

DIFFERENT ASPECTS OF INTEGRATED MOUNTAIN DEVELOPMENT AND THE NEED TO INTEGRATE RANGELAND SYSTEM STUDIES IN CONTEXT OF TOTAL PRODUCTION SYSTEMS IN NEPAL

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1. INTRODUCTION

The mountain region lies in the North of Nepal and is characterized by a diverse climate topography, vegetation, ecology and land use pattern. These areas are not easily accessible by road communication and other modern facilities. The dwellers of the mountain regions of Nepal are the poorest, illiterate, most malnourished people and with the highest infant mortality rate compared to people from other areas of Nepal.

The climate play a very important role in crop production, livestock raising, harvesting medicinal herbs and day to day life of the people in the mountainous environment where sub tropical type of climate prevails in the river basin of lower mountain, temperate in the lap of lower mountain and in the river basin of higher and alpine type in the upper reaches of mountain ranges particularly in the summer months. Most of the high land and mountain tops are covered with snow and occasionally in river basin in the winter season.

Most (26.08%) of the land of mountain region is covered by rock and snow (Table 1) and is the attracting natural scene for the tourism industry of Nepal. The forest and rangeland cover most of the land of mountainous region with 45.25% of the mountain region compared to 2.23% land under cultivation (LRMP 1986).

Table 1. Land Distribution in the Mountain Region (percent area)

Rock and snow	26.08
Cultivated land	2.23
Grazing rangeland	21.08
Not reclaimable	-
Forest	17.24
Waste land (redeemable)	7.22
Road and residential	0.04
Water resources	1.93

2. The issues and problems

The issues and problems faced by the mountainous people for integrated mountain development are as follows:

2.1 Social Issues

- Food deficit areas
- Ownership and user group of grazing land are different
- People are poor, illiterate with high infant death rate
- Limited option for livelihood
- Poor capabilities of local communities to undertake development work
- Migration to urban areas
- Poor risk bearing capacity of the people

2.2 Infrastructural issues

- Inaccessible area by road, communication and other modern facilities
- Poor infrastructure to carry out integrated development work
- Inadequate input availability
- Poor market access
- Poor infrastructure for developing tourism industry
- Poor infrastructure to process the medicinal plants obtained from forest

2.3 Natural Resources issues

- Soil erosion and fertility decline often shallow, acidic in nature
- Degradation of rangeland productivity
- Erosion of pasture and forage genetic resources of alpine region
- Inadequate use of water resources for power and irrigation
- Poor diversified use of forest product medicinal herbs, Yarcha Gumbha, Morchella fungus etc
- National and district boundary issues for grazing land management
- Fragile ecosystem.

2.4 Biological issues

- Short growing season with slow plant growth rate
- Need of diverse cropping system to suit diverse ecosystem determined by sloppiness, topography, altitude, wind and climate
- Disturbance in the migrating system of animal husbandry practices to use the water and forage resources at different elevation during winter and summer months
- Inadequate effort to utilize the indigenous knowledge to utilize the available knowledge regarding forest product, animal and crop agricultural diversity
- Competition on grassland by wild and domestic animal
- Inadequate effort to produce off seasonal market led vegetable and other agricultural product
- Inadequate effort to explore the biological efficiencies in the mountain region

2.5 Policy issues Yonzon (1998)

- His Majesty's Government of Nepal has not given thrust on rangeland improvement issues particularly of high mountain region
- Lack of appropriate policies for sustainable rangeland development

- Agricultural and forestry policies have neglected the role of rangeland biodiversity in the development and their potential contribution for integrated mountain development
- Lack of integration of Ministry of Agriculture, Ministry of forestry and soil conservation and Ministry of local development to develop appropriate strategies and policies for rangeland development as the ownership lies with MFSC and users are the MOA and local bodes
- Lack of policy to explore and support the economically advantageous option of integrated mountain development e.g. tourism, herbal plant processing, saffron production, Morchella fungus production, Yarchaguba production etc

2.6 Constraints related to fodder and pasture production in the alpine region

- Establishment of sown pasture in alpine is difficult task
- Limited proven technologies for high hill environment
- Limited resources are available to furrowers
- Rockiness, stoniness and steepness of the pasture land
- Shallow depth of soil with acidic nature
- Severe winter cold with poor fodder supply
- Uncontrolled grazing system which support the spread of unwanted species
- Poor rate of decomposition of organic matter
- It is almost difficult to cultivate alpine pasture

3. THE CROP LIVESTOCK MIXED FARMING SYSTEM IN MOUNTAIN REGION OF NEPAL

The People in the high mountainous region derive their livelihood from crop production, animal husbandry' and sale of herbal medicine from forest. Majority of the mountain people derive their livelihood from agriculture.

