

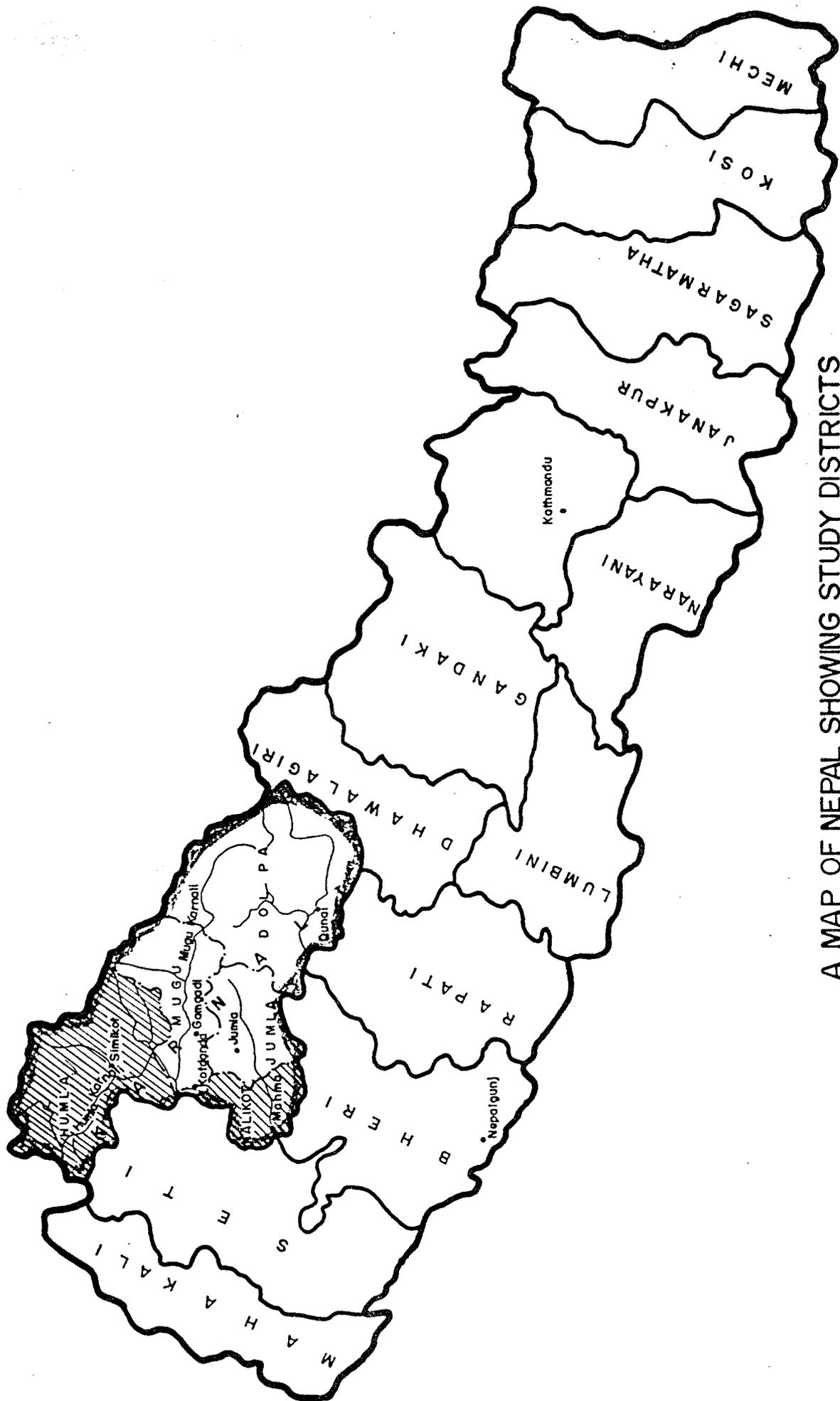
**A Natural Resource Management
Study Report**

**PART II
Learning from the People of Humla and Kalikot
Districts**

**Submitted to:
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A MAP OF NEPAL SHOWING STUDY DISTRICTS

LIST OF NEPALI NAMES

Bari/Pakho	Dry land and rain-fed terraces, lands other than wet lands that for various reasons can't be flooded for rice cultivation.
Ghar bari	Lands surrounding houses or located near to village settlements (Home stead lands).
Hal-	Traditional land measurement unit based on area which a pair of bullock can plough in a day (10 hours). 1.5 hal land is approximately 1 ropani.
Khet	Wetland where water can remain on the surface or the upper soil layer, making the land suitable for rice cultivation
Kundilla katne	A type of slash and burn agriculture which is usually practised in steep slope land. This practice is also called <i>Khoria</i> in some places.
Mana, pathi and muri	Local unit for measuring cereals and liquid that can't be counted. 8 manas make a standard pathi and 20 pathis make a muri. However, mana used in Karnali zone is exactly half of a normal or standard mana as used in other places of Nepal. Therefore, 4 standard manas make already 1 pathi in Karnali zone. This makes Karnali muri exactly half of the standard muri. Conversion of mana to kilo and pathi to quintal is confusing because mana, pathi and muri measure volume and not the mass.
Manapathi	A traditional social arrangement, involving payment for a service (such as protecting a patch of forest) in the form of grain collected from client households.
Mukhiya	A local authority responsible for collecting land taxes from the people living in the respective village.
Noralo	A local person hired (selected or elected) by the local community to control free grazing in the village khet or bari. The community provide manapathi for the service of Noralo.
Ropani	Unit for measuring land in mountains and hills. 20 ropanis make a hectare.

ABBREVIATIONS

ACAP	Annapurna Conservation Area Programme
ASC	Agricultural Services Centre
BYVY	Build Your Village Yourself Programme
CBO	Community Based Organisation
CDO	Chief District Officer/District Administration Office
CDP	Community Development Programme
CFDP	Community Forestry Development Programme
CFTP	Community Forestry Training Project
CO	Community Organisation
CSD	Centre for Self help and Development
CWSS	Community Water Supply System
DADO	District Agriculture Development Office
DDC	District Development Committee
DEO	District Education Office
DFAMS	Department of Food , Agriculture and Marketing Services
DFO	District Forest Office
DIO	District Irrigation Office
DLSO	District Livestock Services Office
DPM	District Programme Manager
DWSO	Drinking Water Supply Office
GO	Government Organisation
Ha	Hectare
HCDA	Humla Conservation and Development Association
HMG/N	His Majesty's Government/Nepal
ICIMOD	International Centre for Integrated Mountain Development
INGO	International Non Governmental Organisation
KLDP	Karnali Local Development Programme
KTM	Kathmandu
KTS	Karnali Technical School
LA	Line Agency
LDO	Local Development Officer
LRMP	Land Resources Mapping Project
LSDO	Livestock Services Development Office
MHDP	Mechi Hill Development Programme
MLD	Ministry of Local Development
MOA	Ministry of Agriculture
NARC	Nepal Agriculture Research Council
NCAR	Nepalese Centre for Applied Research
NFE	Non Formal Education
NGO	Non Governmental Organisation
NPG	Nepalganj
NRM	Natural Resource Management
NTFP	Non Timber Forest Product
PM&E	Planning, Monitoring and Evaluation
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
RAAKS	Rapid Appraisal of Agricultural Knowledge Systems
RRA	Rapid Rural Appraisal
SAPPROS	Support Activities for Poor Producers of Nepal
SNV	Netherlands Development Organisation
SSI	Semi Structured Interview
SWOT	Strength, Weakness, Opportunity and Threat
TBBP	Trail Bridge Building Programme
TOR	Terms of Reference
VDC	Village Development Committee

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CHAPTER 1

INTRODUCTION

Part II of the Natural Resource Management Study Report comprises the findings of the field study in four villages of Humla and Kalikot. Only after reading this volume, Parts I and III of the report can be understood well. Part I is mainly a summary from the findings of the study, translated in recommendations for an NRM policy for KLDP and Part III is about the findings of the actor analysis and the co-ordination and linkage between these actors.

Part II deals with people and their environment, with the interdependency of these people on natural resources for their livelihood and with the way they manage these resources. For a full understanding of natural resource systems, we need to know the limitations and how people cope with harsh conditions and changing circumstances. Therefore, Part II addresses the main constraints people face in finding a balance between use and over exploitation of natural resources.

The field study has taken place in Humla and Kalikot. Therefore, in chapter 2, first an introduction of Humla and Kalikot is given, followed by a brief introduction to the villages. To understand how people survive in these remote areas an impression is given about people's survival strategies, and the role of agriculture in food security (chapter 3).

The bulk of this volume consists of chapter 4, 5, 6 and 7 about local resource management systems in Piplang, Kharpel, Phoi Mahadev VDC and Lalu VDC respectively. The topics for discussion in these chapters are:

- Farmers' perceptions on natural resources
- The nature of the resource base and the farming system (livelihood issues). The farming system relates to agriculture, livestock management, forest management and allocation of resources as labour, knowledge and time. Specific attention is given to the responsibilities the women have in resource management.
- Local resources management systems and people's indigenous knowledge
- Responses to resources scarcities at village level
- Traditional village institutions for resource management at individual or communal level.

Finally in chapter 8, the findings are compiled into some broader conclusions and preliminary recommendations for further steps to be undertaken in the villages of study.

CHAPTER 2

SETTING THE SCENE: INTRODUCTION TO THE RESEARCH DISTRICTS

This chapter presents an overview of these two districts and provides background information about natural resources in Humla and Kalikot to facilitate the understanding of the specific features of the study villages.

2.1 Humla district

2.1.1 Location

Located in the far northern Himalayan region of mid-western Nepal, Humla lies between 29.25° to 30.57° N latitude and 81.30° to 82.30° E longitude. This district is bordered by Mugu in the east, Bajhang and Tibet, autonomous region of China in the west, Tibet in the north and Bajura and Mugu in the south (Fig 2.1). It is located between 1,300 and 8,000m. above sea level. Simikot, the district headquarters lies at an altitude of 2,950m. asl. In terms of transport and communication facilities, Humla is one of Nepal's most remote districts.

Humla has a relative large area with undisturbed nature: large forest areas, little settlements, inaccessible mountain area's. The district therefore has an ecosystem with a large bio-diversity in flora and fauna.

There is an increasing pressure on these natural resources because of:

- poaching, especially the musk deer,
- illegal export of wood to Tibet,
- deforestation especially in the vicinity of Simikot,
- excessive collection of medicinal plants (NTFP's), because of their high economic value,
- increased pressure on pasture area's after Tibetan pastures have become less accessible.

(Humla district profile)

The district has however no protected ecosystem: no national park, wildlife reserve or hunting reserve.

There is a small but growing number of tourists visiting the area yearly, mainly trekkers to the border of China.

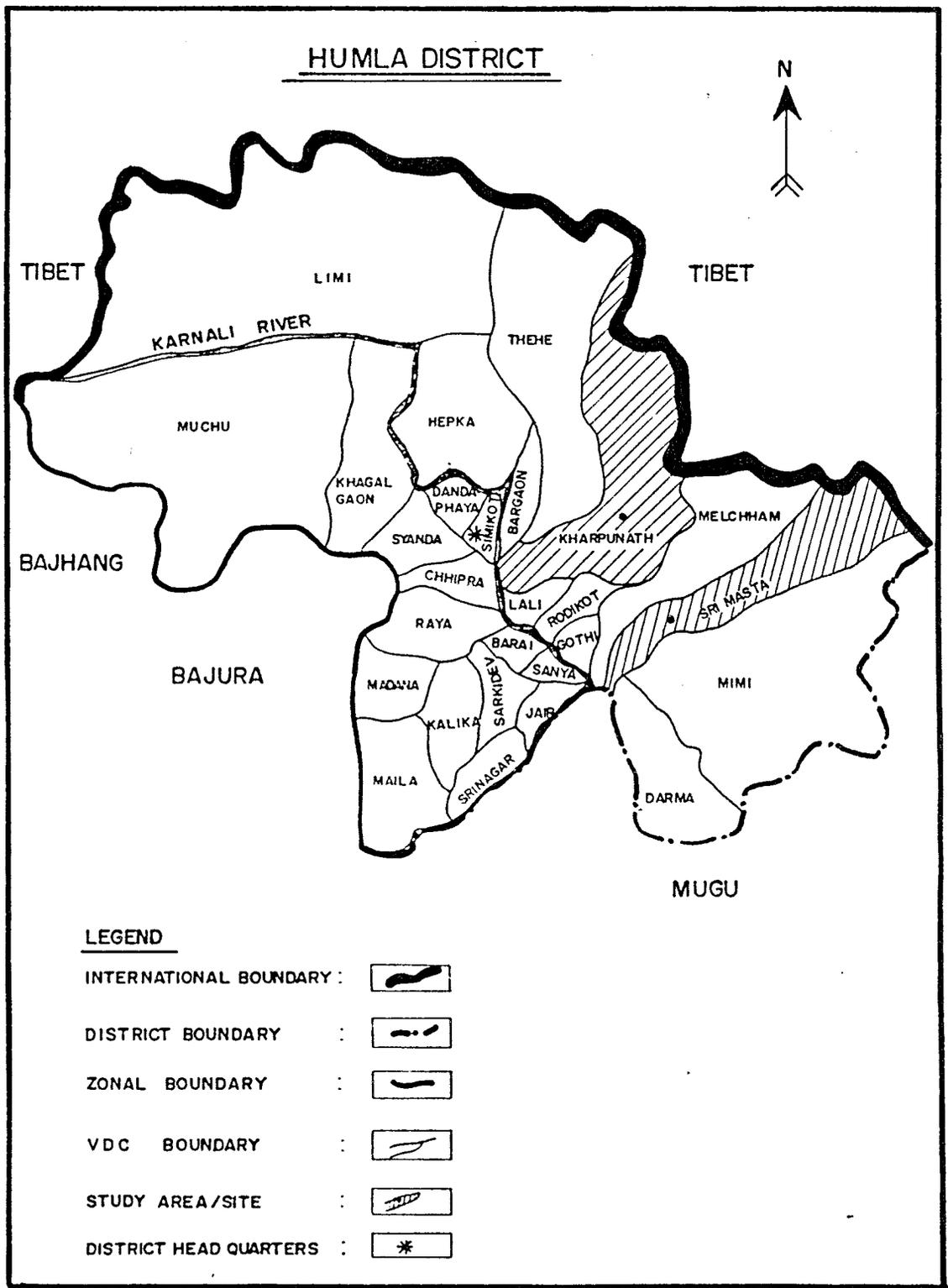


Fig. 2.1 Humla district

2.1.2 Climate

The major part of Humla lies in the Alpine zone (3000-8000 m) and the cool temperate zone (2000-3000). The north and middle of the district receives an annual precipitation of 500-1000 mm. The south part receives 1000-1500 mm/year.

2.1.3 Population

The 1991 census reported that the population of Humla grew at an annual rate of 5.27 % between 1981 and 1991 which is more than double to the national average (2.1%). The question arises why the population in Humla has increased so rapidly over the last decade. Decline in child mortality rate seems unlikely as a study carried out by Kanchanga Research Firm (1990) reported a child mortality rate of 26.7 percent in Humla. This rate is nearly triple to the national average (10.7%). The average family size in Humla is high (5.8 members according to Humla district profile), however, this gives not sufficient ground for the explosive population growth. Likewise, immigration to Humla is unlikely and emigration of people out of Humla also seems very low (migration to India for about six months for wage earning is only seasonal and not permanent). However, this seasonal migration to India combined with the fact that many men are away from home for some months to graze their sheep and goats in high and low altitude areas may be the reason for the unreliability of the population data. Furthermore, the remoteness and inaccessibility of Humla may have caused that not all the villages or at least not all the houses have been visited during the population census.

Table 2.1 Population changes in Humla (as reported by different censuses).

Population	1971	1981	1991
Number	24,000	20,303	34,383
Percent change		- 1.6	+ 5.27

Source: CBS (1986, 1995)

The population decrease in the decade '71-'81 is probably due to changes in the political map: during that decade some VDC's of Humla were incorporated under Mugu district (Humla district profile). Indeed, the increase in population in that period in Mugu (+50%) has been more than the average for Nepal (+30%) (Sill and Kirkby, 1991).

2.1.4 Land use

Humla is characterised by high mountains with steep slopes ($> 45^\circ$) and narrow valleys. The elevation level of the river valleys is usually higher than 2000m, with mountain tops often reaching 4000m. or more. The district has a total area of 6131,00 ha of which only a small portion is suitable for ecologically and economically sound agriculture.

Topographically, Humla can be divided into four major zones:

- a) Narrow Valley
- b) Mid hills
- c) High hills
- d) Snow areas

Most of the area is covered with snow, rocks, forests and pastures (table 2.2). The cultivated area is less than 2 percent of the total area, one of the lowest figures for Nepal. Population density, measured by number of inhabitants per sq. km, is low in Humla when compared to the other districts in Nepal: 5.6 persons per sq. km. As the population density is low, accordingly the ratio of inhabitants to available agricultural land (0.37 ha/person) is relatively high in Humla (to compare: Kalikot has 0.15 ha/person). The total irrigated area is 10 - 25% of the agricultural land (Sill and Kirkby, 1991).

Table 2.2 Land use pattern in Humla

S.N	Land use	Area	
		ha	%
1	Agriculture	9,297.0	1.8
2	Forest	125,107.0	24.5
3	Snow	50,590.0	9.9
4	Pasture	14,144.0	2.8
5	Others (water, settlements, barren land, landslides, stony banks and slopes etc.)	312,327.0	61.0
Total		511,465.0	100.0

Source: Land Resources Mapping Project (1987)

Table 2.2 shows that less than 2 percent of the land (less than 9,297 ha) in Humla is cultivated. Contradictory to this, an estimate of HMG's on-going topographical survey (from interview during field study) shows some 13,000 ha of land under cultivation. Land Survey Officials claim that they have measured literally all cultivated land, therefore also forest which has (recently) been converted into permanent cultivated land. This may be one of the reason why these data differ so much.

Box 2.1 'Slash and burn' in Humla.

According to the people of Humla "*kundila katne*" (slash and burn or shifting cultivation) is a common practise in their district. In many places, conflicts among local people have been intensified because forest, a common property resource, is used for agricultural purposes. In other words, if some people claim a piece of forest as their private land, others oppose to this practice as was also observed by the study team in Kharpel (see also chapter 3.1.2).

2.1.5 Forest resources

In Humla, most of the forest can be classified as evergreen coniferous forest up to 3000m. This type of forest is found in the central belt of the district (particularly in the central and southern belt of the Karnali valley). *Deodar* (*Cedrus deodara*) and pine are the most common species together with fir, rhododendrons, lauth, walnut, chuli, *kharsu* and birch. People use these HMG forests freely for timber, fuel wood and grazing as public lands or open access resource. Forest resources are the major source of energy in Humla. People hardly bring any fodder from the forest but do bring litter for compost preparation. During winter cattle and buffaloes are brought here for grazing.

The forests at high altitude are rich in medicinal plants, non timber forest products (NTFP) or "jaributi's" such as *jatamansi*, mushroom, *panch aunle*, *hattijade*, *katuki*, *khakse*, *attis*, *sunamati*, *bitumen*, *chiraito*, *bojo*, *ghodmacha* and *bhutte*. For many people these NTFPs are a source of income, despite the fact that many of them are prohibited to harvest and sell. (Humla district profile)

2.1.6 Fodder

It is not a common practice to plant fodder trees, or to allow these to establish naturally in the cultivated upland terrace risers. Only at the edges of trails and village roads fodder species as *Dhatailo*, *Badu*, *Khadik* were found. Sometimes people feed animals fodder from trees such as *Banjh*, *Thinke* and *Kharsu* during winter season (interviews and observations).

2.1.7 Pastures

In Humla, almost all of the households have their pasture fields lying above the villages where people have built temporary cattle sheds. In addition to this, people take animals to other pasture fields further from the village as well. For example to the alpine grassland areas found between 3,000 and 5,000 m where people take their sheep and yaks in the summer season (Humla district profile).

In the past, people did not cultivate the land surrounding the cow sheds (*goth*). But, these days, people have been converting these pasture lands into permanent agricultural fields. No cultivated pasture (*khar bari*) has been encountered in the district (personal observations).

In general, people keep their livestock temporary in high altitude pasture lands for 4-5 months in the summer and bring them down to the village when the winter starts in Oct- Nov. Sheep are further moved to low altitude areas in Kalikot, Dailekh and Aacham during the winter season, locally called *Aulla* (warm areas). In the past, people in some areas used to graze particularly yaks, chauri, sheep and goats in the pasture lands located in Tibet as a part of the transhumane cycle (transhumane refers to seasonal movement of animals for grazing). In these days, however, restrictions to the number of animals and increased fees for pasturage imposed by the Chinese government have forced many people to reduce or even stop using Tibet's pastures.

Still, in Humla, livestock husbandry proves to be an important source of income. At farm level, farmers mainly keep livestock for draft power and manure, the most important input in maintaining the soil fertility. The northern and southern part of Humla can be distinguished from the point of view of livestock systems. In the northern part, people keep mainly yak, *chauri*, sheep and cattle. The southern part is dominated by cattle, buffaloes, sheep and goats (Humla district profile).

2.1.8 Farming system

Farming-forestry-livestock relationships are still strong in Humla. The farming system can be characterised as labour intensive, low input and at a subsistence level. The influence of market forces on the farming system are minimal. Lack of labour is often a constraint to optimal farming. Terracing of slopes in high altitude areas is a dominant feature, although most terraces still have a high sloping gradient resulting in soil and productivity loss (interviews and observations).

