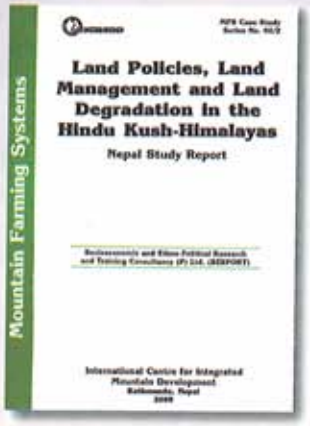
The Workshop on Participatory Forest Management: Implications for Policy and Human Resources' Development in the Hindu-Kush Himalayas brought together forest management personnel from various parts of the HKH. The basis of their discussions was the people-centred forest policies that have emerged in many countries of the region and their objectives of supporting and strengthening participatory forest management to ensure that the needs of mountain people receive the priority they deserve. The policies along with their constraints and opportunities were discussed in depth, guided by papers provided by the participants themselves. Volume 1 is the Workshop Document, Volume 2 deals with China, Volume 3 - Eastern Himalayas, Volume 4 - India, Volume 5 - Nepal, and Volume 6 - Pakistan.



Papola, T. S. ed. 2000. **Women Entrepreneurs in Mountain Areas: Pproceedings of a Regional Workshop**, 21-23 Dec 1999, Kathmandu, Nepal. 56p. ISBN 92-9115-183-1, Price: US$ 15.00, 10.00, 7.50

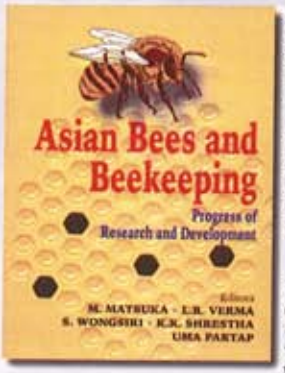
This report summarises the proceedings of above titled Workshop held from 21-23 December 1998 at ICIMOD. A number of recommendations were made on strategies, policies, and programmes for the promotion of women's entrepreneurship in mountain areas based on the background presentations on trends and issues from the studies conducted by ICIMOD, statements by participants on their experiences as entrepreneurs and representatives of women entrepreneurs' organisations and promotional institutions, and discussions in the plenary sessions and working groups.

Specifically, the report highlights the suggestions made about the selection and diversification of products, marketing, and the policy environment needed to improve the access of women entrepreneurs to the assets and resources necessary to start and run productive enterprises. It also records the roles of different stakeholders and ICIMOD, as suggested by the workshop participants.



Socioeconomic and Ethno-Political Research and Training Consultancy (P) Ltd. 2000. **Land Policies, Land Management and Land Degradation in the Hindu Kush-Himalayas.** Nepal study report (MFS case study series, 00/2). ICIMOD. 98p. ISSN 1561-8676, Price: US$ 15.00, 10.00, 7.50

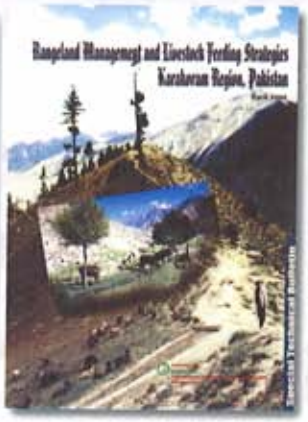
This study is about government land policies and their impact on land use, management, and land degradation. Land policies in Nepal were, in general, found to have a negative impact on the majority of the population and cause land degradation. A review is first made of the overall national framework for guiding development efforts with due regard given to sustainability and maintenance of the environment. The various perspectives on land degradation are discussed and five key areas of concern selected for this study (agriculture, property and entitlement, forestry, national parks and wildlife, and decentralization are analysed). Performance in the country's leading economic sector, agriculture, is found to be unsatisfactory, while achievements in forestry and protected area management are mixed. Land ownership and tenure entitlements are unfavourable from both equity and efficiency perspectives. Finally, while there has been considerable rhetoric regarding participatory and bottom-up processes of resource management and decision-making, empowerment of local bodies through decentralization remains inadequate.