Table 2. Contribution of livestock to total Agricultural income of farm household (NRs.)

Ecological Region	Crop.(%)	Livestock (%)	Agriculture (%)
Mountain	3549(52.7)	3190(47.3)	6739(100)
Hill	4495(64.3)	2495(35.7)	6990(100)
Tarai	8224(80)	2057(20)	10,281(100)
Nepal	6007(71.7)	237(28.3)	8378(100)

The Agriculture has been playing major role, in the farm economy of the Nepalese household (Table 2). The share of livestock to mountain farming families (Tulachan and Neupane 1999) was 47.3% compared to crop (52.7%).

A case study of Guthichaur village situated at 9500 ft. showed that the livestock contribution were 45.95% compared with 45.95% from crops. The farm household earns 13.3% of their income from herbal medicine and other sources.

There is an increasing trend of livestock contribution as we move from Terai to high mountain region (Table 3).

Table 3. The different sources of farm family income at Guthichaur village.

Sectors	Share (Rs.)	% share
Crop	2987.62	40.74
Livestock	3369.94	45.95
Other	976.67	13.31
Total	7334.23	100

4. ANIMAL RAISING SYSTEM IN THE MOUNTAIN REGION

The farming communities adopt mixed crop-livestock- Agro-forestry type of system in the mountain region. The animal raising system is based on agro pastoral system in high altitude areas. Migratory and semi stationary type of animal raising system is common in the high mountain region of Nepal.

Migratory Animal raising system: The herder or shepherd move with livestock in search of feed and water all the year round. The shepherd along with sheep and goat make a bigger circuit with winter pasture in lower basin of rice belt areas of lower hill region to alpine pasture in the summer month. The shepherd had forced to stop to take to lower hills for grazing due to high charges and obstacle made by the local bodies to protect their forest.

Short circuit migration: Generally the sheep or cattle are inside the house or at basement of the house during winter and are taken out for grazing in a clear day. They are fed with hay during severe winter with snow.

The Yak and Nak also follow the short circuit system of migration but are kept at higher alpine and at higher elevated areas.

5. NEED TO INTEGRATE RANGE LAND PRODUCTION SYSTEM

- Most of the rivers of Nepal are originated from rangeland. The bigger hydroelectric power plant has been based on water sources coming from the rangeland. Proper management of grazing land for sustaining the water resources will be an approach to integrate with the hydroelectric power generating system of the country.
- The construction of mini micro hydro plant for power supply and cooking will help to improve the livelihood of the high land dwellers to utilizes the rangeland.
- Growing pasture and forage species in the apple orchard: The forage legumes will help to enrich the soil of the orchard and is useful practices for making hay for winter feeding practices.
- Growing high values cash crop like saffron to promote the livelihood of the poor people of the region.
- Helping to make cheese production with forage based high yielding animal particularly Chauries (the crossbred of Yak and Cattle).
- Investigating the domestication of Yarcha Gumba and Morchella (Guchhechua) production for improving the economics of the poor farmers. The processing herbal plants will be another areas for providing jobs and improving the livelihood of the mountain people.
- Leasing the rangeland to the user group for improving the rangeland productivity
- Generation of technology to suit the high hill environment mixed crop-livestock- forestry rangeland production system.
- Improving the forage conservation technology for winter feeding system.
- Improving the storage and marketing facilities for livestock product
- Helping to improve in-situ-genetic improvement programme for crop, livestock, horticultural, crop, vegetables and pasture species

- Generation of technologies to improve steepy and marginal land for forage production
- Improvement on grazing management system in the alpine pasturcland

6. REFERENCES

LRMP 1986. Agriculture and Forestry Report.Kathmandu. Kenting Earth Sviences, Lanada and Department of Topography, HMG/Ncpal.

Shrestha N.P. and Sherchand L. (1988) Role of livestock in Ncpalesc Farming System paper presented at the 6^h World conference of Animal Production, Helsinki, Finland, Organized by the World Association for Animal Production, Nepal Agricultural Research Council, Kathmandu, Nepal.

Tulachan P.M. and Neupane A. (1999). Livestock in Mixed Farming Systems of the Hindu Kush-Himalayas Tnvends and sustainability. Food and Agricultural Organization of the United Nations and International Centre for Integrated Mopuntain Development, Kathmandu, Nepal.

Yonzon P. (1998). Biodiversity Conservation of Range land. Proceedings of the Third Meeting of Temperate Asia Pasture and Fodder Network (TAPAFON).