2.1.9 Cropping practices and cropping pattern

Table 2.3 Common cropping patterns (one year) found in Humla district

S.N	Land type	High altitude areas (>2000m)	Low altitude areas
1	Homestead garden (<i>Ghar bari</i>)	Maize+Vegetables-Wheat Maize-Wheat Maize- Barley Maize-Naked barley Maize+Fingermillet- Barley	Maize-Wheat Maize-Barley Maize+vegetables-Wheat Proso millet (Chino)- Wheat
2	Upland (<i>Pakho</i>)	Proso millet- Fallow Fallow-Wheat, Barley Fallow-Naked Barley Mustard-Naked Barley Buck wheat-Wheat Proso millet- Wheat Finger millet- Wheat Finger millet- Naked Barley	Rice+foxtail millet(Kaguno)- Wheat, Barley Proso millet+ Foxtail millet- Wheat, Barley Maize+Fingermillet-Wheat Rice+Fingermillet-Wheat Rice-Wheat, Barley
3	Lowland (<i>Khet</i>)	Rice-Fallow Rice-Wheat Rice-Barley Fingermillet-Wheat Fingermillet- Barley Rice- Naked barley	Rice-Wheat Rice-Barley Rice-Naked wheat Fingermillet+Maize-Wheat

Source: DAO Humla

In Humla, cropping patterns change with changing micro-climatic conditions, altitudinal variations and land use types. Table 2.3 gives an idea of the common cropping patterns in high and low altitude areas. Naked barley ("Uwa"), buckwheat ("Phaper"), finger millet ("Kodo") and proso millet ("Chino") are the major food crops in Humla (outcome fieldstudy). People do grow upland and lowland rice in small areas, but it does not contribute significantly

Presently, no improved rice is cultivated in Humla district. Ladmairo, Rajkote, Kalomarsi are some of the major local rice varieties in Humla. Maize, wheat, naked barley and proso millet are all local varieties. Farmers usually do not apply chemical fertilisers except for a few farmers living near the headquarters, who have begun to use chemical fertilisers in small quantities.

Vegetable growing is not commonly practised.

From table 2.3 it can be concluded that one can find a large diversity in cropping patterns depending on climate, soil features, altitude etc.

An interesting practice related to the cropping pattern and growing season, which can be found throughout the Karnali zone, is described in Box 2.2

Box 2.2 Wetting of rice seeds in Humla.

Farmers wet their rice seeds on the 12th of Chaitra, with a margin of a few days earlier or later. They have no clear answer to the question: "Why do you wet the rice seeds particularly on the 12th of Chaitra?". Many say that this date was given by the God, specifically Lord Chandan Nath of Jumla Bajar. Some people say that they can harvest more if wetted on that date or that the seeds do not germinate well if they are not wet on that date. Others state that they have observing this rule because their parents have been doing this. It anyhow indicates the beginning of the growing season which is short due to the cold climate. Farmers wet the seeds inside the house because the seeds do not germinate in the open field due to the cold climate.

2.1.10 Productivity of crops

Table 2.4 presents the area, production and yields of major cereal crops in Humla district as reported by the Ministry of Agriculture.

It is good to realise that such statistical data may not be as reliable as one would like to believe:

- Potato production and yields are increasing very much over the years, although there has been no major intervention of the Department of Agriculture in the last years; why has the yield doubled then?
- More or less the same accounts for the presented increase in rice production in 93/94. How is this possible when no fertilisers are used, when no improved varieties are introduced and when there has been no significant increase in irrigation facilities?
- The table fails to mention important food crops as naked barley, proso millet, buckwheat and foxtail millet. These crops are not regarded important by the national institutions and are therefore "lost" in the statistics. During the field study it was

found that especially the slash and burn areas are often cultivated with these crops (Table 2.5).

Therefore caution has to be taken when interpreting Table 2.4.

Table 2.4 Area, production and productivity of major crops in Humla district

Crops	1975/76	1985/86	1990/91	1991/92	1992/93	1993/94
Area (in ha)						
Rice	230	450	520	520	500	300
Maize	600	650	50	50	90	150
Millet	780	1120	1110	1110	1360	700
Potato	400	450	550	550	550	550
Wheat	800	600	620	610	620	650
Barley	900	320	810	820	830	500
Production (in MT)						
Rice	490	670	830	840	790	600
Maize	1030	650	80	90	150	200
Millet	990	1180	1220	1230	1520	710
Potato	1800	2250	4000	4150	4160	4470
Wheat	920	430	630	610	670	740
Barley	990	250	780	790	800	490
Yield (in MT/ha)						
Rice	2.130	1.489	1.596	1.615	1.580	2.000
Maize	1.717	1.000	1.600	1.500	1.777	1.332
Millet	1.269	1.054	1.099	1.108	1.117	1.014
Potato	4.500	5.000	7.272	7.545	7.563	8.127
Wheat	1.150	0.717	1.016	1.000	1.080	1.138
Barley	1.100	0.789	0.962	0.963	0.964	0.980

Source: DFAMS 1990 and CBS 1995

Table 2.5 Production and area of other important crops

Crops	Area (ha)	Production (MT)	Yield (MT/ha)
Naked barley	865	865	1.0
Buck wheat	500	500	1.0
Proso millet	300	251	0.84
Foxtail millet (<i>kaguno</i>)	55	44	0.80

Source: District Agriculture Office

Although agriculture is the main occupation of the people in Humla, the majority of the population has been sustaining their economy through seasonal migration by going to India for about 4 to 6 months, mainly in the winter. Male members from 60 % of all households go to India each year in search of unskilled labour. This is one of the specific characteristics of the people living in Karnali zone.

Box 2.3 Seasonal migration to India

People in Humla do not earn much in India. Many even lose all of their earnings, because they are cheated. Lucky ones can buy some cloth and utensils. The main reason for the migration is that meals at home are saved. Many people said that they would leave going to India if they can get off-farm employment in the village. In other words, seasonal migration to India is people's response to shortage of food and employment at village level (field study).

2.2 Kalikot district

2.2.1 Location

Located in the mountainous south-west of the mid-western region of Nepal, Kalikot lies between 28.27° to 29.28° N latitude and 81.28° to 82.2° E longitude. The district extends over two physio-graphic regions: the mountainous region and the mid hills region. The district is surrounded by Jumla and Jajarkot in the east, Acham and Bajura in the west, Mugu and Bajura in the north and Acham and Dailekh in the south and located at an altitude of 738 to 4,472 masl. Khandachakra, the district headquarters, lies in Manma VDC at an altitude of 1900 masl.

2.2.2 Climate

The majority of the district lies in the cool-temperate zone (2000-3000m) and the warm temperate zone (1000-2000m). Annual precipitation varies from 500-1000 mm/year in the north, to 1000-2000 mm/year in the middle and the south of Kalikot.

2.2.3 Population

The total population of Kalikot district as reported by two past successive national censuses is given in Table 2.6.

Table 2.6: Population changes in Kalikot district

Population	1981	1991
Number	87,542	88,781
Change %		1.4

Source: CBS (1986,1995)

This table reveals that the population growth rate in Kalikot (1.4%) over the last decade has remained below the national average (2.1 %).

2.2.4 Land use

The total area of the district measures 1,479.27 sq.km. Table 2.7 presents basic land use types.

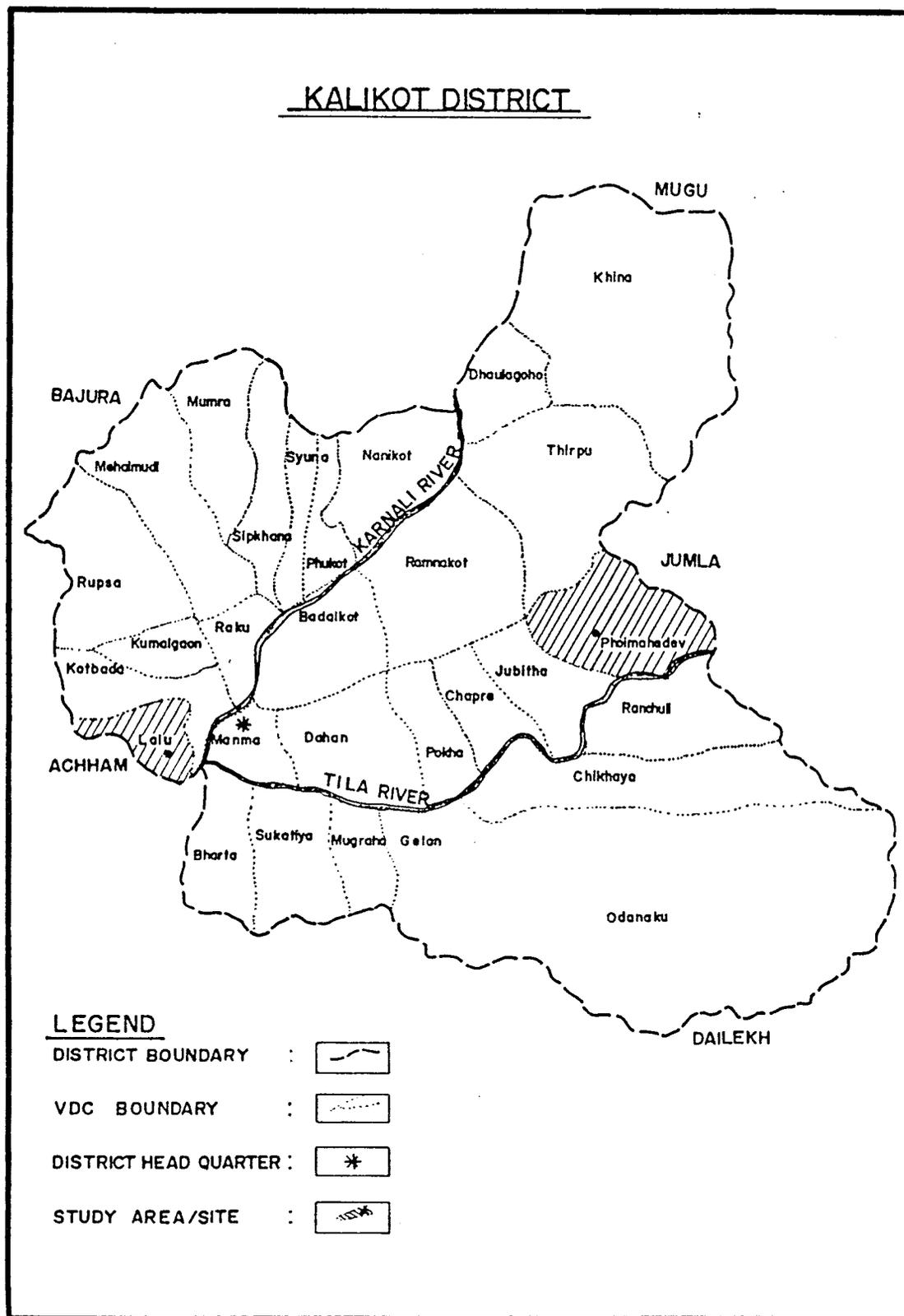


Fig. 2.2 Kalikot district

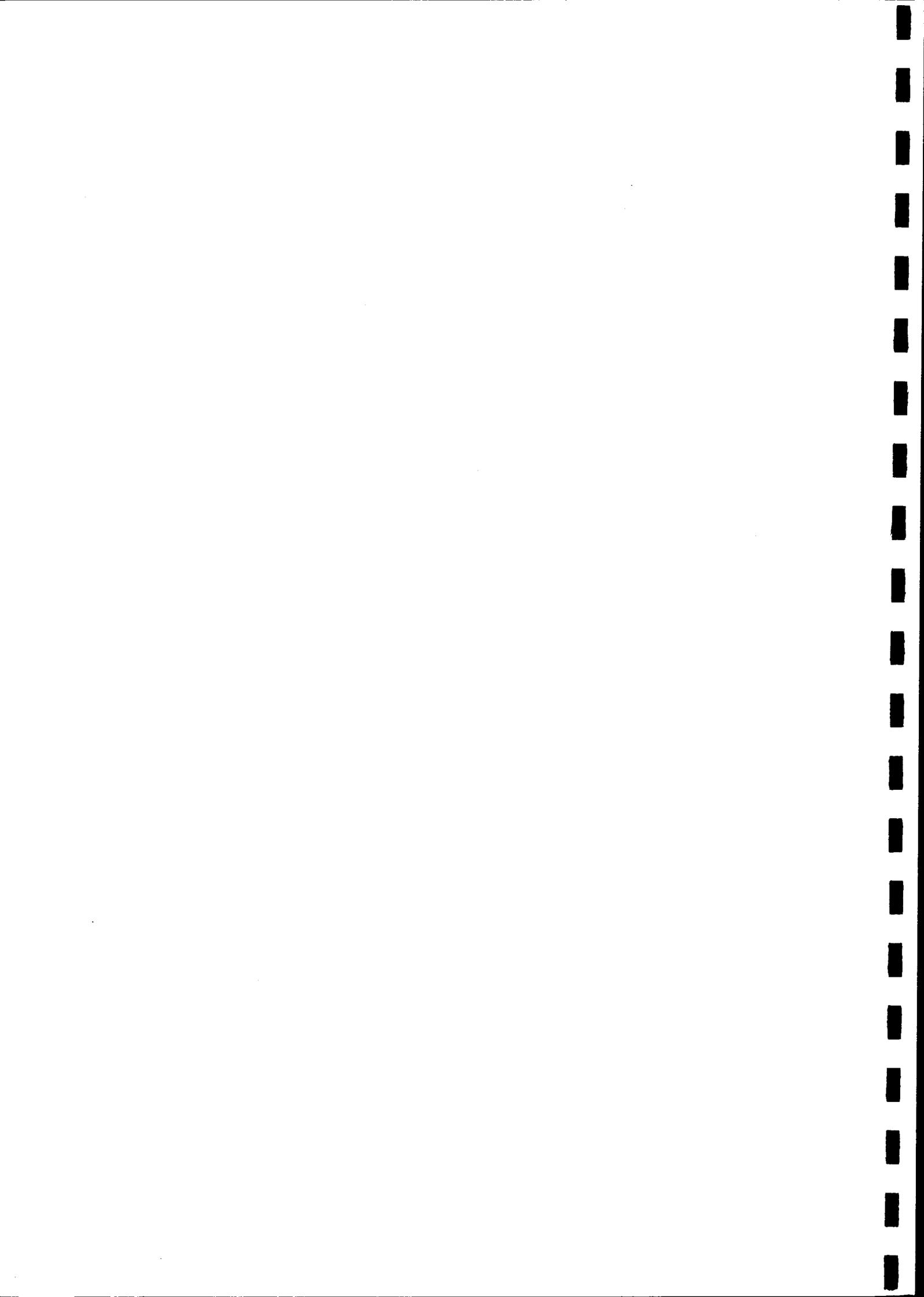


Table 2.7 Land use pattern in Kalikot district

S.N	Land use pattern	Area (in ha)	%
1	Agricultural land	13,100	7.5
2	Forest	109,224	62.3
3	Pasture	44,448	25.3
4	Rocks	3,051	1.8
5	Settlement	176	0.1
6	Others	4,928	2.0
	Total	174,927	100.0

Source: District Profile 1994-95, DAO, Kalikot

Table 2.8 Area cultivated as reported by the on-going land survey

Land use	Area (in ha)
Cultivated land	16,601.7
a. Low land (<i>khet</i>)	3,512.7
b. Upland (<i>pakho</i>)	13,099.0

Source: Land Survey Office, Kalikot

Like in Humla, also in Kalikot the cultivated area according the findings of the on-going land survey (Table 2.8) is significantly higher, compared with the data of DOA (Table 2.7).

2.2.5 Forest resources

In high altitude areas, people use forest mainly for firewood, litter (bedding for animals) and timber for house construction. But, in low altitude areas such as Lahu, people also use forest to collect fodder.

Although types of vegetation in forest depends upon elevation, topography, climatic condition, soil type, exposure to sunlight and rainfall, most common trees found in Kalikot are *Paiun*, *Khari*, *Banjh*, *Rains*, *Pine*, *Bhojpatra*, *Utis* etc.

2.2.6 Fodder

Although planting fodder trees in terrace risers is not a common practice in Kalikot, people have often allowed fodder trees to regenerate naturally. For example, in higher altitude areas such as Phoi Mahadev, people do not prefer fodder trees growing in terrace risers. Yet plants of *Dhatailo*, *Bedu*, *Khadik* etc are found there. On the other hand, different types of fodder trees, namely *Koiralo*, *Tanki*, *Bhimal* etc can be found growing on terrace risers in VDCs located in lower altitude areas (e.g. Lahu) indicating that people are actively managing their terraces around homesteads.

2.2.7 Pastures

In Kalikot, the following three types of pastures are found (DAO, Kalikot):

- High altitude pastures (locally known as *Lekh* or *Patan*). These are located away from the village at higher elevations and are the main summer season grazing areas for sheep and goats. Each village has kept exclusive rights to specific pasture areas. Often people have traditional rules for taking the animals up to the *Patan* and back to the village. People who fail to observe this rule are likely to be fined by local communities.
- Low altitude pastures (locally known as *Goth*) are also located away from the village but below the *Patan* and nearer to the village. These are used for summer grazing for cows and buffaloes. Each household has its own *Goth*.
- Village grazing lands (locally known as *Gaucharan*) are areas set aside for grazing animals when they are brought to the village during winter season.

Private pasture areas (Kharbari) are also found in Kalikot (individual foddergrass areas within Common Property Resources in Lalu: field study).

Although livestock husbandry makes an important contribution to household income, (especially in some of the resource rich VDC's, by selling ghee) almost all people keep cattle also for the purpose of providing draft power and manure for farms. Cattle, buffalo, and goats are generally raised in Kalikot district. The number of sheep is decreasing rapidly and yaks and chauris are not found here. In general, the following two types of livestock management systems can be found:

- Rotational/migratory system: seasonal movement of animals between regular pastures which vary in altitude.
- Permanent system in which livestock is not moved to high altitude pastures for grazing but is kept in the village.

2.2.8 Farming systems

Farms in Kalikot are small and subsistence oriented, with many different land use patterns influenced by prevailing micro-environments. The farming systems incorporate extensive use of public forest and grazing areas. A strong relationship among crop land, forestry and livestock exists in Kalikot similar to other mid-hills and mountainous regions of the country. Without the fodder, firewood and forest litter, the traditional farming system is likely to break down because of declining soil fertility and productivity.

Although there is no clearly defined boundary among different zones, from agricultural point of view, the district can be divided into the following three areas:

- *Lower altitude areas* located at both the sides of the Karnali and the Tila river which has a sub-temperate to sub-tropical climate. Cereal crops (dominated by rice, wheat and maize), vegetables, pulses, oil seeds, tropical and subtropical fruits are grown here. Citrus is the major fruit crop.

- *Middle hill areas* with a subtemperate to temperate climate. Cereal crops (millets and maize domination), vegetables, pulses, oil seeds and fruits such as apple, peach, pomegranate, plum and walnut are found in these areas.
- *High altitude areas* with a cold climate due to heavy snow fall. Potato, finger millet, naked barley, proso millet (*chino*) are mainly grown here.

2.2.9 Cropping practices and cropping pattern

Similar to Humla, cropping patterns and practices in Kalikot vary with changes in elevation and topography. Because the influence of micro-climatic variations is considerable, a large diversity in different cropping patterns and practices can be found (table 2.9). Agriculture is characterised by very high seed application/unit area with low production and productivity. Almost all of the farmers in the district usually use seeds obtained from previous years. They have begun to use chemical fertilisers only recently to improve the soil fertility but it is limited to VDCs surrounding the district headquarters. The district office of Agricultural Inputs Corporation has no dealers except one at Khandachakra, the district headquarters. The sale of chemical fertiliser in the fiscal year 1993-94 has been as follows (AIC, Kalikot):

Diammonium Phosphate (DAP)- 8.0925 MT

Urea-19.809 MT

Potash- 0.472 MT

In addition to chemical fertilisers, farmers have begun to use chemical pesticides and herbicides, particularly "Butachlor" for rice crops.

According to the DAO sources, the office has been trying to introduce improved rice varieties such as Chomrong and Khumla 4.

Table 2.9 Major cropping patterns found in Kalikot district

S.N	Land type	High altitude areas	Low altitude areas
1	Homestead garden	Maize+vegetables-Wheat Maize+beans-Barley	Maize+Fingermillet-Barley
2	Upland	Potato-Buckwheat Maize/Fingermillet-Uwa Fingermillet-Barley Chino-Barley Fingermillet-fallow	Maize-Wheat Maize-Wheat+Mustard Maize+Bean-Barley
3	Lowland	Rice-Uwa/Barley Rice-fallow	Rice-Wheat Rice-Wheat+Mustard

Source: DAO, Kalikot



CHAPTER 3

INTRODUCTION TO THE STUDY VILLAGES

In line with the earlier decision of KLDP to implement NRM activities first in villages where the community development programme is being implemented, four villages located in different physio-graphic locations were selected (fig.2.1. and 2.2. for the location). This chapter gives a brief introduction to the villages and provides insight in day to day survival mechanisms of the people.



Photo 3.1 One of the four "rich" families in Piplang, Humla.

The four study villages:

Humla		Kalikot	
Village	VDC	Village	VDC
1. Piplang	Sri Masta	3. Dhandi Vigma	Phoimahadev
2. Kharpel	Karpunath	4. Sitala and Naula Ghar	Lalu

3.1 Humla

3.1.1 Piplang

Piplang (Sri Masta VDC, ward no 1 & 2) is a small village with only 44 households, packed and stacked upon each other, lying in the middle of a fairly flat cultivated area, on the banks of a branch river of the Karnali. To reach Piplang (1700 m asl), from Simikot, one has to walk two long days to the south, along the bank of the Karnali.