Matsuka M., Verma L.R., S., Shrestha K. K., Partap U. 2000 ICIMOD, AAA, & Oxford & IBH Publishing Co. New Delhi. **Asian Bees and Beekeeping; Progress of Research and Development**. ISBN 81-204-1385-7

AAA and ICIMOD organised the Fourth AAA International Conference in Kathmandu during March 23-28, 1998. Two workshops - one on Bee Diseases and Pests and another on Beekeeping Extension in Remote Mountain Areas - were also organised before the conference. This publication is an outcome of the knowledge and information shared during this conference and the workshops. The book presents an overview of bees and beekeeping R&D in Asia and highlights the issues related to conservation and management of the Asian hive bees, *Apis cerana*. Recent findings in bee diseases and pest control and innovations in apiary management are explained. A section on production, processing, properties, and marketing of different bee products - honey, beeswax, royal jelly, and propolis - has been provided. In addition, detailed information is provided on on new advances in crop pollination research through beekeeping and experiences in extension covering topics ranging from beekeeping needs and extension methodology in hills and mountain areas to the role of various research and development institutions in promoting sustainable beekeeping.

Mountain Voices (2000/1): Road to be or not to be in Mustang? (Also in the Nepalese language - *Himalko Awaaj*), MF, ICOD
Mountain Forum/APMN Bulletin, No. 1, Vol-5,



Shukla, A. N. 2000. **Beekeeping Trainers' Resource Book**. 162p. ISBN 92-9115-197-1 Lang: Nepali, Price: US$ 20.00, 15.00, 10.00

Rangeland Management and Livestock Feeding Strategies Karakoram Region, Pakistan, Special Technical Bulletin

MANUALS published by the Electronic Networking Project

The ITrain Collective: Web Site Creation Training Course (Instructor's Manual)
The ITrain Collective: Web Site Creation Training Course (Students' Manual)
The ITrain Collective: Effective Internet Searching (Instructor's Manual)
The ITrain Collective: Effective Internet Searching (Students' Manual)
The ITrain Collective: Mailing List Facilitation (Instructors's Manual)
The ITrain Collective: Mailing List Facilitation (Students' Manual)

Issues in Mountain Development

1996 to 1999 - Collected Abstracts
IMD 2000/1 Sadeque Syed Z. **Poverty and Social Exclusion in the South Asian Highlands**
IMD 2000/2 Bajracharya B. **Development of Geo-Information Infrastructure: Issues in the Hindu Kush-Himalayas**