The ethnic composition is as follows:

Shahi Thakuri	32
Singh Thakuri	5
Biswakarma	3
Kulal	4
Total	44

NCAR has been working in Piplang for 4 years with a saving programme for women groups, night classes, sanitation, chicken raising and vegetable gardening. KLDP has implemented a drinking water scheme a few years ago. Nearby one can find the Darma Horticulture demonstration farm.

3.1.2 Kharpel

This village (2500 m asl) is located south-east from Simikot at four hours walking distance in Karpunath VDC, ward no 3,4,5 and 6. The village lies on an extreme steep slope, up to 80%! It lies high up the slope, 1 hour walk from the Karnali which floats deep down in the valley. Like in Piplang the 95 hh are neatly packed, but here it is very clear that there is hardly any space left on the steep slopes to occupy. Except for some small patches on the Karnali bank, there are no irrigated fields found in Kharpel.

The ethnic composition is as follows:

Shahi Thakuri	76
Singh Thakuri	1
Bhandari Chhetri	1
Biswakarma	4
Damai	2
Sarki	10
Amlekhi	4
Total	95

NCAR has just started with the CD Program in Kharpel and KLDP is constructing a drinking water project.

3.2 Kalikot

The diversity found within Phoimahadev and Lalu VDC is rather big, therefore the findings of Dhandi Vigma (ward no 5, Phoi VDC) and Sitala (ward no 1 and 2, Lalu VDC) do not necessarily represent the situation for the whole VDCs.

3.2.1 Dhandi Vigma

After a long day walk coming from Jumla bazaar one can reach the large southward facing slope of Phoimahadev VDC. The distances to go from village to village within this VDC are considerable. For this reason one small hamlet in ward no 5 was selected for study purposes: Dhandi Vigma (2200 m asl). The irrigated fields are neatly terraced, and many apple trees can be found.

The ethnic composition is as follows:

Budha (Basnet) Chhetri	15
Karki Chhetri	3
Adhikary Chhetri	1
Biswakarma	21
Total	40

CSD has been working in the area for 3 years now. Main focus is on working through saving groups for women, and on sanitation. KLDP has implemented drinking water in Phoimahadev, but not in ward no.5. Presently KLDP is rehabilitating Phoi's irrigation canal.

3.2.2 Sitala and Naula Ghar

Sitala and Naula Ghar are two hamlets located in ward no 1 and 2 respectively of Lalu VDC, 5 hours walking west from Manma. Lalu is in fact one big stretching slope, with houses and hamlets even more scattered than in Phoimahadev VDC. Because of the devastated character of the area, it was decided to select one or two smaller area's: Sitala and Naula Ghar. Most of the data are collected in Sitala. The area looks beautiful and green, many irrigated terraces and trees can be found. Huge buffaloes are lying in front of huge houses, waiting for another doko of fresh grass.

The ethnic composition is as follows:

Bista Chhetri (Naula Ghar)	53
Biswakarma (Naula Ghar)	1
Biswakarma (Sitala)	8
Damai (Sitala)	56
Total	118

CSD is running the same program in Lalu as in Phoimahadev VDC. KLDP is in the process of completing drinking water schemes for all wards in Lalu.

3.3 Socio-economic profile and people's livelihood strategies

In this paragraph people's economic situation will be explained in terms of their relative wealth and their livelihood. In these hill farming systems, the dependency on natural resources is maximal. Still most families have not enough to eat and therefore people's survival is based on complex livelihood strategies: diverse food and income sources, external support, patron-client relationships and last but not least the use of natural resources.

The following issues are explained:

- How do people survive, what are their livelihood strategies?
- What is the relevant importance of natural resource utilisation in people's livelihood?
- Is it possible to differentiate groups who have different access and control to natural and other resources (money, labour, knowledge)?

To answer these questions first the ethnic composition is given. Then the relative economic status of different groups are explained from villagers' perception. These "wealth rankings" help to recognise the different wealth or so called focus groups in a village. To understand the livelihood mechanisms, SSI's are held with representatives of the relatively poor and rich groups.

It is important to realise that although the word "rich" is used, it does not mean that these people are rich (except for very few people). Almost everybody is poor, but to make a difference between people who have access and control over resources and people who have not, the authors have distinguished "resource rich" and "resource poor" referring to the lower and upper classes of wealth groups.

3.5.1 Humla

Indicators for wealth and economic status of people

A small group of villagers in Piplang and Kharpel were asked to distinguish the relative economic status of all households in the village. First they discussed what constitutes wealth and well being and reached agreement on the main indicators as presented in Box 3.1.

Both villages used more or less the same indicators, But there is a difference in perception between different wealth groups. For example: the very poor in Kharpel have very little land, cattle, access to trade jobs etc. Actually they have only their two hands to work with. This is why they mention the availability of productive labour (young, strong people) as the main indicator.

Most important indicators of wealth were the availability of labour within the family as a major source of wealth, next to the landholding size and the food sufficiency. Many

indicators are directly related to labour availability and income. These indicators include working for GOs and NGOs, earning wage labour by working in development projects, reciprocal exchange of labour for farming activities ("*Parma*"), seasonal migration to India, agricultural wage labour, portering and earning wage labour by running caste specific occupational businesses such as tailoring and blacksmith.

Box 3.1 Indicators for wealth and economical status in Humla

- Size of land holding
- Food sufficiency in the family
- Availability of productive labour in the family
- Working for GOs and NGOs
- Number of livestock owned
- Involvement in trading
- Earning wage labour by working in development projects
- Reciprocal exchange of labour for farming activities
- Seasonal migration to India
- Portering
- Earning wage labour through caste specific occupational works such as tailoring and blacksmithing
- Wage labour in agriculture

After discussing the indicators for wealth the villagers divided the families in the village into several wealth categories. Many indicators were considered before deciding, during these discussions it became clear that many things play a role in day to day survival. However, during all rankings food availability has been mentioned as the major criteria. Therefore the tables 3.1 and 3.2 present the outcome of these wealth ranking exercises in terms of food self sufficiency.

Thus households at the bottom of the poverty line were those which had the least availability of food on an annual basis. Implying that poverty is associated directly with access and control over land and its productivity.

People in higher wealth classes appeared to have more land and cattle, to be less dependent of forest resources for encroachment of land, to have better access to education and therefor government jobs, and to be less dependent on going to India for wage labour.

It was remarkable that there was much consensus in classifying the different villagers in different economical categories. People discussed most about the different wealth indicators and often increased the number of categories during these discussions: in most cases people started with two or three categories and ended with five or six categories.

Tables 3.1. and 3.2 show the economic stratification of the households living presently in Piplang and Kharpel by ethnic groups as distinguished during the wealth ranking exercise.

Table 3.1 Economic stratification of people in Piplang by ethnic group

Category	Food self sufficiency within the family	Households		Total
		Shahi and other Chhetris	Kami and Kulal	
1	Less than 2 months	3 (8.11)	7 (100)	10 (22.73)
2	2 to 3 months	6 (16.21)	-	6 (13.64)
3	3 to 4 months	9 (24.32)	-	9 (20.45)
4	4 to 5 months	7 (18.92)	-	7 (15.91)
5	5 to 6 months	8 (21.62)	-	8 (18.18)
6	6 to 12 months	4 (10.82)	-	4 (9.09)
Total		37 (100)	7 (100)	44 (100)

Figures between brackets denote percentage

Table 3.2 Economic stratification of households living in Kharpel by ethnic group.

Level	Food sufficiency within the household	Households		Total
		Shahi	Kami and Similar caste	
1	Less than 2 months	1 (1.28)	5 (29.41)	6 (6.31)
2	2 to 6 months	24 (30.77)	12 (70.59)	36 (37.90)
3	6 to 8 months	28 (35.90)	-	28 (29.47)
4	8 to 12 months	19 (24.35)	-	19 (20.00)
5	Above 12 months	6 (7.70)	-	6 (6.32)
Total		78 (100)	17 (100)	95 (100)

These tables not only visualise the socio-economic differences among different ethnic groups, but they also indicate the extent of food shortages and people's poverty level in the whole villages of Piplang and Kharpel. As shown in above tables, Kamis and other similar population groups were the poorest among the poor in both the villages. For example, in Piplang 100 percent of the Kamis households had food shortage for more than 10 months. In Kharpel, Kamis and other similar caste groups faced food shortages for nearly six months. This means that they have to search alternative sources of income.

Although landholding size and food availability are very much interlinked, there are situations where people might have land, but no labour to work on the land. In Piplang one man was put into the second category despite that he had a relatively large land holding size. The reason was that he had no sufficient labour to farm all his land and therefor part of his land often remained fallow.

Finally, it should be mentioned that all the households have at least a small piece of land in all the study villages, except two Amlekhi¹ households in Kharpel.

Household income and expenditure pattern

Table 3.3 and 3.4 present respectively the sources of income and the expenditure pattern of resource poor and resource rich families in Kharpel and Piplang. It is important to emphasise here that figures presented in the tables show rough relative data and not absolute figures. The tables are given to understand income and expenditure patterns because these explain much about the livelihood strategies of people and the importance of the natural resource base.

Table 3.3 Income sources of resource poor and resource rich people

SN	Sources of income	Kharpel(%)		Piplang(%)	
		RR	RP	RR	RP
1.	Farming	50	25	50	20
2.	Slash and burn	(25) ²	25	-	-
3.	Livestock raising	20	20 ³	30	-
4.	Service (GOs and NGOs)	10	-	10	-
5.	Occupational work (Tailoring, Blacksmith, & Shoemaking)	-	5	-	-
6.	Seasonal migration to India	4	5	-	65
7.	Portering	-	5	-	-
8.	Trading (daily needs items)	5	-	10	-
9.	Wage labour	4	-	-	15
10.	Working in development projects	3	15	-	-
11.	Collection of medicinal plants such as Jatamansi	4	-	-	-
		100	100	100	100

Resource rich (RR) and resource poor (RP) terminology's are used relatively within the village condition, which means that for example resource rich in Humla could be resource poor in Kalikot. Resource rich refers to those people or households which are relatively economically better situated as indicated by the villagers during the wealth ranking exercise. They represent the upper two classes from the wealth ranking exercise. The resource poor represent poorest of the poor (the lowest wealth class).

Especially in Kharpel the practice of slash and burn contributes to a large extent to people's income. People are more or less forced to encroach the forest, as the productivity

¹ Amlekhi does not refer to caste, but to a family name. Long time ago people from an amlekhi family have been brought to Kharpel to work as slaves.

² Although some of the resource rich practice slash and burn, all the resource poor depend on forest encroachment for their livelihood.

³ Mainly chicken raising.

of the permanently cultivated land is only half of that of newly cleared land (compared with the same labour input).

Although agricultural labour occurs on a large scale in Kharpel, especially by occupational caste people on the land of the Thakuri's, it was not regarded as substantial in terms of survival, because the only compensation people get from the landlord after a day working are a few pieces of bread, too little to feed one person let alone a whole family. Sometimes the labour is not paid at all. This arises from the fact that in Kharpel one finds bonded labour systems. People in debt, mostly from the occupational caste have to pay almost all of their own yearly foodgrain production to their moneylenders, mostly Shahi people. To ensure their own food sufficiency they again have to lend from the same moneylenders. Consequently, they have to pay back this amount of foodgrain the next year, including (!) 50% interest. People in debt, therefore, are getting each year more dependant, this process has no way out as the moneylenders have the possibility to purchase all of the extra yield the debtors earn.

In Kharpel mainly the RR profit from non timber forest products (sale of Jatamansi gave Nrs 150,000 profit in 1994) because they have more free time to collect while RP are engaged more in agricultural labour on the lands of the RR and wage labour for development projects.

Expenditure patterns are illustrated by giving an example of Kharpel (tables 3.4).

In both the villages of Kharpel and Piplang most of the income is spent for food (> 50%), second comes clothing. A smaller portion is spent on medical treatment, festivals etc. Costs for agricultural inputs are not significant. In Kharpel expenditures of the resource poor people for agricultural inputs are marginal compared with the other wealth categories.

In Kharpel, paying the land revenue office during the survey of 1995 has been a costly affair for the resource poor people, they had to pay around Nrs 2000 of bribe per household, also resource rich people had to pay but relatively less (in total Nrs 150,000 was paid by all villagers).

Table 3.4

SN	Sources of expenditure in Kharpel	HRR %	MRR %	RP %
1	Fooding	25	50	55
2	Clothing	10	15	20
3	Medical treatment	10	5	15
4	Celebrating festivals and fairs	10	5	5 ⁴
5	Farming (purchasing agricultural inputs, implements, seeds and purchasing livestock)	15	10	5
6	Education for children	20	15	
7	Miscellaneous (ornaments and so forth)	10		
	Total	100	100	100

HRR=high resource rich

MRR=medium resource rich

Livelihood strategies

Having discussed the socio-economic conditions, incomes and expenditure patterns of resource rich and resource poor people, this section briefly summarises the livelihood strategies of the people in the study villages. An overview is given in table 3.5 below. Agriculture other than slash and burn in the forest is not mentioned: this is the living base for all people in the study area, and is therefore a constant factor.

Table 3.5 Main livelihood strategies in the 2 study villages of Humla

Piplang		Kharpel	
resource rich	resource poor	resource rich	resource poor
seasonal migration to India	seasonal migration to India	seasonal migration to India	seasonal migration to India
sheep/goats raising	labour in development project	Slash and burn	Slash and burn
woollen carpets	occupational work	service	labour
trade	portering	selling NTFP	chicken raising
service		control over resource poor	portering
labour in development project			labour in development projects
portering			

These figures indicate no major difference between the livelihood strategies of resource poor and resource rich people with respect to the use of natural resources except in Kharpel where especially resource poor people are more dependent on slash and burn practices than resource rich.

⁴ Medical treatment and festivals were initially mentioned as one category, because most money for medical treatment and festivals goes to Dhamis and Jhakris.

Although resource poor people are engaged in caste specific occupational activities such as tailoring and blacksmith work, the contribution to the annual income is very poor as showed earlier in Table 3.3. This issue was also specifically brought out by the villagers during livelihood analysis.

The figures below show seasonal migration to India as the most important source of people's livelihood in the study villages. People go to India during winter season because there is no work in the village and they need to bring items for basic needs such as clothes, salt and utensils. Furthermore, by going to India, people skip eating food from the house which is always insufficient for the whole family. In all villages people said that they will not go to India if they will have off-farm jobs or can work for development projects which are implemented in the neighbourhood.

In Kharpel and Piplang it was mentioned that the contribution of livestock to people's livelihood follows a declining trend. At present people keep livestock mainly for manure and draft power. Therefore livestock supports agriculture but does not contribute significantly to the direct livelihood, for example by providing annual cash income, which is especially relevant to resource poor people with little agricultural land. The resource rich people made woollen things and raised income from livestock but not the poor people.

3.3.2 Kalikot

Indicators for wealth and economic status of people

Like in Humla, the villagers in Dandi Vigma, Sitala and Naula Ghar used various indicators for wealth:

- Extent of food shortage within the family
- Land holding size (khet and bari)
- Number of economically active members in the family.
- Number of children in the family
- Involvement in trades and businesses
- Seasonal migration to India (Dhandi Vigma only).

Table 3.6 and 3.7 show the economic stratification of households by ethnic groups in Dhandi Vigma and Sitala/Naula Ghar respectively.

In Dhandi Vigma, one female headed household was classified in the second category despite that she owned a good piece of land. She was however unable to farm her land because she had only a small baby and she was a widow. Therefore also in Kalikot access to labour is given much importance.

Table 3.6 Economic stratification of households by ethnic group in Dhandi Vigma

Category	Food sufficiency within the household	Households		Total
		Chhetris and others	Kami	
1	Less than 4 months	-	4(19.05)	4(10.00)
2	4 to 6 months	4(21.06)	5(23.81)	9(22.50)
3	6 to 8 months	1(5.26)	7(33.33)	8(20.00)
4	8 to 10 months	7(36.84)	2 (9.52)	9(22.50)
5	> 10 months	7(36.84)	3(14.29)	10(25.00)
Total		19 (100)	21 (100)	40 (100)

Table 3.7 Economic stratification of households by ethnic groups in Sitala, Naula Ghar

Category	Food sufficiency within the household	Households		Total
		Bista	Kami and Damai	
1	Less than 6 months	6 (11.32)	9 (13.85)	15 (12.71)
2	6 to 11 months	6 (11.32)	41 (63.08)	47(39.83)
3	12 months	29 (54.71)	11 (16.92)	40 (33.90)
4	> 12 months	12 (22.65)	4 (6.15)	16 (13.56)
Total		53 (100)	65 (100)	118 (100)

Household income and expenditure pattern

Table 3.8 presents the sources of income for the resource poor and resource rich families in Dhandi Vigma and Sitala respectively.

What can not be seen in the table is that in Lalu nearly all household sell ghee, also the resource poor who have less than 6 months food sufficiency. Other sources of income for them are going to India and selling their labour within Lalu VDC. They earn little from occupational works because they cannot compete with the RR of the same ward (same caste), who control most of the market in Lalu (demand for tailoring works).

Table 3.8 Income sources of resource rich and resource poor people

SN	Sources of income	Dhandi Vigma%		Sitala % ⁵
		RR	RP	RR
1	Farming	75	15	35
2	Livestock raising	-	-	30
3	Service (GOs and NGOs)	-	-	35
4	Occupational work (Tailoring, Blacksmith, & Shoemaking)	-	-	-
5	Seasonal migration to India	25	70	-
6	Trading (daily needs items)	-	-	-
7	Wage labour	-	15	-
8	Working in development projects	-	-	-
		100	100	100

The high percentage of income derived from service in Lalu is because many RR people are occupied as teacher (formal and non-formal education).

Some of the RR people sell foodgrains outside Lalu, which is a grain surplus area.

Expenditure patterns are more or less the same as for the villages in Humla: Most of the income is spent on food and next comes clothing. A small amount is spent on medicines and celebrations.

Income spent on farming input is negligible, although in Lalu some money is spent on purchasing buffaloes once in a couple of years.

Sources of expenditure, compilation of four villages

Fooding
Clothing
Medical treatment
Celebrating festivals and fairs
Farming (Purchasing agricultural inputs, implements and seeds)
Purchasing livestock
Education for children
Miscellaneous (ornaments and so forth)

Livelihood strategies

In table 3.9 a summary is given for the main livelihood strategies in the study villages of Kalikot. As discussed in the Humla section, the agriculture is not mentioned as it is the basis for every family to sustain their livelihood, and is therefore a constant factor.

⁵ Deze data are derived from ward no. 1 only. No data are available on the resource poor from ward no 1, due to absence of all people representing this group

Table 3.9 Main livelihood strategies in the study villages of Dhandi Vigma and Sitala

Dhandi Vigma		Sitala ⁶	
Resource rich	Resource poor	Resource rich	Resource poor
seasonal migration to India	seasonal migration to India	trade (ghee)	seasonal migration to India
trade	labour	service	trade (ghee)
service	occupational work	occupational work	labour
---	---	---	occupational work

These figures indicate no major difference between the livelihood strategies of resource poor and resource rich people with respect to the use of natural resources.

Although resource poor people are engaged in caste specific occupational activities such as tailoring and blacksmith work, the contribution to the annual income is very poor.

Seasonal migration to India is the most important source of people's livelihood in Dhandi Vigma.

In Lalu, only the resource poor people go to India, not the resource rich. In Sitala 66% of the households went last year to India. This trend is increasing. However, people manage to earn some cash money in India and combined with the fact that nearly everybody in Lalu has one or more buffaloes for cash income, going to India is not a survival strategy as it is for the people in the other three villages.

3.4 Conclusions

- All villages are relatively poor, except the ones in Lalu. In Kalikot, people's economic condition seems better compared with Humla. In Dhandi Vigma and Sitala respectively 32% and 15% of the households have less than 6 months food sufficiency. In Piplang and Kharpel this is respectively 90% and 44% only. Attaining food sufficiency is thus the prime objective of all villagers except in Lalu. Agriculture as a basis for livelihood is not enough to survive.
- Because agriculture as a basis for livelihood is not enough to survive, people adopt many other survival or livelihood strategies. The most obvious one is the temporary migration of males to India. They save food by not being in their own village and they bring salt, clothes, utensils for the family. There is a difference between Humla and Kalikot. In Humla most of the people claimed they do not bring back any cash money to the village. In Kalikot the opposite is true: for example people from Sitala, Lalu VDC, can save up Nrs 2,500/month in India. This indicates that people from Kalikot

⁶ These data from Lalu are from ward no 1, the occupational caste is the only ethnic group here. It is also one of the poorest wards in the whole VDC.

can obtain better jobs, probably because compared to people from Humla they have better job networks (combination of contractors, lodgekeepers etc)

- Kamis and other people in Kalikot belonging to similar ethnic groups were found economically better off than their counterparts in Humla. However, they were still relatively poor compared to other population groups from their own village/VDC.
- In Humla portering and working as unskilled labour in development projects is considered as an important source of income.
- The practice of shifting cultivation is not an issue in Kalikot, neither were the sale of NTFP's mentioned as significant.
- Although most people can be classified as 'poor', one can distinguish different wealth classes, the resource rich and the resource poor. This differentiation is mainly based on access and control to resources as land, education, labour. Access and control over land (main resource) determines largely one's wealth. The poorest of the poor are often people from occupational castes.
- People's position in local resources management is likely to be influenced by ethnic background. For example, in Humla, Shahi communities regard themselves superior to other communities and they often dominate other communities. Therefore Shahi communities seem in a better position than other communities to control most of the resources (land, labour, time) in the village.
- These different wealth classes therefore adopt different livelihood strategies:
 - For poor people living in Humla and Kalikot, because they have very small landholding sizes, availability of productive labour within the family largely determines one's survival.
 - Resource poor, especially in Humla, depend more on encroachment of the forest for survival
 - Resource rich are more occupied with trade and services (need for education)
 - Resource rich raise more income from Jariboutis: they have more time for collection (access to labour) and even so better access to the market.
 - The resource poor do not invest in agricultural inputs, as they need all their resources (labour, cash) to feed themselves or to pay of their debts.
- The utilisation of natural resources is determined by the diverse nature of the farming systems in which forestry, agriculture and livestock are integrated with daily needs (food, fuel, medicine).
- The direct contribution of livestock to the household income seemed relatively low except for Lahu.

- People in neither of the four villages do invest significantly in external inputs as chemical fertiliser and pesticides.
- Due to lack of off-farm employment opportunities in the village, villagers consider implementation of development projects an important source of livelihood (wage earning) which, if available, is preferred above going to India.
- Understanding the economic condition or status of neighbours by neighbours in a group by using earlier agreed wealth indicators was found effective. However, before carrying out this exercise the objective should be clarified well to the villagers, because people's economical situation is a sensitive issue.



CHAPTER 4

LOCAL RESOURCES MANAGEMENT SYSTEMS IN PIPLANG

This chapter is about the natural resource systems, the management of natural resources and some crucial problems related to the use and sustainable management of natural resources, as perceived by the people of Piplang.

The following issues are discussed in this chapter:

- Relevant natural resources and natural resource systems according villagers' perception focusing on issues that they specifically want to bring out;
- Learning about locally-specific information about natural resources and their management systems; and
- Learning about problems and constraints within natural resource management systems.

To assess these issues the following techniques were used:

- participatory resource mapping and transect walks
- seasonality and trend analysis
- always in combination with observation and semi structured interviewing.

The mapping exercise helped the team to understand the village features, but also opened concepts and issues for understanding people's concerns with respect to local resources. Transect walks have been prepared for all study villages to identify landuse systems and the location specific problems. During the transect walks villagers were very enthusiastic to share their valuable knowledge about resources and their management. As this indigenous knowledge illustrates how people depend on resources as soil and vegetation, some interesting issues are described in this chapter.

After an inventarisation of the main issues in the village, all other discussion with help of trend and seasonality analysis were done to understand why management systems have developed to what they are now and how people adapt to changing circumstances. While discussing local resource management systems, emphasis will be given to:

- farm management
- forest management
- pasture and village grazing land management (*gaucharan*).

When reaching the boundaries of these adaptation strategies, people face constraints they have not been able to overcome yet. This chapter will briefly discuss the major problems encountered as expressed by the people themselves.

These will be described referring to resources as knowledge, labour and time which people allocate for a certain output (production).

4.1 Natural resource systems and their location.

Figure 4.1 is a copy of the social and natural resource map of Piplang drawn by villagers on the floor using local materials such as sticks, stones, leaves and pieces of chalk. People knew exactly what is where and who is who.

Although 77 persons (men and women) had gathered for the mapping exercise, in the beginning only few participated in drawing the map on the floor (Photo 4.1). Women silently watched and participated only when the study team particularly asked for. Simultaneously, despite the fact that the team did not ask, some other men prepared a map separately on a sheet of paper. Later, the two maps prepared independently by the two groups were shown to the participating people for triangulation. Some observations are given:

- In Piplang, people did not give attention to the political boundary between ward 1 and ward 2, although Piplang consists of two wards of Sri Mastha VDC.
- The people first showed the irrigation canal recently completed with financial assistance of the DIO. If it had been possible, people would have shown in the map that the new canal does not serve the purpose at all. People showed the alignment of the old canal, although it does not exist any more, despite many attempts to restore it.
- People showed the forest (*Majh-ko-Melo*, photo 4.2) that is located just behind the village. People have been protecting the forest in order to prevent possible landslides to damage the village. Showing the forest, many said, "Our village would have been washed away long ago, if we had allowed people to cut trees there".
- Although at the time of the study there was no temporary bridge over the Karnali river, people showed a temporary bridge in the map which they make every year during winter season to bring firewood, timber and litter from the forest located in Darma VDC at the other side of the Karnali river.
- People have begun only recently to convert bari land into khet land (after the construction of the present canal. People's concern for land use became clear, as they were very keen on showing khet land and bari land in the map.
- In the map, people showed summer season cattle sheds and pasture lands.
- Because people require grasses for making hay to feed their livestock during winter season, people's discussions also centred on the lack of grazing land and quality grasses there. The map shows the communal grazing land clearly.



Photo 4.1 Mapping in Piplang

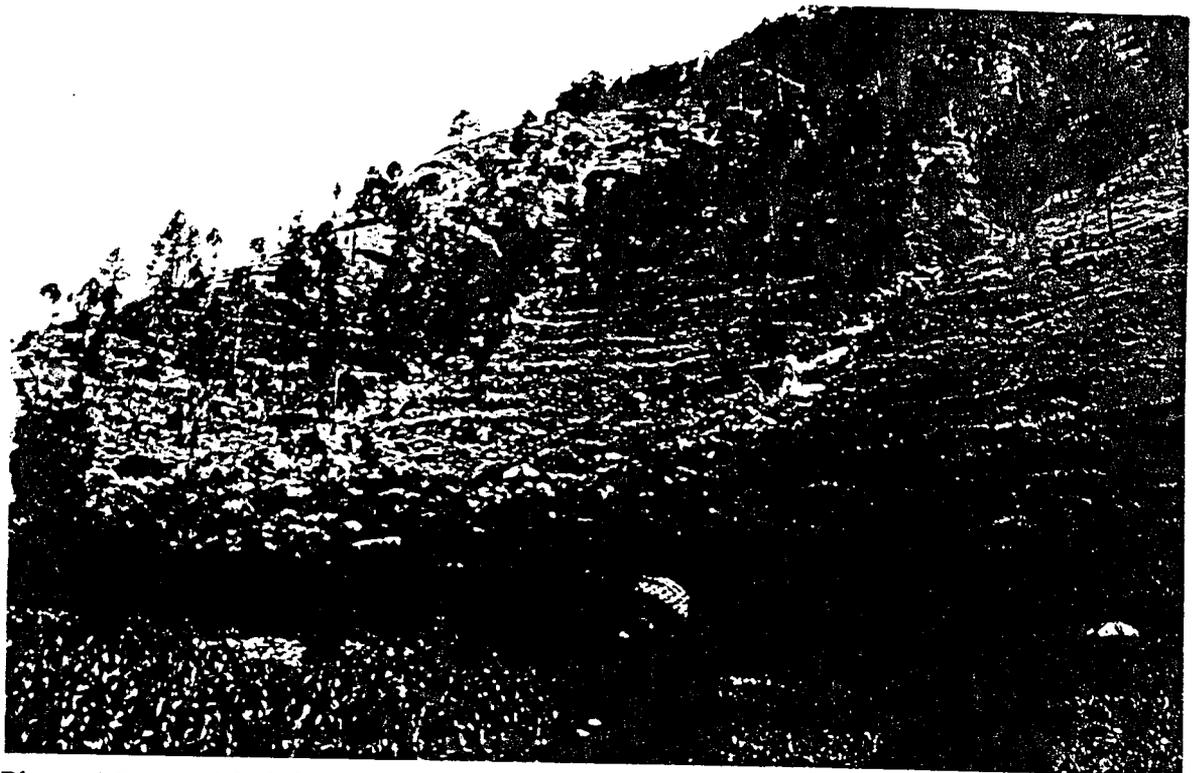
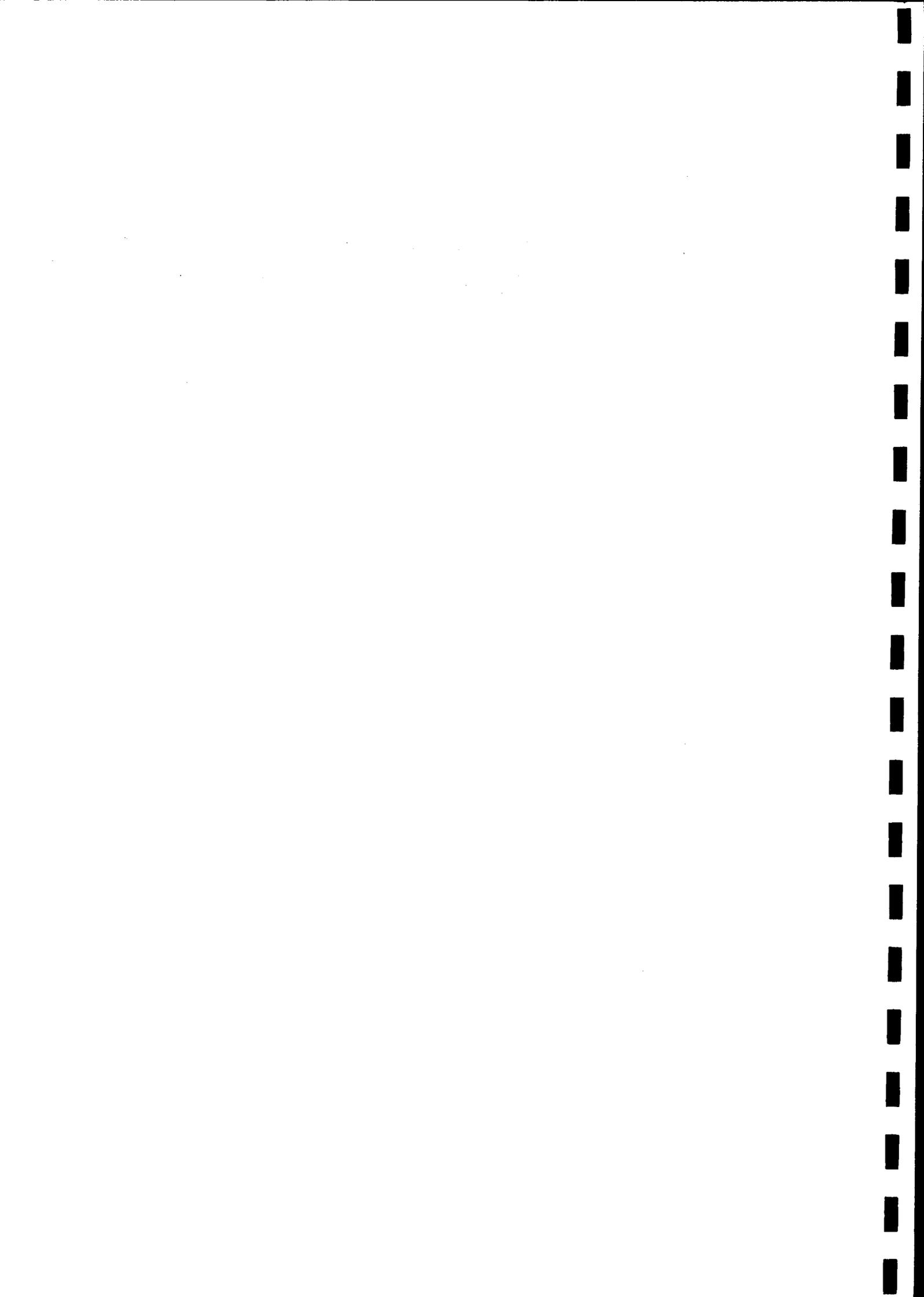


Photo 4.2 '*Majh-ko-Melo*', the forest which protects Piplang from possible landslides



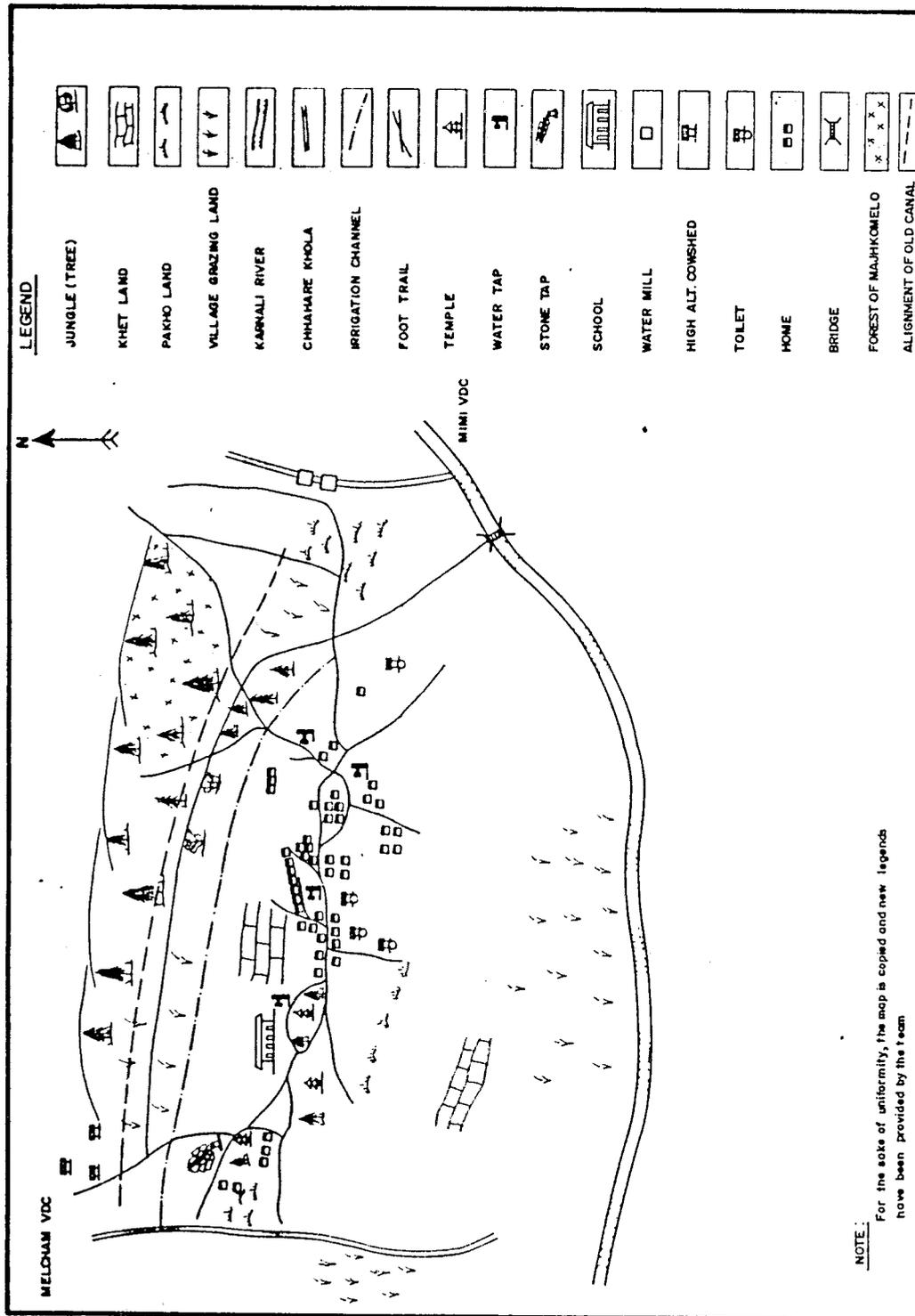


Fig. 4.1 Social and natural resource map of Piplang.

manage village grazing land better and allowed growing of grasses there. Thus, there was sufficient grass in the village for all cattle in the village.

Other common rules were set by the Mukhia such as the decision on which day the people could go to forest for collecting litter for the animals. According to the present Mukhia (Mr Chaturbhuj Shahi), he has lost authority regarding the date of bringing the livestock up. The system broke down following the restoration of the current multiparty system in Nepal in 1990. Many confirmed this, although collecting litter from the forest on a fixed day by all households is still practised. But at present it is the community, not an individual, who sets the date for collecting litter from the forest.

The *Nora* system is another local institution of Piplang which does not exist anymore. *Nora* is a watchman who looks after the animals when they stay in the village. He was selected by the people for a year usually on *Bhuwa Aunsi (Pousha)* and paid a fixed amount of cereals per year called *Newapathi*. For his services, the *Nora* used to receive 4 *mana* (one kilo) cereals per household per year. The main responsibility of the *Nora* was to look after the animals and to prevent them to enter other peoples' field and destroy the crops. This system saved a lot of labour for the individual households. In case of malfunctioning of the *Nora*, the main authority was the head of the village (*Mukhya*). However, the *Nora* system, which was regulating community issues and representing a certain community organisation, collapsed a few years ago in Piplang.

Reasons mentioned are:

- some just started not paying *Newapathi* despite that they had a large number of animals.
- after the restoration of democracy, the traditional village authority was not accepted anymore.
- since a few years ago, people refuse to work as a *Nora* because they do not agree on the payment to commensurate their labour.

4.3.3 Forest management system

People have recognised the need to protect the forest located north of the village (Plate and also see Figure 4.1) called *Majh-ko-Melo*. No one is allowed to cut trees there and collect litter because people are convinced, from past experiences, that a landslide will occur which could wash away the whole village. Last year, people planted 355 saplings of forest trees bordering the *Majh-ko-Melo* area. *Pawe Salla*, *Jumli Salla*, *Banjh* and *Bains* (willow) species were planted. The villagers were motivated by the community development programme of NCAR. However, hardly any plants survived due to the lack of proper management and technical supervision.

For collecting firewood, people are free to go to the forest any day a year. For one household about 1 *bhari* (30 - 40 kg) firewood lasts for 3 - 4 days in the summer and only for one day in winter. Therefore, almost every day, especially outside the agricultural peak season, one female member of the household needs to go to collect firewood. This increases the workload for women considerably. Firewood is also collected from the

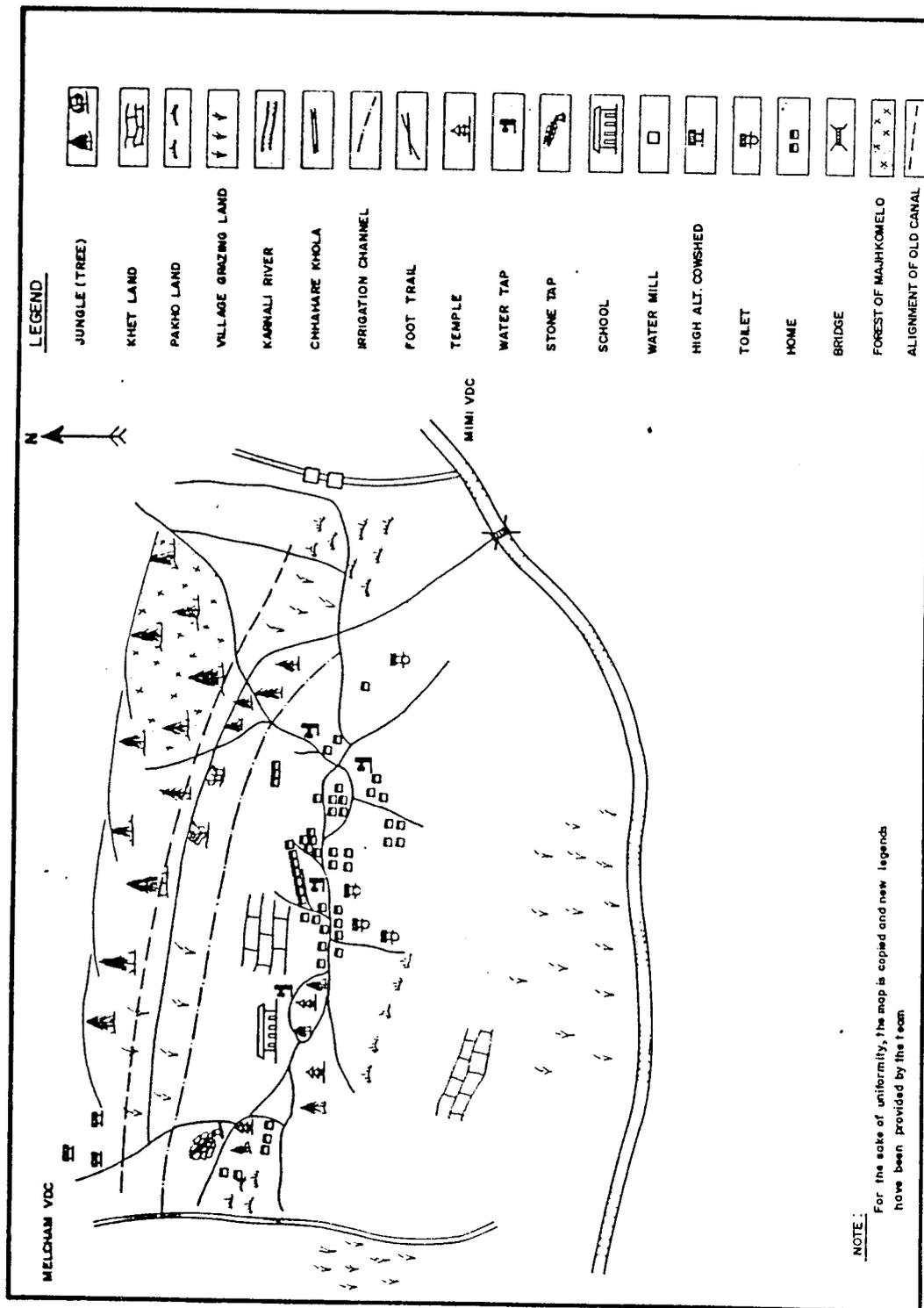


Fig. 4.1 Social and natural resource map of Piplang.