Staff on the Move

BHUTAN	
M Myint & B Bajracharya/Apr	To conduct national-level training course on RS/GIS Application to resource mgmnt. LOBEYSA, THIMPHU, HAA VALLEY
P Pradhan/Apr.	To organise concluding of National Level GIS/RS Training. LOBESA, THIMPHU, HAA VALLEY
J G Campbell & P Tshering/April	To attend the closing ceremony of the GIS/RS training and to meet the Chairpersons of the ICIMOD Board & Support Group and officials of other partner institutions. THIMPHU
S R Chalise & S Sial /May	In relation to programme development related to water harvesting. THIMPHU
T S Papola & P Tshering/June	To have discussions with partner institution on the 'Women Entrepreneurship' project. THIMPHU
Li Tianchi/June	To organise and conduct Geo-Technical Training for irrigation engineers, KHANGMA, TRASHIGANG, & THIMPHU
P Tulachan & P Tshering/July	To provide technical backstopping of two field studies - Small holder dairy farming and marginal farms. THIMPHU
CHINA	
P Tulachan & A Neupane/ Apr	To conduct 'Mountain Agricultural Systems & Societies Information File' (MASSIF) training (ISNAR Project) and discuss livestock research project with TAAAS
J Merz/Apr	To follow up on the HYMOS and Hydrological Data Analysis Training and to review the progress made in water and erosion studies, KUNMING, BAOSHAN
C Guangwei/Apr	To assist in the training of sustainable mountain agriculture in TAAAS, LHASA
T Partap/May	In relation to the mountain agriculture training programme.
P Pradhan & P Bitter/Apr	To attend the concluding ceremony of the GIS/RS national training course and to attend a meeting at the QNP, LHASA
C Richard/Apr	To attend a planning meeting for the QNP Project (TMI), a meeting with TAAAS/IYIC - Yak Congress, and to check training (RRP) venue in Nagchu prefecture
J Gregson & D Tandukar/May	To organise workshop on Internet Technologies, LHASA
T Partap, B Bhadra, & SB Thapa/May	To participate in the Annual Review and Planning Meeting of ATSCF Project, CHENGDU, NINGNAN, & MAOXIAN
Rotmans Arjen/July	In relation to ISNAR project work and to meet technical staff at the Focal Point Institution - TAAAS. LHASA
Tang Ya/July	In relation to programme development and to the study possibility of introducing Andean crops in Tibet. LHASA
A. Bhatia/July	In relation to programme development and to attend the 'Culture and Biodiversity Congress'. KUNMING
J G Campbell/July	To meet Board Members, consult with partner institutions, and attend the Culture and Biodiversity Congress. KUNMING & BEIJING
INDIA	
U Partap/Apr	To attend the launching of beekeeping programme and oversee shooting of film on pollination. KULLU & SHIMLA
T S Papola/Apr	To attend workshop on the 'Role of science and technology for integrated development of the Himalayas' and hold meetings for programme development. DELHI, ALMORA, KANDA, & NAINITAL
K Rijal & P. Tulachan/June	To provide inputs to field studies on marginal farm/farmers and to attend and present a paper in a seminar on 'New options of hill agriculture.' NEW DELHI, SHIMLA, KULLU
N S Jodha/June	To participate in an International Conference on joint forest management. NEW DELHI & RAJASTHAN
J G Campbell/July	To meet Board Member, collaborating institutions, and donors and to attend the regional IUCN meeting. NEW DELHI
MYANMAR	
A Bhatia/July	Programme development and attend cultural and Biodiversity congress in Kunming. YANGON.
NEPAL	Many staff travelled to various parts of Nepal to attend workshops/ meetings, to organise/implement training programmes, supervise research work, to carry out studies, and in relation to field activities.
PAKISTAN	
P Pradhan & P Mool/Mar-Apr	To conduct national-level GIS/RS Training at the Pakistan Forest Institute. PESHAWAR
F Ahmad & U Partap/Apr	To attend beekeeping training programme on *Apis Cerena* management and pollination & to supervise video filming on apple pollination. ISLAMABAD, PESHAWAR, QUETTA & ZIARAT
J Gregson/Apr.	To carry out assessment of the Pakistan Internet Project. ISLAMABAD & GILGIT
K Rijal/May	To develop energy programme for Hilkot Watershed (PARDYP Project Site), PESHAWAR & ISLAMABAD
J Merz/June-July	To follow up on the Water and Erosion Analysis Training and review activities in the field. PESHAWAR & HILKOT
GLOBAL LINKAGES	
S Akhtar/Apr	On a Project Preparatory/ Planning Mission to KYRGYZSTAN, KAZAKHSTAN & TADJIKISTAN
CP Jayalakshmi/May	To attend the Mountain Forum (MF) Board Meeting & meet the officials of the European MF/IUCN. SWITZERLAND
J Gurung/May	To attend the Gender Mainstreaming Workshop for IFAD Country Portfolio Managers. BANGKOK, THAILAND
J G Campbell/May	To attend the MF Board Meeting and meet European partners. SWITZERLAND, NORWAY, FINLAND, & AUSTRIA
G Joshi/April	To participate in the Watershed Management Training Programme. BANGKOK, THAILAND
P Sharma/May	To attend a workshop on Interdisciplinary Research on Environment and Development. OSLO & BERGEN, NORWAY
J G Campbell/June	To participate in the World Mountain Forum Meeting and to meet donors and partners. FRANCE, GERMANY, NETHERLANDS
M Banskota/June	To attend the International Mountain Research Workshop and World Mountain Forum, GRENOBLE & CHAMBERY, FRANCE
G Rana/June	To participate in 'Women 2000: Gender Equality, Development and Peace for the Twenty-first Century, NEW YORK, USA.
A Bhatia/July	To participate in the Havard programme and programme development. BOSTON
S Pradhan, B. Shrestha/June	To attend Japan Space Fourm, NASDA Meeting, ESRI International Conference, & USGS Meeting, TOKYO, USA, THAILAND
J Denholm/July	To attend a symposium and 'Montane Mainland Southeast Asian Governance'. CHIANG MAI
U Partap/July	To attend the '8th International Symposium on Pollination' and to visit the Austroprojekt and Lunz Beekeeping Institute. HUNGARY & AUSTRIA
S R Chalise/July	To participate in the International Conference on Extreme of the Extremes as keynote speaker. REYKJAVIK, ICELAND. He also visited the Danish Hydrological Institute, COPENHAGEN, DENMARK
B Bhadra/July	To attend the 'South Asia Regional Workshop on Sustainable Management of River Basins'. COLOMBO, SRI LANKA