4.2 Land use

Using the natural resource map prepared earlier, sites and routes for the transect walks were planned in consultation with the villagers. Figure 4.2 presents the transect of Piplang. While preparing the transect, the variations found within the village land use systems are represented as much as possible. The figure for Piplang shows the following five types of land use:

1. Forest/Pasture,
2. Upland/Lowland (*Bari and Khet*)
3. Homestead (*Ghar bari*)
4. Upland (*Bari bari*) and
5. Village grazing land (*Gaucharan*).

The following section briefly describes the cropping systems based on different types of land use systems.

4.2.1. Cropping systems

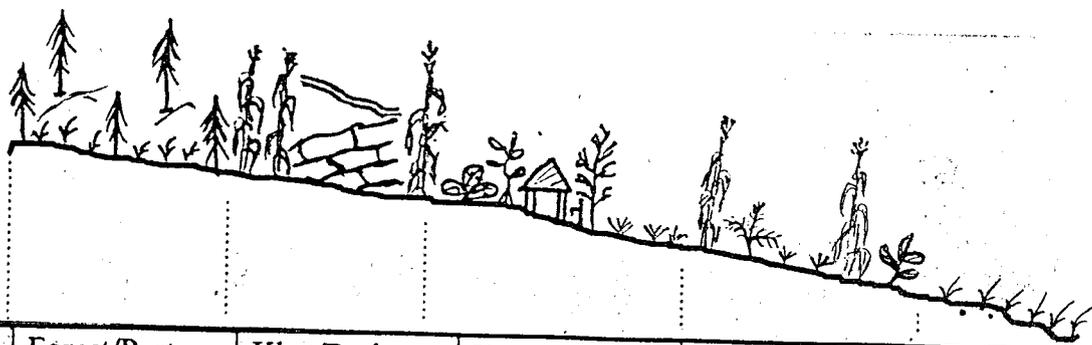
The transects show high diversity or variations in cropping systems within the same village. Depending on the soil, climate and availability of labour, farmers have evolved several cropping systems. Many different types of cropping systems were found within similar land use types or ranges. A diversified farming operation was found to protect people against a bad year.

As described in the transect, upland cropping systems also varied according to the location or distance from the village. Different soil types found is one reason. Most common found is the cropping of upland rice (*nan-dhan*), fingermillet and proso millet (*chino*). Rice/maize-wheat and rice/fingermillet-wheat cropping patterns dominate the homestead areas.

Interestingly, people planted foxtail millet (*kagumo*) around the upland rice crop and on the terrace risers. This was done to protect the crop from excessive weed infestation. Secondly because *kagumo* is drought resistant and performs well on these drier area's compared with the middle of the plot. Blackgram is also sown on terrace risers and as a sole crop in the middle of the farm plots. People said that blackgram improves the soil structure and the nutrient status of the soil.

Multiple cropping (the practice of growing several crops on the same piece of land) dominates the home stead (*Gharbari*) areas. According to the villagers, it has two advantages. Firstly, they believed that this practice enhanced farm stability and efficiency in the use of land and labour. Secondly, it reduces the risk of food shortage which is likely to occur if only one crop is grown per season. Farmers say that some year one crop performs better and in the next year another crop.

Vegetable growing is very minimal and limited to kitchen gardens. The area for kitchen gardening is also not encouraging. Planting fruit trees is not common.



Land use	Forest/Pasture	Khet/Bari	Homestead	Bari bari	Village grazing Gaucharan
Soil	Stony/gravel/ sandy	Black sandy	Black	Grey dry soil (Bhukya mato)	Sandy/ gravel
Vegetation	Aule salla, Babio	Bhimal, Titepati, Khadik, Bedu, Dhaturo, Bhango	Wild peach walnut, Bedu,	Titepati, Sisno, Fern	Thatch grass, Titepati Pirre, Babio
Cropping pattern	----	Maize-Wheat Rice-Wheat Millet-Wheat Millet-Fallow Chino-Fallow Chino-Wheat	Maize+Veg- Millet	Maize-Wheat Maize-Fallow Millet-Fallow Horsegram+ Chino -Fallow Blackgram+ Chino-Fallow	----
Livestock	Grazing during Jestha to Kartik (May/June - Nov/Oct)	Grazing during Mangsir (Nov/Dec) to Magha (Jan/Feb)	----	Grazing during Falgun to Baisakh when animals are brought back to village	----
Problems	Landslide, Shortages of fodder & firewood	Irrigation, Insufficient manure, Small size of landholding, Poor quality of soil	Diseases in vegetable crops Lack of government services	Insufficient manure No irrigation facilities Poor quality of soil	Landslide, Poor quality ground grass

Fig. 4.2 Transect of Piplang

4.3 Local natural resource management systems

The previous section described the available bio-physical resources used at farm level. How they are being used and managed by the farmers and how these resources are interlinked with each other and other resources like labour, knowledge and time is explained in this section.

4.3.1 Farm management system

In Piplang, almost all land can be characterised as upland. However, some farmers have begun to convert some upland located near the homestead to khet following the availability of irrigation water through an irrigation project which was constructed in 1989/90.

For plowing, people use a wooden plow which is light and small (Photo 4.1). Contrary to other areas, in Piplang people use a wooden blade as plough, instead of iron. According to the farmers, a wooden blade serves its purpose well as the soil is soft and has a limited soil depth. Not only is the wood from the *Bhanjh* tree durable and light for plowing but it also regenerates quickly after coppicing. Besides this, iron is costly and too heavy to bring from India.



Photo 4.3 A wooden plow used in Piplang

In Piplang, one progressive farmer (Janak B. Shahi) was experimenting with five local rice varieties namely *Basmati*, *Lotan Saro*, *Ratan Pur*, *Nandan* and *Kalo Ghatilo*. He was encouraged to do so because of (limited) availability of irrigation water. He is also experimenting with many types of local green manure species to improve the soil fertility.

Crops' seasonal calendars. Because the planting and harvesting season depends upon the climatic condition, the following crop seasonal calendar (Table 4.1) shows Piplang's general weather condition and the planting and harvesting season of the major crops.

Table 4.1 Seasonal crop calendar, Piplang

SN	Months	B	J	A	S	B	A	K	M	P	M	F	C
<i>Weather condition</i>													
1	Rainfall												
2	Snowfall												
3	Frost												
<i>Sowing and harvesting season of major crops</i>													
1	Maize		S	S	W	W				H	H		
2	Wheat	H	H							S	S		
3	Rice (upland)	S	W							H	H		S
4	Rice (lowland)		S	S		W				H	H		
5	Chino			S		H	H						
6	Fingermillet			S	S	W				H	H		

B = Baisakh (Note: colour's darkness shows intensity of rainfall, frost etc.)

S- Sowing season W- Weeding H Crop harvesting season

Participation in farming activities by gender. The farming operations performed do vary by gender. Table 4.2 shows the gender seasonality activity calendar for farming activities in Piplang. This table indicates that men exclusively are involved in ploughing and land preparation while women are involved in activities related to soil fertility management such as carrying manure to the farms, transplanting and weeding. Other activities are done by both sexes. This means that for farming operations, women work more than men. This even becomes more clear when one realises that livestock management is mainly a women's responsibility. No related specific roles for men in agriculture can be seen from the month of Pausha to Baisakh. It is during that time that men go to India in search for seasonal work.

Table 4.2 Gender seasonal activity calendar for farming activities in Piplang

SN	ACTIVITIES AND MONTHS	B	J	A	S	B	A	K	M	P	M	F	C
1	Soaking rice seeds in water												M F
2	Ploughing field (land preparation)		M										
3	Transplanting rice seedlings		F	F									
4	Weeding rice fields			F	F								
5	Harvesting rice							M	M				
6	Carrying rice to homestead							M	M				
7	Threshing								M				
8	Sowing wheat & barley seeds						M	M	M				
9	Threshing wheat and barley			M			F	F	F				
10	Harvesting wheat and barley		M	M									
11	Sowing maize												M F
12	Weeding maize		M	M									
13	Harvesting maize					M	M						
14	Threshing maize						M						
15	Carrying manure	F							F			F	

M- Male, F- Female

Soil fertility management

First of all it is noteworthy to mention that farmers are recognising very well the specific properties of the soils in the village regarding moisture holding capacity, fertility, texture,

depth etc. Besides poor soil quality in most fields, there is also a problem of declining productivity trends.

Farmers do have recognised this problem of declining soil fertility, but they have not yet been able to reverse this trend. In recent years the shortage of manure has forced the farmers to apply the cattle manure in a rotational way: if a plot receives manure in winter season, it will not receive manure in summer. Many years ago farmers would apply manure during both seasons. Because animals are moved to higher altitudes in summer season, winter crops receive more manure than summer crops.

Besides compost, which is not often well matured, people use several "weeds" like *Titepati* and *Bhango* as green manure or to make compost. Intercropping of leguminous food crops (pulses such as blackgram, horsegram and soybean) with maize is practised to restore soil fertility. Unfortunately these crops often fail due to insect infestation (blackgram).

People have not yet begun to use chemical fertiliser. The main reason is that they have little access to this input:

- Applying chemical fertiliser is a costly affair.
- Piplang is located at a distance of two days walking from the district headquarters and only the DADO is presently responsible for the supply of chemical fertiliser. There are no private dealers in the district.

But even with a huge amount of subsidies (approximately Nrs. 67.00/kg), using chemical fertilisers is not suitable for farmers because of the lack of adequate irrigation facilities and the poor soil quality prevailing in Piplang. Reasons enough to conclude that use of these external inputs is likely to be non sustainable.

In brief, the above suggests that only nutrients transfer within the components of the farming system can help farmers to maintain soil fertility.

Irrigation management system.

As indicated earlier, most of the land in Piplang is rainfed. Confronted with food shortages the farmers in Piplang have been trying to construct a canal for the village already for three generations long. They received some financial support from the District Council in 1977-78, and with voluntary labour the system could function properly for a few years. Due to physical difficulties however, (landslides, fragile slopes) the canal broke down quite soon. People tried to protect the slopes by planting a few trees, but this has not been effective.

In 1989, the DIO built an irrigation system from the same source but with a different alignment. The people reported that 30-lakh rupees were involved, but nobody could verify this. Probably the actual costs have been much lower (based upon personal observations of the system). Unfortunately also the DIO has no records. For the farmers this project is not very successful:

- the system has been designed completely wrong and although the source gives a lot of water, less than 50% is used.

- the construction shows many major defects and is not yet completed either (an iron gate valve, which was lying in the village still needs to be installed)
- the project has not being handed over yet (and probably will never be)
- some people's labour wages are still not paid

Apart from the technical defects the most striking feature was the complete lack of farmers involvement and as a consequence their ignorance about the project's design, costs and implementation procedures. They felt a complete lack of ownership. The inheritance is however, quite disastrous for the farmers, who have started to convert upland to lowland after this government intervention.

Despite insufficient supply of water, the people do not dispute who may convert upland to lowland. People have not yet thought about a proper water management system, mainly because the supply of water is still not significant. They find it important enough however, as this year people spent an amount of Nrs. 70,000 for maintenance and repair of the system. (Nrs. 50,000 from the "Build Your Village Yourself"(BYVY) program of HMG/N and an additional Nrs. 20,000 voluntary labour).

Plant protection

Among the cereals grown in Piplang, especially rice crops often get infested by insects and pests followed by maize and finger millet. Except 'loose smut' (a seed borne disease), wheat, naked barley and barley have no other pest problems. Proso millet seemed fairly resistant to major insects or diseases.

Farmers also talked about the incidence of locust (*Salaha*) and army worm on maize crops (the locusts were fried and eaten because people had insufficient food to eat).

Although only a small amount of vegetables are grown, few farmers have begun to use chemicals. Indigenous techniques are not practised in the village. Rather, few farmers were asking about timely supply of good quality chemicals. Whether they can purchase these costly chemicals is another issue.

Weeding is widely practised for all crops except for winter crops such as wheat. While weeding maize crops, people incline maize plants to touch the ground level. People said that this practice makes the plants' stalk strong as new root emerges from inter-nodes, causing the plants to be more resistant to wind lodging.

Postharvest technology

People have a tremendous knowledge about the appearance and use of local resources. This is logic as they have lived here for generations and largely depend upon these resources for their survival. In the following only one example will be given, as there is far too much to document.

Box 4.1 Postharvest technology in Piplang

In Piplang, people store cereals in permanent pits of 1 meter deep. The inside walls of the pit are coated first with *Bhojpatra* (*Betula Utilis*) and then the pit is filled with cereal grains. After covering the pit with *Bhojpatra* and plastering the pit with mud, cereal grains can be stored for years without being infested by insects/pests.

4.3.2 Livestock management system

As has been indicated earlier, people of Piplang have been following a migratory system of livestock management. Table 4.3 shows the movement of the different livestock types. The sheep are moved to the high altitude pastures (with good quality grasses abundantly available), the buffaloes go to the mid altitude level and the cattle stay at the lowest elevations just above the village. People said that buffaloes can not graze at lower elevations because the land is too steep for them. Each household keeps at least one permanent cowshed for buffaloes and one for cattle at the two different elevations. Cultivating the area around these sheds is quite common.

Previously it was not necessary to have land entitlement certificates (*Lalpurja*) for cultivating these areas. However, people have now recognised the need to receive such a document and during the recent cadastral survey people have been demanding for it.

Often the daughters of a family are engaged in going to the cow sheds, looking after the cattle and the cultivated land. Other members stay at home and become engaged in other farming activities. Since usually the daughters go to the shed, they have less access to formal education.

Sheep and goats are taken to the warmer, lower altitude areas as Kalikot, Bajhang, Dailekh and Jajarkot. Rice, salt and other items are brought back from these areas, transported by the sheep and goats. As this is Karnali zone's traditional system of trade and transport, jokingly, people have given the name of 'Karnali Truck' to the sheep and goats.

Table 4.3 Seasonal Calendar for livestock grazing areas

SN	Type of Livestock/Month	B	J	A	S	B	A	K	M	P	M	F	C
1	<i>Sheep and goats</i>												
	1.1 Grazing in low altitude areas												
	1.2 Grazing in village khet												
	1.3 Grazing in high altitude (Patan)												
2	<i>Cattle and Buffalo</i>												
	2.1 Stall feeding												
	2.2 Grazing in village gaucharan												
	2.3 Grazing in higher elevations (Goth)												

The above table also indicates how people feed their livestock in the village. Tree fodder is hardly used (except from little "Khadik"), mainly because the shading will effect the productivity of the crops. In the summer they do not need treefodder as there is not much cattle in the village. Cereals are not fed, due too food shortage of the people themselves. Quality of the grasses for grazing in the village area are reported to be poor. Species found are: *Pirre, Kose Ganjo, Furke Ganjo, Rate Ganjo, Salimo*.

Some people claimed that the village grazing area has decreased during the last years because some people have expanded their cultivated land. Therefore many people nowadays take their cattle to the grazing land located on the banks of the Karnali river.

An interesting thing about buffaloes is that people usually do not keep them in the village when they are brought back from the cow shed. They are sent to relatives and friends in other villages where it is less cold for buffaloes, and where more grasses are available than in Piplang.

Cattle is stallfed during the winter, because it is too cold outside. Hay (made in *Kartik* by the women) is fed during *Pousha* and *Magha*.

For collecting litter, the people of Piplang go to the forests located in Melcham, Darma and Mimi VDCs. They have collectively fixed one day in *Falgun* and *Chaitra*. People said that they have not yet encountered any kind of restriction from these VDCs.

Mukhia, Nora and livestock. It seems that, in the past years, there has been a relationship between *Mukhia, Nora* and the livestock management system in Piplang. "*Mukhia*" refers to the ancient institutionalised system of collecting land revenues at village level by the head of the village. Besides this, the "*Mukhia*" had an important role in the livestock management system. For example, he had the authority (given by the state) to decide at which date the animals had to leave for the higher elevations and vice-versa. No one would be allowed to keep animals in the village after this date, or bring the animals back to the village earlier, otherwise the person would be fined. This facilitated people to

manage village grazing land better and allowed growing of grasses there. Thus, there was sufficient grass in the village for all cattle in the village.

Other common rules were set by the Mukhia such as the decision on which day the people could go to forest for collecting litter for the animals. According to the present Mukhia (Mr Chaturbhuj Shahi), he has lost authority regarding the date of bringing the livestock up. The system broke down following the restoration of the current multiparty system in Nepal in 1990. Many confirmed this, although collecting litter from the forest on a fixed day by all households is still practised. But at present it is the community, not an individual, who sets the date for collecting litter from the forest.

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Reasons mentioned are:

- some just started not paying *Newapathi* despite that they had a large number of animals.
- after the restoration of democracy, the traditional village authority was not accepted anymore.
- since a few years ago, people refuse to work as a *Nora* because they do not agree on the payment to commensurate their labour.

4.3.3 Forest management system

People have recognised the need to protect the forest located north of the village (Plate and also see Figure 4.1) called *Majh-ko-Melo*. No one is allowed to cut trees there and collect litter because people are convinced, from past experiences, that a landslide will occur which could wash away the whole village. Last year, people planted 355 saplings of forest trees bordering the *Majh-ko-Melo* area. *Pawe Salla, Jumli Salla, Banjh* and *Bains* (willow) species were planted. The villagers were motivated by the community development programme of NCAR. However, hardly any plants survived due to the lack of proper management and technical supervision.

For collecting firewood, people are free to go to the forest any day a year. For one household about 1 *bhari* (30 - 40 kg) firewood lasts for 3 - 4 days in the summer and only for one day in winter. Therefore, almost every day, especially outside the agricultural peak season, one female member of the household needs to go to collect firewood. This increases the workload for women considerably. Firewood is also collected from the

forests of Melchaam, Mimi and Darma, the neighbouring VDC's. No conflicts with other VDC's have been reported. In the past years, few people collected Jaributi. However, they left the business because they had to pay too much royalties and it requires a lot of hassling with the forest authorities to lower the price of the royalties. It is also hard to get a good price as people are dependent on and exploited by local traders.

4.3.4 Gender considerations

It already became clear that women's workload in farming activities is high, table 4.4 gives an overview of all resource management related tasks performed by women. Although men also perform some of the mentioned tasks, it are the women who are most responsible. The last column shows the relative workload per month of women. Not mentioned are specific household tasks as cooking, fetching water, taking care of the children etc.



Photo 4.4

Mainly women are responsible for NRM related tasks.

Table 4.4 Major activities carried out by women in Piplang

SN	Months	Activities	Related to	Workload
1	Baisakh	-sowing upland rice -collecting stones in upland rice field	Crop management Soil fertility maintenance	□□□□□ □□
2	Jestha	-harvesting wheat panicle -cutting wheat stalk -carrying wheat stalk -threshing wheat -weeding upland rice -carrying manure	crop and harvest do do do do soil fertility maintenance	□□□□□ □□□
3	Asadh	-sowing maize, millet, chino, blackgram, horsegram -transplanting rice (khet) -weeding upland rice -carrying manure	Crop management do do Soil fertility maintenance	□□□□□ □□□□□
4	Shrawan	-weeding maize, fingermillet, horsegram, chino -transplanting fingermillet -carrying manure	Crop management do Soil fertility maintenance	□□□□□ □□□□□
5	Bhadra	-weeding rice (khet), fingermillet and chino -cleaning terrace risers	Crop management Land management	□□□□□ □
6	Aswin	-Harvesting maize cobs -Harvesting and threshing rice -Harvesting kaguno -Storing maize cobs -Drying maizecobs -cutting kaguno stalks -carrying manure	Crop harvest do do do do do do soil fertility maintenance	□□□□□ □□□□□ □□
7	Kartik	-plucking fingermillet -cutting fingermillet stalks -drying fingermillet panicle -making bundles of grasses -carrying grasses bundle to house -sowing wheat -managing forages for livestock -cleaning terraces and terrace improvement	Crop harvest do do Livestock Livestock Crop management Livestock Land management	□□□□□ □□□□□ □□
8	Marga	-carrying manure -collecting firewood -sowing barley -milling grains	Soil fertility maintenance Forest resource use Crop management Processing food	□□□
9	Pousha	-collecting firewood	do	□□
10	Magha	-collecting firewood -collecting litter	Use of forest resources do	□□
11	Falgun	-cutting grasses for livestock -making compost -collecting grasses -searching litter -collecting firewood	Livestock Soil fertility maintenance Livestock Livestock Forest resource use	□□□□□ □
12	Chaitra	-cutting grasses for livestock -collecting litter and firewood -carrying manure	Livestock Using forest resources Soil Fertility Maintenance	□□□□□ □□

4.4 Problems and constraints

Having presented briefly the local resources management systems, this section deals with problems which have been identified/recognised by the people themselves.

4.4.1 Getting poor yields, using high seed rates.

Table 4.5 gives the average seed rate and yields of the major crops in Piplang. This table shows not only a high seed rate but also strikingly poor yields of all major crops as compared to normal yields reported by research. Farmers do emphasise that the yields mentioned below are obtained only under circumstances of no drought and normal rains. People say, "*Weather is the king*".

Table 4.5: Average seed rate and yields of major cereal crops, Piplang

SN	Crops	Seed rate		Average yield	
		Local unit (Pathi/ha)	Standard unit (Kg/ha)	Local (Muri/ha)	Standard (Kg/ha)
1	Maize	1.5-2	35-45	2-3	925-1390
2	Wheat	10-12	230-280	1-2	460-925
3	Rice	4-6	65-95	2-3	650-975
4	Fingermillet	2-3	40-60	2-2.5	831-1040

When these data are compared with those found in government report's and statistics (see Table 2.), it becomes obvious that there is a discrepancy between actual productivity rates found in the field and data found in those reports. This becomes even more clear if we consider the declining trends in the production of maize and rice (Fig 4.3)

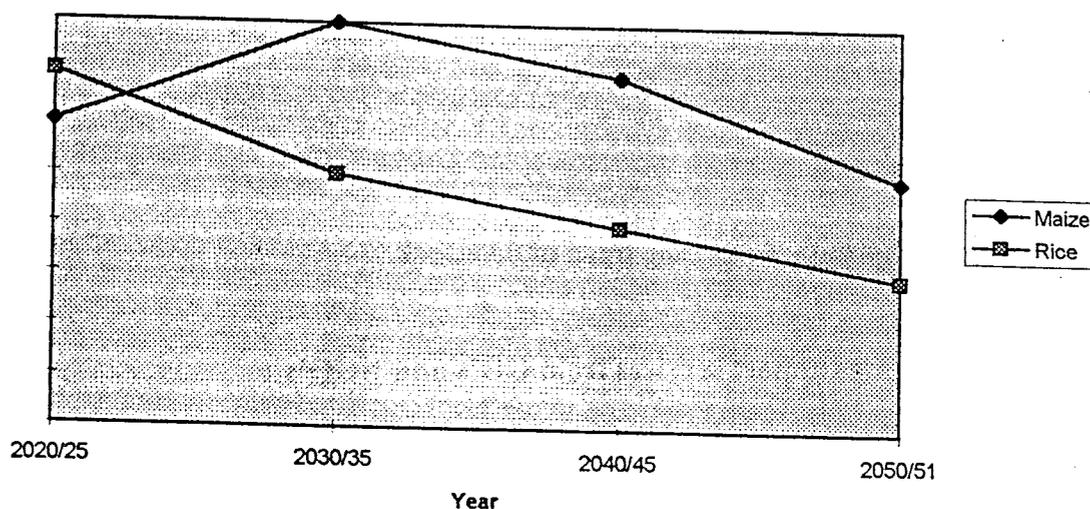


Fig. 4.3 Productivity trends of maize and rice in Piplang

4.4.2 Declining grazing land area and decreasing number of livestock

The area of cultivated land has increased, as a result, less area is now available for grazing. Another trend which can be found is the decreased number of sheep (some individuals have even abandoned sheepraising) and buffaloes. The reasons for the declining soil productivity trend are directly related with the amount of manure and therefore the amount of livestock per farm unit. The following trend figure (Figure 4.4) shows how the number of livestock (except cattle) has declined in Piplang in the past years.

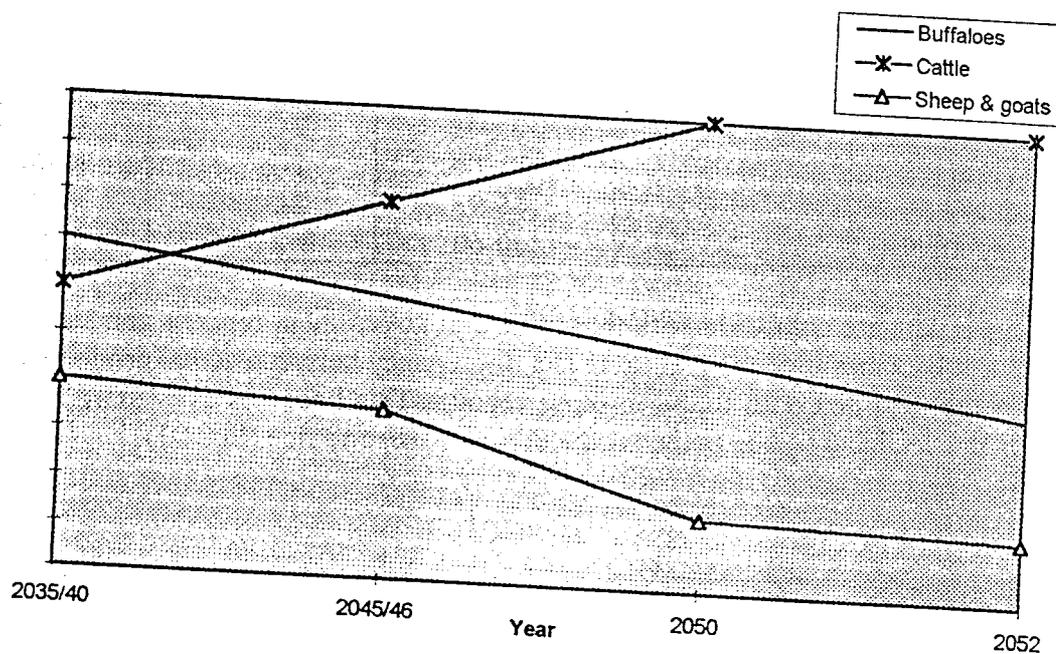


Fig. 4.4 Piplang's decreasing trend of livestock.

4.4.3 Inadequate support services from GO's and NGO's

Table 4.6 presents an overview of development interventions of Piplang. This indicates how meagre the support services for Piplang are currently. This was one of the major problems often mentioned by the villagers during the study period.

Table 4.7 Major development interventions in Piplang

Organisation	Name of the Office	Services available through	Since when	Major activities/remarks
Government	District Forest Office	Sarkighat	-	None
	Agriculture Development Office	Melchaam	1988	Providing training to farm leaders for using improved inputs which are not available locally.
	Livestock Development Office	Melchaam	1986	Training for Village Animal Health Worker with no monitoring and supervision
	Horticulture Farm, Darma	Darma	1972	Before the farm was privatised in 1993, although minimally, it used to provide outreach support services to farmers for fruit and vegetable cultivation, apart from availing vegetable seeds, fruit saplings etc. These days, farmers have no access to these services (see part III)
	District Irrigation Office	Simikot	1989	Constructed an irrigation canal which, according to the local people, is yet to be completed and does not function well.
Non-governmental	NCAR	Piplang	1990	Initiated an Women in Development programme through the support of the TBBP which has now become a community development programme under KLDP in 1994. Although the programme is yet to show visible impacts, presently it is running literacy classes and forming saving and credit groups for women, running poor village sanitation programmes and kitchen gardening activities.
	KLDP	Piplang	1990/1991	Provided a drinking water system in the village, which seems to be well managed by the villagers. Local people (users' committee) have taken full responsibility for daily supply, maintenance and repair.

4.4.4 Fodder shortage

In Piplang, despite that people often encounter fodder shortages for animals during winter season, when cattle are stall fed, they neither preferred to plant nor allowed regenerating naturally emerged fodder trees on terrace risers. Mainly because there is no practice of feeding tree fodder to animals and because people tend to avoid shading of standing crops. During summer season people do not require fodder to feed animals because they are moved to higher elevations for grazing.

4.4.5 Weak community organisation

Despite that a national non-governmental organisation (NCAR) has been working in Piplang for nearly 5 years, community organisation seemed very weak and people often did not trust each other. Local resources management systems of past years were not in place. Some people did not visit each others' houses because of pending conflicts. When KLDP facilitated people to form an users' committee for the drinking water system, they did so. However, such a committee was missing for the irrigation project. Many did not know clearly the purpose of women's saving and credit groups.

4.5 Conclusion

While learning about local resources management systems in Piplang, the following conclusions can be drawn:

In Piplang the indigenous knowledge about NRM is impressive and people are very much aware of the importance of the resources found locally (see use of Bhojpatra, local wooden plow, efforts to construct irrigation system etc.). A reason for this is that Piplang is a village which due to its geographical setting (remote, mountainous area, no access to markets) is very much dependent on internal resources.

In spite of this level of awareness, the past years show a declining trend in natural resources availability (declining production of major crops, decreasing number of livestock, less grazing land) and also in community organisation (break-down of Nora system). This indicates that the NRM systems in Piplang are far from static and very sensitive for outside and internal influences. Unfortunately, till so far external support (notably NCAR and DIO) has not been able to reverse these negative trends.

CHAPTER 5

LOCAL RESOURCES MANAGEMENT SYSTEMS IN KHARPEL

This chapter presents the local resources management systems in Kharpel village of Humla district.

5.1 Natural resource systems and their locations

While drawing the map, participation of women was not encouraging. Not only the physical presence of women during the mapping exercise was low, but also those who were present remained almost silent in a corner. When the team requested them to participate, very few came forward. They lost interest soon, because they were not heard by men in the exercise.



Photo 5.1 Extracting oil from Chuli (wild peach)

Besides their usual heavy workload, one of the possible reasons for women's poor participation might be the forthcoming Janai Purnima festival which requires women to bring red soil far from the forest to paint houses and to crush chuli (wild peach) to extract oil. Although using chuli for making cooking oil shows how people use available local resources, extracting oil from it seemed very tedious and time-consuming work for women (Photo 5.1).

In Kharpel, on the first day, participation of people was interestingly high, partly due to the fact that people were curious to know why a KLDP team was there. Who were the people in the team? Who sent them? And for what purpose? Another reason was that the study team had met many people earlier (immediately after arrival to the village) and briefed the purpose of the visit. In the beginning, many people seemed suspicious of the team. People's reasons for suspicion came to the surface during the mapping exercise and also during the following days (see section on Kharpel's problems and constraints).

Figure 5.1 is Kharpel's social and natural resource map which was drawn by villagers on the floor using locally available materials such as leaves, pieces of chalk. The map has been given new legends by the team for keeping uniformity. The following has been observed while the map was drawn.

- In the map, specifically, people showed dried water sources, areas where people have been practicing *Kundilla katne* (shifting cultivation practices) and village grazing land. This meant that the people of Kharpel did not make a distinction between the units of natural resources and the problems surrounding them.
- As stated earlier, wards 3, 4, 5 and 6 of Kharpunath VDC constitute Kharpel village. While drawing the map discussions centered around making boundary lines between the wards. For many, the boundaries between the wards had no meaning. They asked among themselves, "Why should we draw wards considering that Kharpel is a cluster of all these wards and we are using resources jointly".
- In Kharpel, people showed village roads and trails in the map as a reference point to different altitude levels in order to describe changes in cropping patterns and practices.

5.2 Land use

Kharpel's transect walk was carried out in such a way that the study team could observe kundilla areas, dried water sources and different cropping patterns. Partly, because people proposed this traject and partly because the study team was inspired to do so when people prepared the social and natural resource map. Figure 5.2 is a transect of Kharpel which shows six different types of land use and several cropping patterns: kundilla, farming around cattle shed (two elevations), homestead (Gharbari) and pakhobari and khet

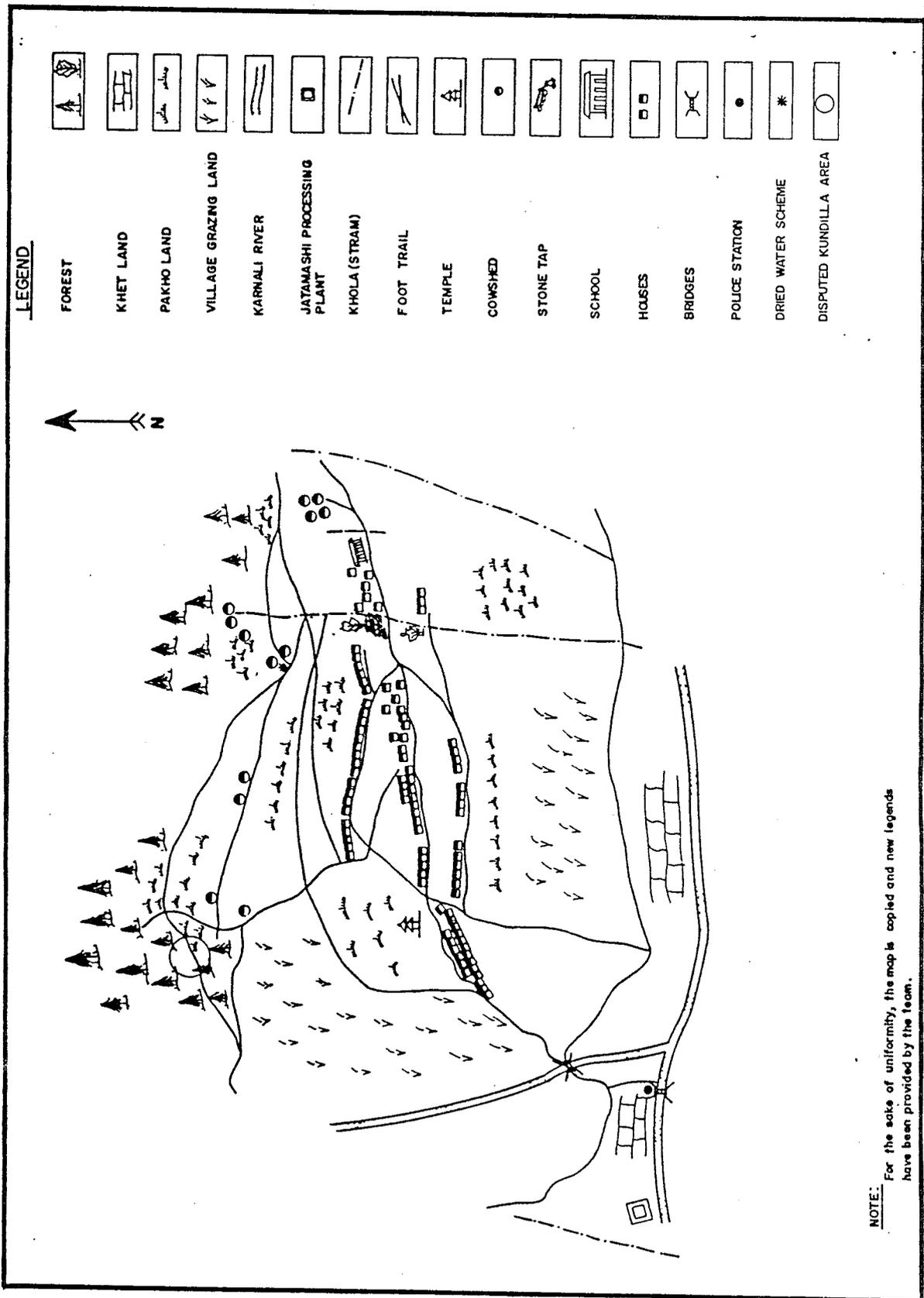
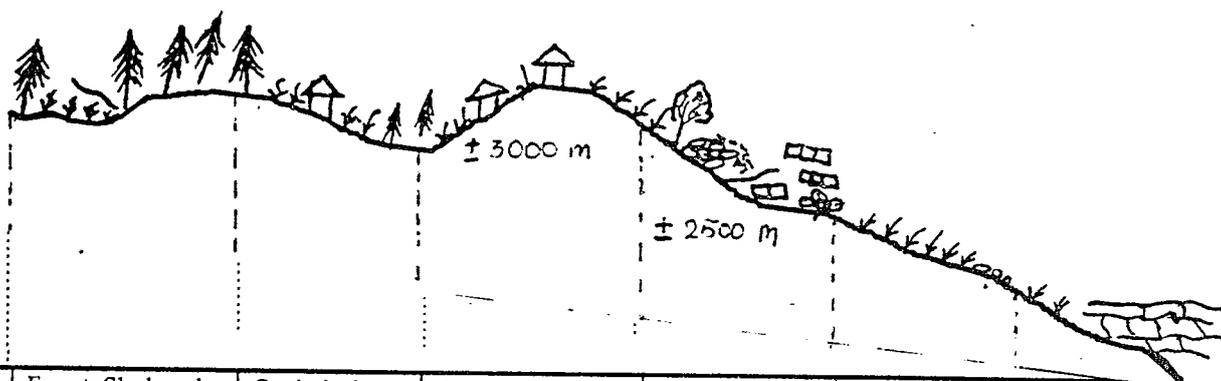


Figure 5.1 Social and natural resource map of Kharpel





Land use	Forest, Slash and burn	Cattleshed, Pasture and Pakho	Cattleshed and Pakho	Homestead	Upland (Pakho bari)	Lowland (Khet)
Soil	Black fertile	Gray, gravel	Black, stone and sand	Gray sandy	Gray sandy, stones	Sandy loam
Vegetation	Pawe salla, Timure pati, Guale pado, Dhuch, fern	Fern, Koyasi, Pawe salla, Chumlayo, Khamu, Bhango Titepati, Rainsh	Fern, Koyashi, Titepati, Pipal, Ainselu, Banjh Rainsh, Chutro, Dhatailo, Khamu, Khadik Chumlayo,	Bhango, Titepati, Kose ganjo, Khamu, Salla	Phurke ganjo, Kose ganjo, Jade ganjo, Biralcho, Pirre, Titepati	Chutro, Bedu
Fruit and vegetable	-	Potato	Apple, Chuli, Swisschard, Rayo	Tomato, Pumpkin, Chilli, Walnut Cauliflower, Peach, Apple, Chuli	-	-
Cropping pattern	Buckwheat+Potato +Wheat-Fallow Millet-Fallow Chino-Fallow Uwa- Fallow	Chino-Fallow Mustard-Wheat Wheat Buckwheat-Wheat Uwa-fallow	Buckwheat-wheat Mustard-wheat Chino-Fallow	F/millet-Uwa F/millet-Barley Chino-Barley Chino-Wheat Chino-Uwa	F/millet-Fallow Chino-Uwa F/millet-Uwa	Rice-Wheat Rice-Barley Rice-fallow Chino-Wheat F/Millet-Wheat
Problems	Deforestation, Forest burning, Conflicts for using the part of forest as "slash and burn" and shortage of fodder and litter in the forest	Lack of water for livestock Slash and burn	Lack of water for livestock, Drying of water sources, Breaking down terraces, slopes up to 80% (!) Poor quality of soil	Insects and diseases in fruits and vegetable, Labour shortage, Lack of irrigation facilities, Drinking water, Sliding down of terraces, Poor quality of soil	Steep slope (70%), Breaking down of terraces, Labour shortage, Lack of irrigation, Poor quality of soil	Labour shortage, Lack of manure, Insufficient irrigation water, Productivity low

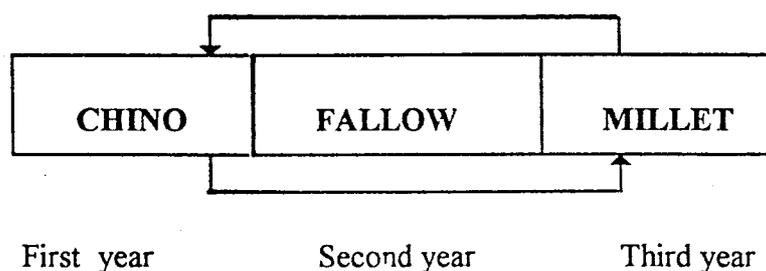
Figure 5.2 Kharpel's transect



5.2.1 Cropping systems

In Kharpel, people have adjusted cropping patterns according to altitude. Even a small increase or decrease in altitude affects the cropping patterns considerably. Apparently, people use here many types of cropping patterns in different elevations for two major reasons. Firstly, to spread risks of crop losses, for example by selecting short duration crops (e.g Chino and Buckwheat) with built-in resistance to extreme climatic conditions such as cold. Secondly, to optimize utilization of labour and ensure yield by following a particular cropping rotation in a particular area.

As for example, in some portion of the Takla area, since many years all farmers do plant either Chino or fingermillet in rotation. If Chino is grown in one half of the area, fingermillet is sown only after the plot has been kept fallow for more than a year. Thus, people harvest two crops in three years with more than a year of fallow period between Chino and fingermillet. This not only helps people to maintain the soil fertility indirectly but also protects Chino from *Saas Lagne* (people claim that Chino is not likely to produce grains when anyone enters field during flowering time. According to them, Chino is susceptible to people's respiration: *Saas Lagne*).



Unlike Piplang, in Kharpel, Chino and buckwheat cropping pattern was dominant in the upper part and fingermillet (transplanted) in lower parts. In winter, people take either wheat, barley or uwa. Multiple cropping dominates the home stead (*Gharbari*).

Vegetable growing (including kitchen gardening) was very nominal, although some chillies, tomatoes and cucurbits could be found in some areas as the study period happened to be in the rainy season. In addition to a few unpruned apple trees around home stead gardens, commercial apple orchards could be counted on fingers. People seemed reluctant to extend apple orchards primarily for two reasons. Firstly, because the lack of market and low price for fresh apple fruits. Secondly, woolly aphid infestation appeared to be high. As a result the encountered apple trees were in an ill shape.

5.3 Local natural resource management systems

5.3.1 Farm management system

In Kharpel (Photo 5.2) most of the farming land is found on extreme slopes (average of 70 % measured), terraces have been constructed to make agriculture at least slightly possible. Among others because of wind and frequent occurring earthquakes, the terraces are sliding down frequently, people need to struggle to keep terraces intact. Agriculture in Kharpel is therefore very marginal. (see Box 5.1).