ICIMOD Staff Members

Directorate

Dr. Gabriel Campbell, Director General
Dr. Binayak P. Bhadra, Director of Programmes
Mr. Milan Raj Tuladhar, Head, Administration & Finance
Support Staff: Ms. Tika Laxmi Gurung, Ms. Anjali Shrestha, Ms. Prerna Thapa, Mr. Man Bahadur Katwal

Institutional Strengthening Unit

Mr. Prem Krishna Manandhar, Programme Officer

Mountain Farming Systems Division (MFS)

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Dr. Pradeep Man Tulachan, Farm Economist
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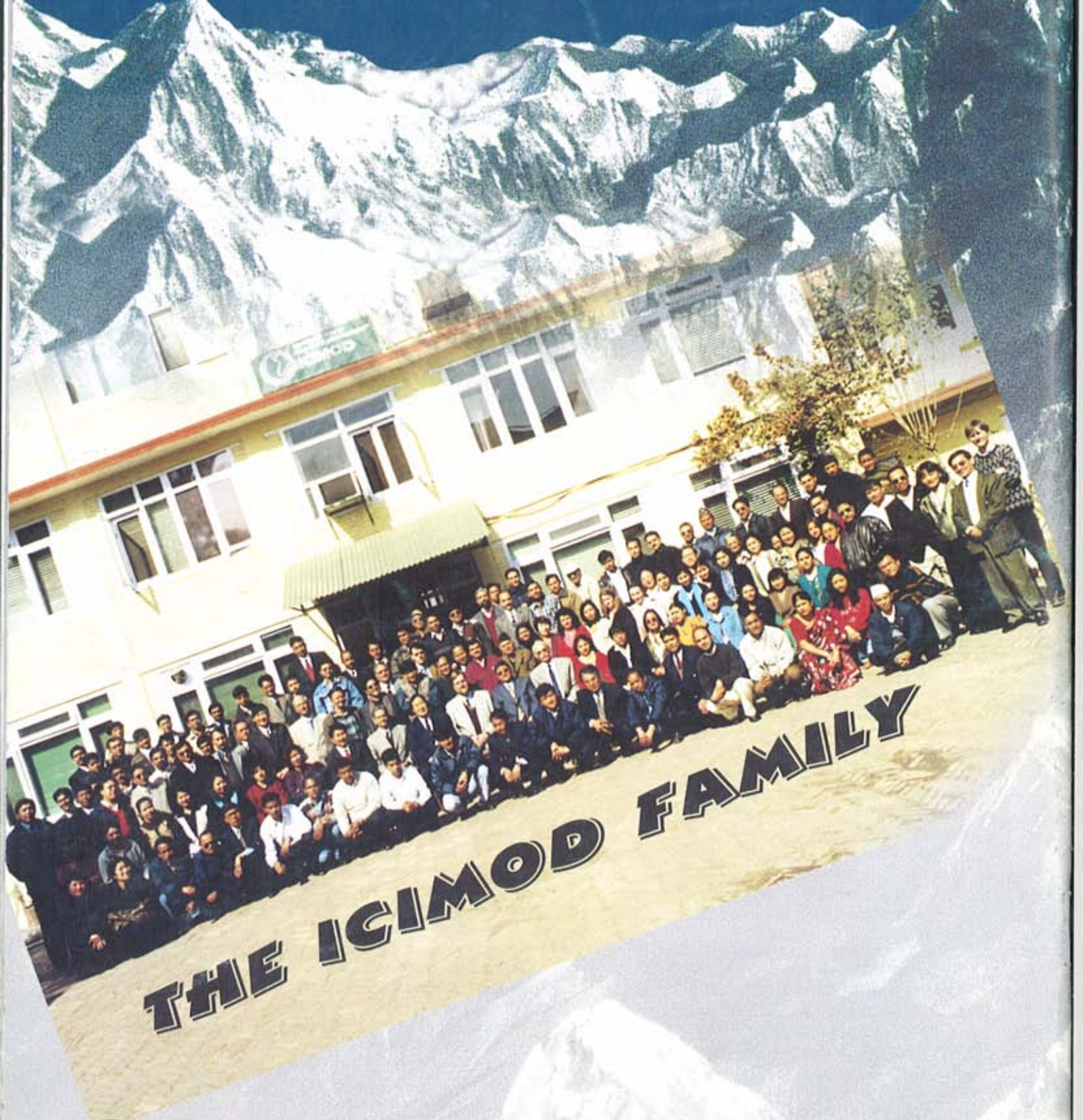

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