Box 5.1 Terrace management in Kharpel

In Kharpel, people are very well aware of the fact that they cultivate slopes that are too steep for cultivation. Often they experience the negative effects of landslides destroying houses and land. The village is literally on the verge of collapsing. Regardless, people need to survive. They are doing this already for ages, therefore, they have in-depth knowledge on for example terrace management:

- The soil is sandy with little cohesion: when dry or saturated with moisture it comes down, only when the soil contains little moisture it stays where it is. People say for example that after two days of heavy rainfalls very often slides do occur.
- The high slope gradient of the terraces is because there is very little soil depth, often less than 50 cm! If the soil depth would have been more they would certainly have decreased the slope of the terraces.
- Most of the time there is a shortage of manure. In that case they apply manure only on the top of the slope to compensate with the lower part, as more nutrients are washed out at the higher part of the terraces. These nutrients are partly washed out to the lower part of the terraces.
- The terrace risers are deliberately kept green. The fact that these risers contain relatively many fodder species (observation) indicates that they purposely manage these risers. Selective weeding is practiced to ensure especially fodder and oil crops to grow there. They cut the unwanted weeds, if the weeds would have been pulled out, the next year these unwanted weeds would come back even more vigorously (Photo 5.3).
- Only few trees on the risers of the terraces can be found: some people tried to plant trees, but reported that the seedlings did not survive. Indeed, it is a dry area and survival rates on these soils are expected to be low.

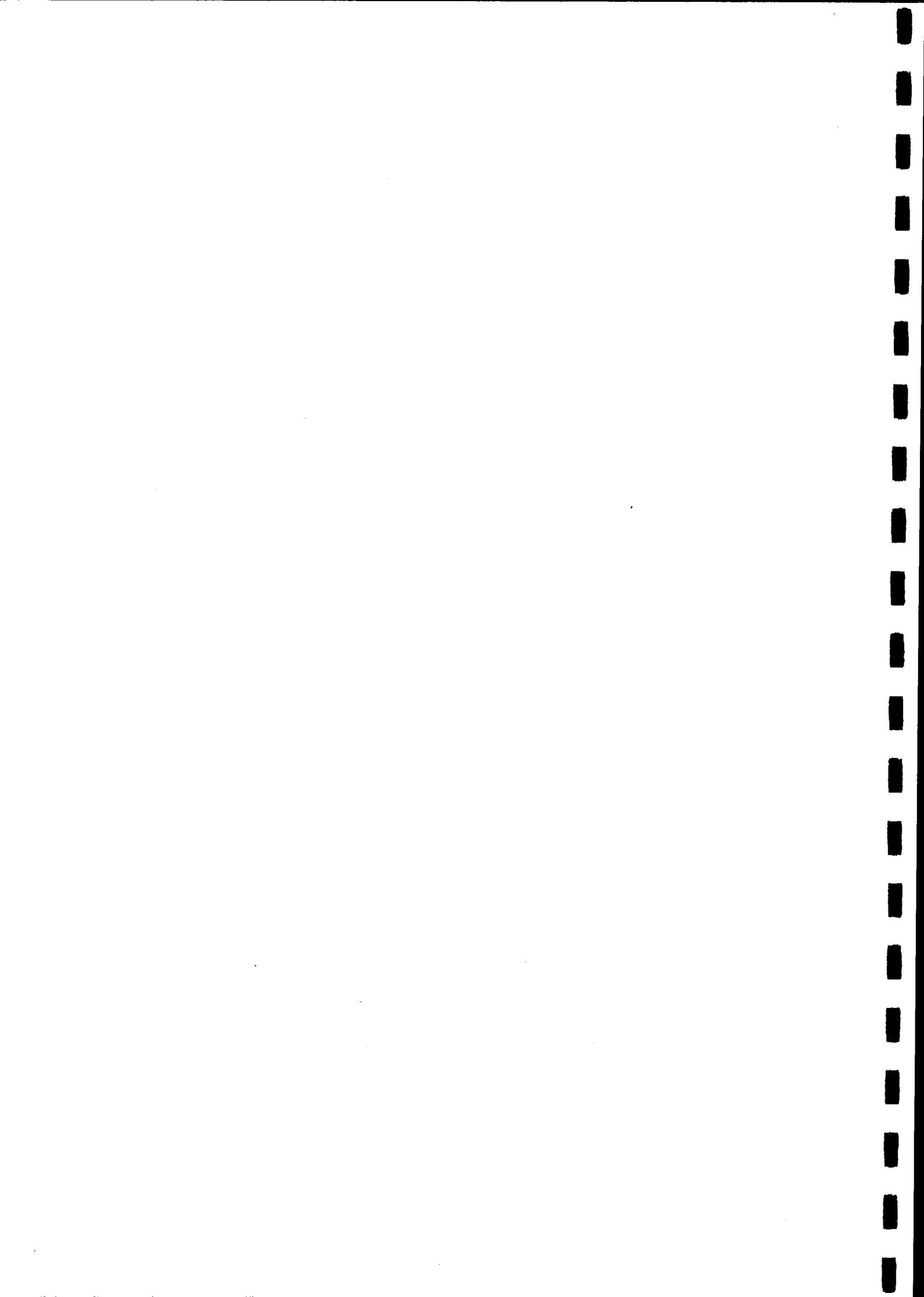
Most of the land in Kharpel can be characterized as upland (Pakho). Additionally there is some khet land along river side of Karnali, at an altitude of about 2,030.m. However, as a result of water shortage, many years it is not possible to transplant rice and people end in growing fingermillet.



Photo 5.2 Kharpel, built on an extreme steep slope



Photo 5.3 Terraces on steep slopes, green terrace risers in between



As has been stated earlier, in Kharpel, cropping patterns vary by elevations. They are shown in the transect (Figure 5.2), the following Table 5.1 shows Kharpel's seasonal crop calendars in different areas which are located at different altitudes.

Farming is traditional in Kharpel, people do not use improved varieties of seeds and fertilizers for any crops, except one farmer who reported using limited amounts of chemical fertiliser for he had no livestock to make manure.

Table 5.1 Kharpel's seasonal crop calendar by areas

SN	Crops	B	J	A	S	Bh	As	K	M	P	Ma	F	C
1. Thana													
	Wheat				H		S						
	Buckwheat				S			H					
	Mustard				S			H					
	Chino	S					H						
2. Takla													
	Chino		S				H						
	Fingermillet							H				S	S
3. Bhukachaur													
	Wheat				H		S						
	Buckwheat				S			H					
	Chino		S				H						
4. Bansegaro													
	Fingermillet			S			H						
	Uwa							S	S				
			H	H									

Note: S - Sowing and H - Harvesting
B - Baishakh and C - Chaitra

Resource flows within the farm system

In order to understand the resource flows (in-flow and out-flow) in Kharpel, people were asked to prepare a community resource flow map (Fig 5.3) to illustrate the external and internal linkages and interrelationships among various components of the farming systems. Although not asked specifically, people showed first the in-flow of nutrients to the components of the farming systems. The out-flow (production) from the components (e.g. farm, forest and homestead) was only indicated when asked for. This indicates that especially the flow of nutrients to the system is very important to the people. Indeed, this is particularly crucial when people depend much on the internal, local resources for farming.



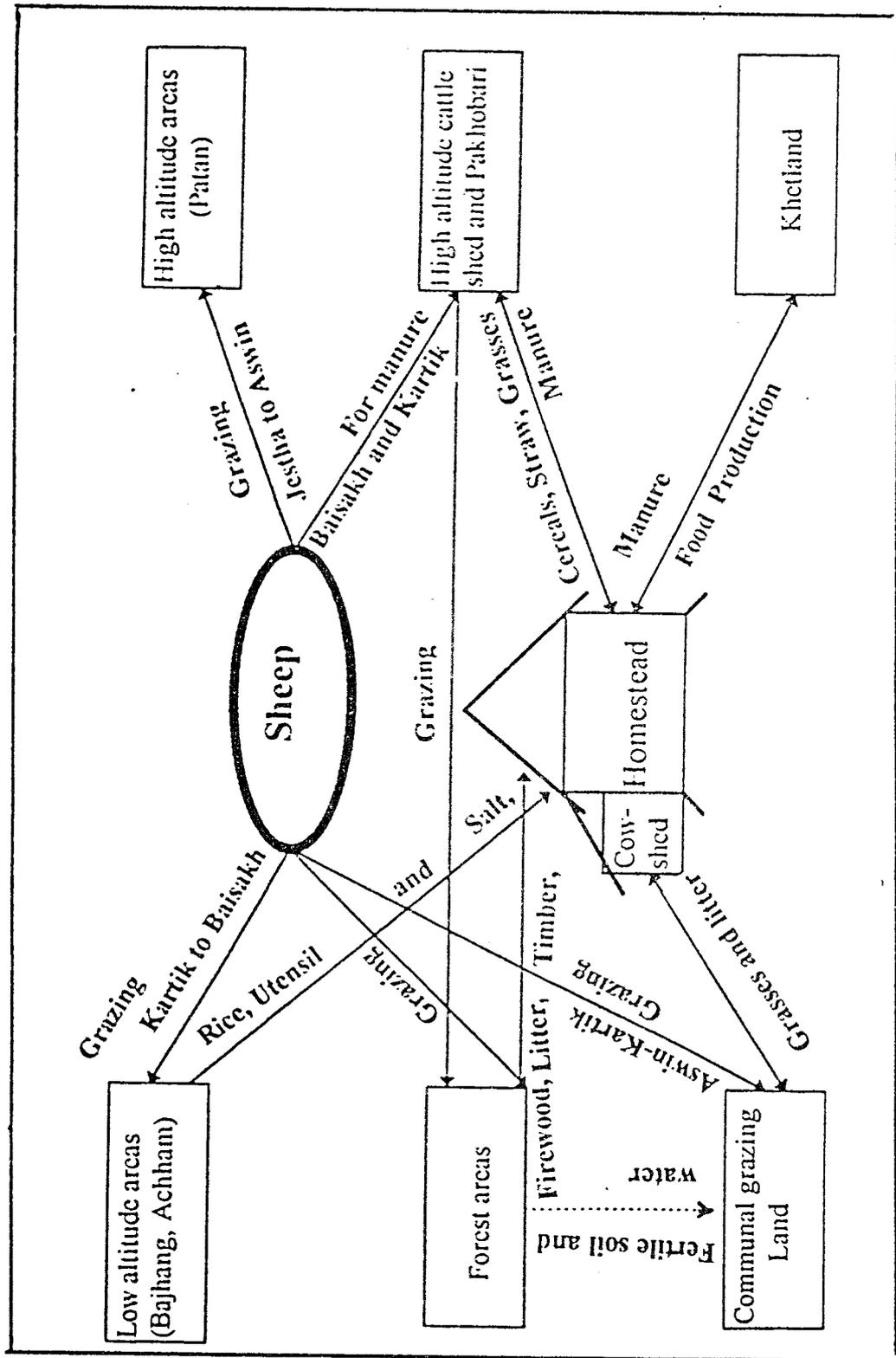


Fig. 5.3

Resource flow diagram of Kharpel



Soil fertility management

As shown in the resource flow diagram, people of Kharpel maintain the fertility of their soil by the methods described below:

- a. Following a migratory/transhumance livestock management system- As discussed in Piplang, cattle are moved to higher elevations areas during summer season so that the manure obtained from them can be used for the upland fields located at these areas.
- b. In situ manuring of fields by sheep tethered at night- In Kharpel people consider sheep as an important resource for improving the nutritional status of the soil. During winter sheep do graze at low altitude, relatively warm areas (Bajhang, Achham, Kalikot and Surkhet), while during summer they graze at high altitude areas (pasture land or Patan located at Saipal Himal and Limi Himal). While moving between these to grazing areas, people keep them for about a month in the village. In the village, these sheep are shifted from farm to farm for field manuring. The land owner is responsible for taking care of the sheep at his farm land. People said that they are following this practice since many generations, presently about 20 percent households in the village have sheep..
- c. Applying manure in rotational way- As in Piplang, people of Kharpel have been forced to apply the cattle manure in a rotational way: if a plot receives manure in winter season, it will not receive in summer. Before, farmers had sufficient manure to apply in both seasons.
- d. Keeping fallow period- Usually, people take single rice crop in Khet land during summer season followed by fallow in winter so that soils get time to recover and yield better. Likewise, as discussed earlier, people take two crops in three years in Takla and other high altitude areas. This provides sufficient time for the soil to regenerate its nutritional status.
- e. Manuring terraces- Terraces receive most of the time only manure at the upper part (see box 5.1)

Irrigation management system

For upland (Pakho land) areas, there is no irrigation facility. Recently, people have formed an user committee in order to construct a sprinkler system of irrigation which is financed by the World Bank under its ILC project. The project is being constructed under the supervision of the District Irrigation Office. The people of Kharpel are to provide voluntary labour service as agreed upon (10 percent of the total estimated amount of Rs 80,45,964.00). The main task of the user committee is to manage the provision of the voluntary labour service. According to many, getting such a huge amount of voluntary labour is not a problem because it is a crucial project which will help people of Kharpel not only to increase production, but also provide cereal grains milling facilities.

It should be noted here that the neighbouring village of Yangtsu already has many water mills and that these two villages (Yangtsu and Kharpel) are in dispute for many generations for the access to water and forests, which are located in Yangtsu and used by

Kharpel). Therefore, if Kharpel would have its own watermills, the people would be less dependent of Yangtsu. It was also mentioned that the watermills would decrease the workload of especially women.

The importance for irrigation water is illustrated by the example of a local teacher from Kharpel who remembered how he had a hard time to get a wife a few years before because in Bajhang¹, where most of the married women in Kharpel come from people did not want to marry their daughters to Kharpel due to its lack of water and milling facilities.

The construction of the proposed irrigation project has already been started, although there is no detailed design and sufficient budget and despite of a dispute which resulted in a case pending to the Supreme Court, which will be discussed later in this chapter.

For irrigating Khetland, people have a small old irrigation canal (*Kulo*). Although there is a shortage of water, there is no users' committee to control the distribution of water and maintain the canal. This year, people used some money of HMG's BYVY scheme to repair the canal. However, the problem of water shortage is far from being solved.

Plant protection

Farmers did not report major insects and pest infestations in crops except loose smut and rust diseases in wheat and stem borer in *Uwa*. For controlling rust, people said that they do smoke crops by burning the leaves of *Pawe Salla*. When *Chino* is reported to be affected by *Saas Lagne*, cow's *mohi* (liquified curd extracted from butter) is sprayed on the crop. Likewise, ash is sprayed if vegetable crops, particularly cauliflower, onion and turnip, are infested by insects (aphids). In Rice, weeding has become a problem due to increasing spread of *Sawan* (*Cyperus* spp.) weeds. Especially in the Takla area, farmers need to weed the plots with fingermillet as many as four times (compared to only once normally). For every hal land (1.5 Ropani), 6-7 persons are required for this weeding practice.

Post harvest technology

In Kharpel, people store cereal grains in pits using *Bhoj patra* like in Piplang. However, they can't make pits in front of houses or at the side of the village road as the village is situated on sloping land and the houses are clustered and standing very close to each other. Instead, they make pits inside the cattle sheds.

5.3.2 Livestock management

Because of too steep land and heavy snowfall, buffalo keeping is not possible in Kharpel. Therefore, people of Kharpel only raise sheep and cattle. Cattle mainly provide manure and draft power for farming. Table 5.2 shows Kharpel's seasonal calendar for feeding cattle and sheep.

¹ Since generations male Shahi Thakuris living in Humla district usually go to Bajhang district for marriage with Singh Thakuri women.

Table 5.2 Kharpel's seasonal calendar for livestock grazing

SN	Type of Livestock/Month	B	J	A	S	Bh	As	K	M	P	Ma	F	C
1	<i>Sheep and goats</i>												
	1.1 Grazing in low altitude areas												
	1.2 Grazing in village khet												
	1.3 Grazing in high altitude												
2	<i>Cattle</i>												
	2.1 Stall feeding												
	2.2 Grazing in village gaucharan												
	2.3 Grazing in Goth												

B for Baisakh and C for Chaitra

Sheep remain in the village only for 30-40 days, but the months that they are in the village vary.

Since the drinking water sources in the goth area dried out, cattle are allowed to graze in village gaucharan during summer time.

In the past, sheep were a major source of income. These days, their contribution to the local economy has dramatically decreased because of the reason illustrated below (Box 5.2). The main purpose of the box is to show how a well intentioned program can affect people living in other non-targeted areas adversely.

Box 5.2 No grazing for Sheep and Goats

In the past, people living in warmer areas (Kalikot, Dailekh, Aachham and Surkhet) were pleased when sheep and goats were brought to their villages during the winter season for grazing. People offered voluntarily milk and cash to sheep owners and cereals to sheep and goats because they required manure for improving the nutritional status of soil. However, nowadays, people do not welcome them any more because of two main reasons:

Firstly, in the mid hills, people have established community forests as promoted by HMG's extensive community forestry development program, among others because people need to protect their forests for themselves as they do have shortage of fodder for their own animals. Therefore, to harass sheep herders, people have begun to levy tax when sheep and goats are brought to their villages for grazing. Levying such taxes is also supported by the forest act as it is crucial for the promotion of community forestry programme.

Secondly, in the mid hills, many people have begun to use chemical fertilizers. Hence, in-situ manuring by sheep and goats for improving the nutritional status of land is no more necessary.

Besides the installment of taxes, the import of subsidised food is making the migration of sheep and goats from the high altitude pastures in Tibet to the warmer districts less profitable. People used to bring salt from Tibet and foodgrains from the lower areas. Nowadays the lower districts are provided with salt and the higher areas with food grains from food supply schemes. Before, people used to get four parts of rice for one part of salt, while at present people only get two parts of rice for one part of salt.

Because keeping sheep and goats has become problematic, sheep owners had formed an user committee on 1988 facilitated by District Livestock Office for the purposes as timely provision of vaccination and improving the management of grazing land (Patan). However, the committee became automatically defunct when the District Livestock Office was merged into the District Agriculture Office to form the united District Agriculture Development Office in 1992². The fund raised through monthly fee from the members has until now remained unused in the Rastriya Banijya Bank, Simikot.

Not only raising sheep became difficult in the past years, also keeping cattle became very problematic due to recent drying of water sources in forest areas. As a result, people have begun to keep cattle in *Goths* newly constructed around the village. People are concerned, because now they need to drink water from the same source where animals drink. In that sense, the fact that KLDP is nearly to complete a drinking water scheme, is getting even more important for the villagers of Kharpel.

At present, there is no communal management system in the village through which animal movement to high altitude *Patan*, *Goth* or low altitude warmer areas is controlled.

5.3.3 Forest management system

People of Kharpel have formed rules to collect litter from the forest. They know that collecting litter haphazardly is harmful to the health of forest. Therefore, people collect litter only during the months of Chaitra and Baisakh after the elected Ward Chairman decides about the date. Upto 1977, the *Rokaya* was responsible for regulating litter collection. According to the key informants, the system demised when some rich and powerful people skipped paying earlier fixed amount of cereals. Also now the same rich and powerful people, do not obey the system by bringing litter from the forest at any time. No one dares to fine them for they are rich, powerful and of high status. People collect litter from Cholakhar ko Ban, Siyala Ban, Dhudang Ban and others. Fern or *Uniyu* is highly liked by people for litter. They say, "*Uniyu* never flowers, stone never grows".

Firewood collection is an everyday business as people bring firewood everyday when they have no work in the farm. Although both men and women collect firewood, the work especially is done by women. People need firewood more in the winter, but during this season it is more difficult or not possible to collect due to heavy snowfall, that is why people collect most of the firewood during the summer season. People bring firewood mainly from Ghetto ko Ban and Cholakhar Ko Ban..

Kundilla katne or 'slash and burn' is widespread in Kharpel. Box 5.3 shows people's seasonal calendar for 'slash and burn'. People claimed that they receive more yield per unit area (nearly three times as that of upland) and relatively need to invest less labour. Some said that they would not have survived till now, if they had not begun Kundilla Katne some

² Since July 1995 these two offices are again seperated.

10 years ago. People have begun *Kundilla katne* extensively since 1982/83 when there was a draught in the village. (photo 5.4)

Box 5.3 Kharpel's seasonal calendar for *kundilla*

Falgun/Chaitra-	Felling trees in the forest
Jestha-	Burning forest
Jestha/Asadh-	Land preparation (Digging/hoeing)
Jestha/Asadh-	Sowing buckwheat
Shrawan-	Cutting new flushes
Aswin-	Cutting new flushes
Bhadra/Aswin-	Harvesting buckwheat

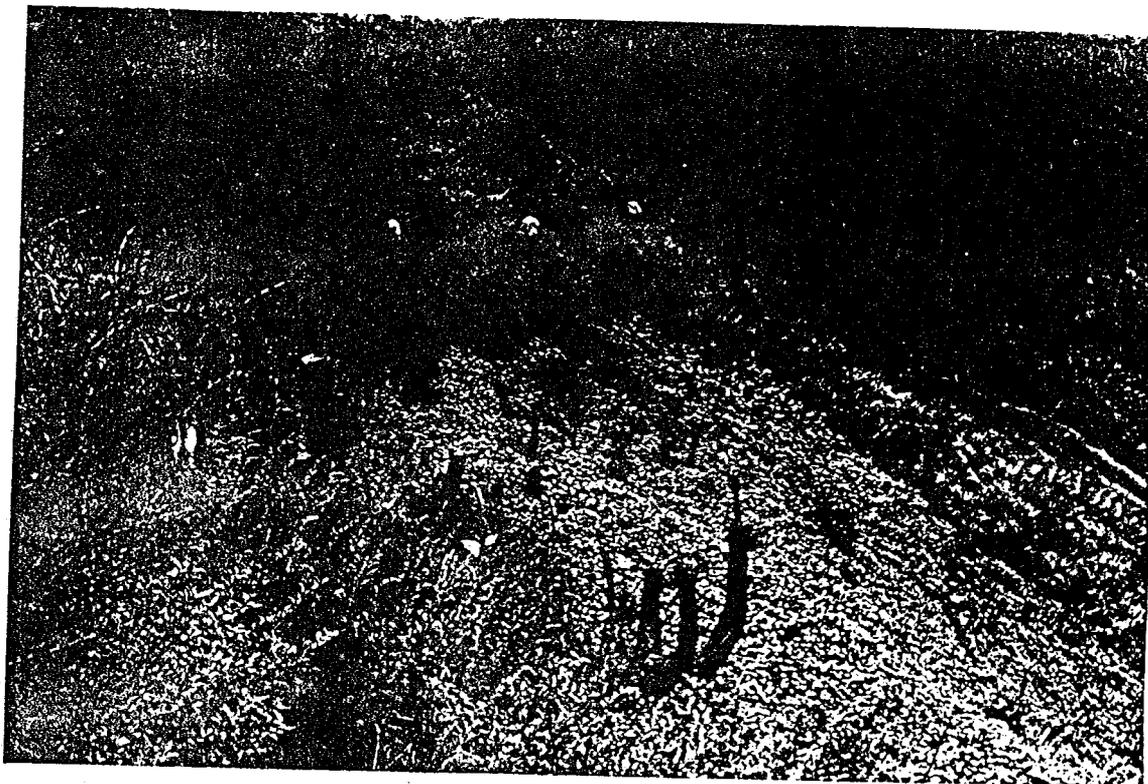


Photo 5.4 *kundilla kaatne* or slash and burn area in Kharpel

Non Timber Forest Products *Jaributis*

People of Kharpel have been using forest, particularly located in remote areas from the village settlement, for collecting *Jaributis*, non-timber forest products usually traded to India, often in large quantities, as raw materials for the production of essential oils, resinoids, spices and herbal medicines. Indeed, Humla district is resource rich with respect to valuable and rare *Jaributis*. Of many *Jaributis* found in Kharpel areas, the following are used by people for different purposes as given below:

Jatamansi (<i>Nardostachys jatamansi</i>)-	Trading purpose
Gutche chyau (<i>Morchell</i> species)	Trading purpose
Katuki (<i>Picrorhiza kurro</i>)-	Trading purpose
Gandhaino-	Medicinal purpose (Stomach pain)
Nirmasi	Medicinal purpose (Treating old wounds and pus)
Padamchalnu (<i>Orchis latifolia</i>)-	Medicinal purpose (Using as a tincture iodine for fractures and cuts)
Tite (<i>Swertia chirayita</i>)-	Medicinal purpose (Stem used for controlling malaria)
Ghia-	Medicinal purpose (Treating for internal hotness and cracking lips)
Red buj	Medicinal purpose (Red dysentery)
White buj	Medicinal purpose (White dysentery)

Especially Jatamansi and Gutche chyau are important to people of Kharpel from economic point of view. This study specifically focuses on Jatamansi collection, although Gutche chyau gives high profits. In 1995, its price was approximately Rs 4,500 to Rs 5,000 per Kg at Simikot, Humla local market.

Until recently, some village middle men and traders used to collect Jatamansi from the villagers at a very low price, not more than Rs 10.00 per kilo. Very few people collected Jatamansi, because the price did not commensurate to their labour.

Initiation of a district based Non-Governmental Organization, Humla Conservation and Development Association (HCDA), through the technical support of Kathmandu based Asian Network for Sustainable Agriculture (ANSAB) and Appropriate Technology International, Washington, USA provided an opportunity for the villagers to collect Jatamansi from the forest. HCDA aims at organizing local people for sustainable harvesting of jaributi and enhance their commercialization. Having collected Jatamansi from the local people, HCDA extracts oil from it through distillation and export to foreign countries. People of Kharpel said that in 1994 they received about Rs 1,50,000 from HCDA for Jatamansi. This means that people collected about 5,000 Kg of Jatamansi last year (@ of Rs 27.0 per kilo). The price of Jatamansi seems fairly high and people seemed motivated to collect it having found a ready made market, as has been evident from the sale and capacity of oil distilling factory. In 1994, the factory had collected about 30,000 Kg of Jatamansi. The factory operates for about 300 days a year by running 24 hours a day. It consumes about 8 to 9 quintal firewood per day, that is 2,400 to 2,700 Quintal per year. HCDA realises that they utilise an enormous amount of firewood and therefore they have (not yet concrete) plans to use hydropower and they have an additional tree plantation programme. It is not known if this tree plantation programme is successful and

if it possibly could provide sufficient regeneration of the forest compared with the firewood necessary for the oil distilling factory.

Although the price of Jatamansi offered by HCDA seems not low as compared to the price paid by traders, it is interesting to note that the price of Jatamansi per kilo in 1991/92 in eastern hills was already Rs 50.00 (Edwards 1993). Likewise, in 1993/94, its price was Rs 24.00 per kg in Dolpa district (Den Hertog 1994).

This year, finding jatamansi has become a difficult task for the people of Kharpel, at the place where people collected in 1994, close to Kharpel no jatamansi can be found anymore. HCDA realizes this difficulty and also because one of its objectives is to maintain the bio-diversity in Humla, it has formed a user committee in a.o. Kharpel which is to control on harvesting time and amount in order to oversee that the resource base is not heavily overexploited. However in Kharpel, it was not clear what the user committee was doing to guide and control people in using the forest more sustainable.

Likewise, it was not clear how HCDA would assure that people collect jatamansi in a sustainable way, although it was said that they would not allow people to collect from the same area without an interval of five years. Establishing regeneration plots has not yet begun and seems difficult as little is known about its botanical features and regeneration capacity. HCDA stated that they only bought jatamansi which has been harvested in a sustainable way without the roots. In Kharpel however, this way of collecting is not practiced yet, and it was not confirmed that HCDA does not buy jatamansi which has been collected in a non sustainable way.

5.3.4 Gender considerations

In Kharpel, the farming operations by gender division were found almost similar to Piplang (See Chapter 4). It should be mentioned here that the month for a particular activity might vary slightly here as compared to Piplang, as required by the differences in climatic conditions. However, unlike Piplang, people of Kharpel do not allow unmarried daughters to carry manure (*Mal-ko-Doko*) to the field, even though carrying *Mal-ko-Doko* is performed exclusively by women. This activity is performed by *Buhari* (Daughter-in-law) and *Sasu* (Mother-in-law).

5.4 Problems and constraints

5.4.1 Much seed, little yield

In Kharpel, to cope with adverse climatic conditions and poor soil quality, people apply a high amount of seeds but nevertheless receive low yields, as illustrated in Table 5.4. This table shows seed rates and yields of the major crops of Kharpel on both Khet land and Pakho land.

Table 5.4. Average seed rate and yields of major crops, Kharpel

SN	Crops	Seed rate in		Average yield in	
		Local unit Pathi/hal	Std. unit Kg/ha	Local unit Khal/hal	Std. unit Kg/ha
Khet land					
1.	Wheat/Barley	10 -12	160-200	5 - 6	1,330-1,550
2.	Rice	7 - 8	70-90	2 - 3	550-800
3.	Uwa	10-12	160 -200	3 - 4	930-1,060
4.	Fingermillet (Transplanting)	8- 9	40-50	6- 7	1,500-2,000
Pakho land					
1.	Chino	8 - 9	40-45	4-5	1,060-1,200
2.	Buckwheat	16-20	80-100	2 - 3	400-800
3.	Wheat	14-16	200-240	3 - 4	800-1,060
4.	Fingermillet (Sowing)	16-18	80-90	3-4	900-1,060

Note: 1 hal = 20 local pathi = 10 standard pathi, 1.5 hal = 1 ropani.

5.4.2 Decreasing agricultural production

Like Piplang, in Kharpel decreasing agricultural production was recognized to be a problem by almost all farmers. A decreased amount of manure because of a decreased number of livestock is one of the reasons for this problem.

In addition, people perceived bad weather condition and untimely rainfall to be important elements which causes fluctuations in crop yields from one year to an other. Combined with the already marginal condition of the land, the unpredictability of crop production makes it very difficult to make large investments as for example improved seeds application and the use of improved fertilizer.

Soil erosion. Because of the extremely steep slopes in Kharpel, even aggravated by a highly erodible loose sandy soil, soil erosion in Kharpel is very high. Although almost all upland has been terraced, this does not prevent erosion sufficiently, because the little depth

of the soil does not permit more horizontal terraces. The erosion comprises: landslides, loss of topsoil, and loss of nutrients.

Decreasing number of livestock The number of livestock is decreasing for many reasons: shortage of labour, shortage of grazing land, increased occurrence of cattle diseases such as foot and mouth disease, decreasing supply of fodder and litter in the forest and people's practice which prevents them from selling milk to outsiders. Furthermore especially the number of sheep and goats is decreasing because it is getting more and more difficult to practice the traditional migratory grazing system (see 5.4). Another major reason why the number of especially cattle is decreasing is described below.

5.4.3 Drying water sources

Currently people of Kharpel have been struggling to avail drinking water to cattle as a result of drying water sources in the forest above the village. People mentioned two reasons for the emergence of this problem. Felling of trees and burning new flushes for 'slash and burn' was the first reason depicted by local people, the second reason given by them was the frequent occurring earthquakes. Some even reject the first reason. Regardless its causes, fact is that the water sources have been drying out in Kharpel, which led people to keep cattle in the village during summer season which, in turn, has further reduced the supply of forages and grasses during winter season. Drying of water sources is one of the major problems for the villagers which made people to shift cattleshed from the higher elevations to lower elevations near the village. Presently, people and animals drink water from the same source

The concern of the people of Kharpel is illustrated by the fact that some amount from HMG's Build Your Village Yourselves Scheme has been utilised to dug out some of the dried water sources. Unfortunately, this attempt was not successful, having noticed no sign of water, people later on distributed the amount equally among each household.

5.4.4 People's disputes over using natural resources

In Kharpel, many people are farming on forest lands at several locations, as has been evident from photo 5.2, for some 'slash and burn' is a problem and for others it is way of survival. Likewise, for some, fire used during slash and burn agriculture is a problem as it destroys forest areas. For the practisers of 'slash and burn' however, it is necessary because it facilitates regeneration of new flushes in the forest.

Besides this, Kharpel illustrates how people remain in conflicts for using units of natural resources. Box 5.4 gives a case study about a kundilla area used by people from the poorest part of Kharpel.

Box 5.4 Kundilla in Kharpel

A forest section where mainly resource poor occupational caste people have been farming is the reason for a conflict situation in the village. There are two conflicting parties among the villagers. One group claims that the forest in question is a part of a communal, government owned forest and that some people have recently encroached the forest to farm it in order to obtain the ownership certificate during the on-going survey works. In contrast, the other group merely consisting of the people who have farmed the forest, mostly Kamis, rejected the above mentioned claim and argued that the forest is not a communal forest but private farms which often remained uncultivated due to lack of labour and other financial crisis. People supporting this argument also emphasize the fact that the people who are farming the forest are very poor and vulnerable. They would hardly survive if they are not allowed to farm the forest. The concerned people had to pay bribe to the land survey officials for land entitlement to get the concerned area registered as private agricultural land (acquiring land ownership certificates).

The opposing group however argued that some powerful Shahi families have also encroached forest lands there and that they were strategically supporting Kamis with a vested interest of acquiring the land ownership for themselves too. This group also argued that they have been using the forest always for fuelwood, litter and timber and that they require the forest for grazing livestock.

If the Kamis and others will receive the land ownership certificate, the other group threatened that they will farm the remaining part of the forest. They have even filed a case at the Land Survey Department objecting the survey of the forest as cultivated land. The problem is further complicated because the two groups are supported by leaders from different political parties.

Conflict about a sprinkler irrigation project. Kharpel has had a difficult relation with the neighbouring village of Yangtsu for centuries. With the construction of the irrigation project described in section 5.3.1 a new conflict between the two villages emerged:

Box 5.5 About a sprinkler irrigation project which is under way in Kharpel

An ambitious irrigation project. In Kharpel village, the World Bank is to launch a multi-million rupee irrigation project through its Irrigation Line of Credit (ILC) project. The water source for irrigation (Ghatte khola) lies in another ward of Kharpunath VDC and the canal is to pass above Yangtsu village, Kharpunath VDC, ward 7, which has been opposing any move to construct the canal. People in Yangtsu claim that their village will be washed away when the canal breaks down, because the canal is to be constructed on the very steep and vulnerable slopes above their village.

When the District Development Committee failed to bring together these two villages, it was decided to stop the project. However, some local leaders succeeded to convince policy makers at higher levels who, in turn, instructed the District Irrigation Office to continue the project. This made Yangtsu local leaders to file a case to the Supreme Court in Kathmandu with the hope of receiving a court's order for closing the project. The case is not yet decided by the Supreme Court. The story does not end here. The two villages Kharpel and Yangtsu have been rivals in issues as political dominance and the use of local resources for hundred years. The conflict started seven generations ago following the separation of two sons of a local leader. According to local people, the elder brother lived in Kharpel and the younger one in Yangtsu. Found deceived by the younger brother, the elder brother was upset and the dispute was rooted in. Most of the resources such as forest, water and good fertile land remained under the control of Yangtsu. The conflict was passed from the generation after generation (see time line).

Although people in Kharpel seem divided as mentioned in earlier sections, over the issue of constructing the irrigation project they were fairly united irrespective of their political background and despite that people realise the fragile nature of soils. It should be noted here that in Kharpel, the slope of agricultural land is extremely steep, even weak air blows top soils from the field, terraces often break down. People said that the proposed project is not likely to cause soil erosion and land slides because it will be a sprinkler irrigation system. Interestingly, no one in the village has ever seen the functioning of a sprinkler irrigation system. The people of Kharpel require water at any cost.

5.4.5 Bonded labour system

One part of the population (mostly occupational caste people) of Kharpel is totally dependent to other habitants of Kharpel, mostly relatively rich landlords. The dependent group are already for decades in debt by the other group, which means that they have to pay almost all their harvest to the people they have a debt with and from which they subsequently have to borrow foodgrains again, resulting in never-ending cycle of debt (see chapter 2). Because of this situation these people will never invest to improve their farming system, because they will not receive the profits from the investments themselves. On farm development in Kharpel is not only stagnated because the exploited group will not take the initiative but also because the landlords themselves will be reluctant to invest in their land as most of the work is been done by other people.

5.4.6 Too little development interventions in the past years

In terms of development interventions, in the past years, people from Kharpel seemed to have little access to these interventions, despite that the village is located near to district headquarters. However, these days the situation seems to have improved significantly. Not only KLDP is about to complete a drinking water system, but also District Irrigation Office is to install a sprinkler irrigation system (see Box 5.5). Besides this, NCAR is initiating a community development programme with financial assistance of KLDP. The following table 5.5 shows how the people of Kharpel are receiving development support services from different agencies-GOs and NGOs, specifically with respect to NRM.

Table 5.5 Development intervention in Kharpel

Organization	Name of the institution	Services available through	Since when	Major activities
Government	District Forest Office	-	-	None
	Agriculture Development Office	Lali		None
	District Livestock Office	Lali	1988	Formed sheep raising group which remained defunct after the merging of the DADO and DLSO
	District Irrigation Office	Simikot	1994	Constructing a sprinkler system of Irrigation (140 ha coverage)

Non-government	NCAR	Kharpel	1995	Implementing community development works through the financial support of KLDP
	HCDA	Kharpu	1994	Forming Jatamansi collection group
	KLDP	Kharpel	1995	Installing drinking water system

5.5 Conclusion

Kharpel is an extreme resource poor area: marginal land on incredible steep slopes, no water, little forest. Most of the activities being performed by people seem directed towards survival: moving cattle sheds near the village, growing mixed cropping for spreading risks of crop failure and mass conversion of forest into permanent agricultural land.

In Kharpel the productivity of the land is decreasing, however people do not invest much in soil fertility improvement. This has a wide variety of reasons: a decreasing availability of manure, high rate of soil erosion, labour shortage, no access to improved seeds, fertilizers and technical support services and a social structure which is not oriented towards on farm improvement.

Kharpel is a village of many controversies: political and social conflicts, still prevailing feudal structures, extreme pressure on the natural resource base because of the marginality of the area. The Kharpel study clearly illustrates that different interests and conflicts exist for the use of natural resources and that these interests and conflicts are very much location specific.

It is unfortunate to mention that in Kharpel local resources management systems such as *Nora* and *Rokaya* have now become institutions of the past.

The study however also revealed that people are highly motivated to think about improvements in the management system and alternative sources of livelihood.

CHAPTER 6

LOCAL NATURAL RESOURCE MANAGEMENT SYSTEMS OF PHOIMAHADEV .

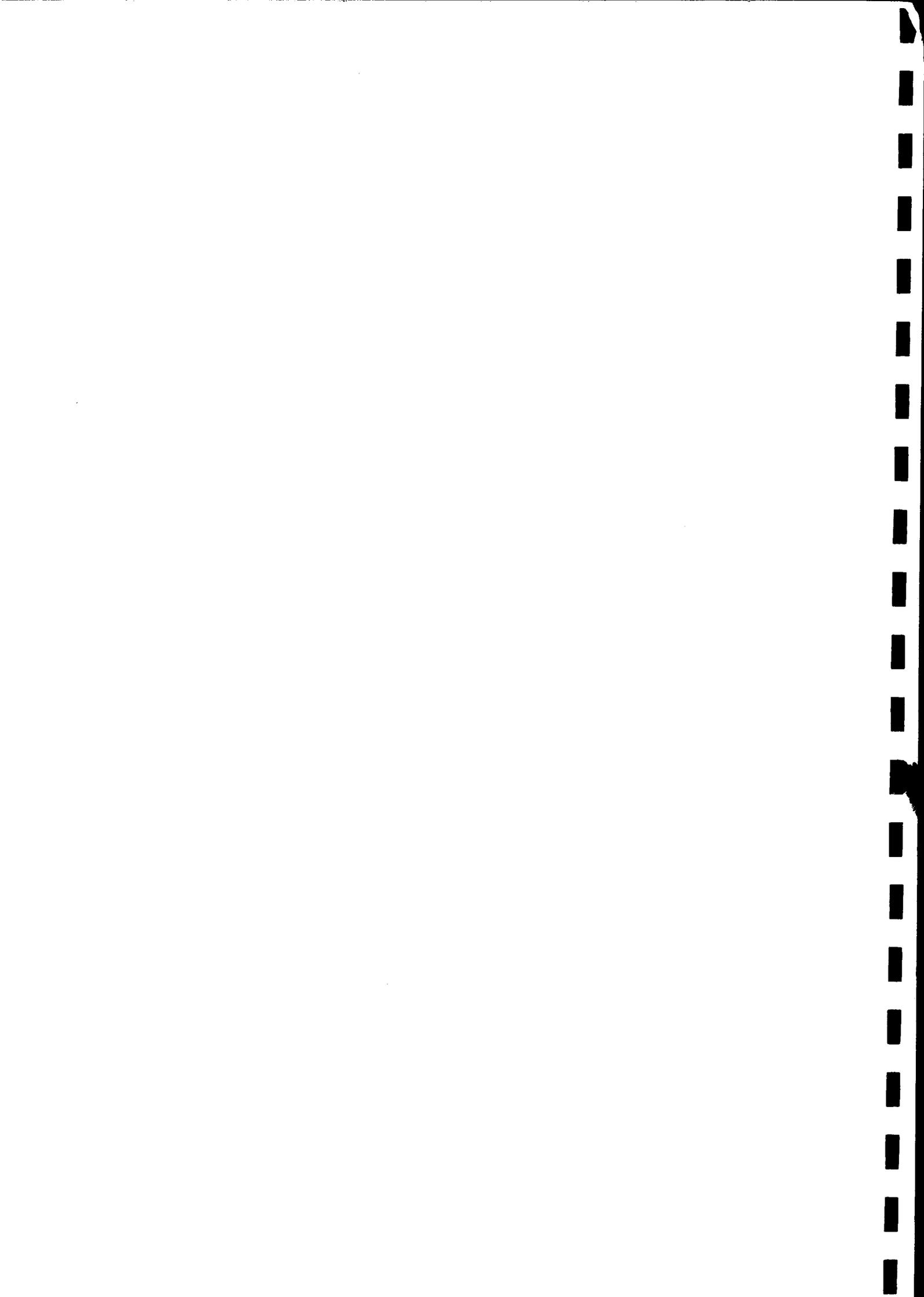
The study in Phoimahadev VDC focused on the village of Dhandi Vigma (ward no.) and the community called Chabisa Kuria (“Six times twenty households”).

6.1 Natural resource systems and their location

In Dhandi Vigma, people’s participation while drawing the social and natural resource map (Fig 6.1) was quite high, even though people were busy with different agricultural works. Probably because of the long term involvement of KLDP and CSD in this VDC, the villagers were very collaborative. The time line (Annex II-6-1) gives detailed information about KLDP’s and other intervening agencies’ interventions.

Some observations made during the mapping exercises were:

- Participation of the women surprisingly was high. While women were drawing the map, men were suggesting to show missing issues (Photo 6.1).
- People of wards nos. 3, 4 and 5 consider themselves as one community, which is called Chabisa Kuria (six times twenty or one hundred twenty households). They share many communal activities such as the management of the irrigation system, working according a *parma* system (reciprocal labour exchange for farming) and the payment of cereal grains to the people of Ranchuli village for using the forest located in that VDC.
- While drawing the map, first the people showed a new tree plantation situated south of the community forest for ward no 5. For two plantation sites (the other one is situated in ward 4) there is only one forest committee.
- In the map, people paid much emphasis on showing the forest which is located at the other side of Tila river in Ranchuli village.
- As happened in Kharpel, people showed trails in the map as a reference to the altitude to explain changes in cropping patterns and practices.



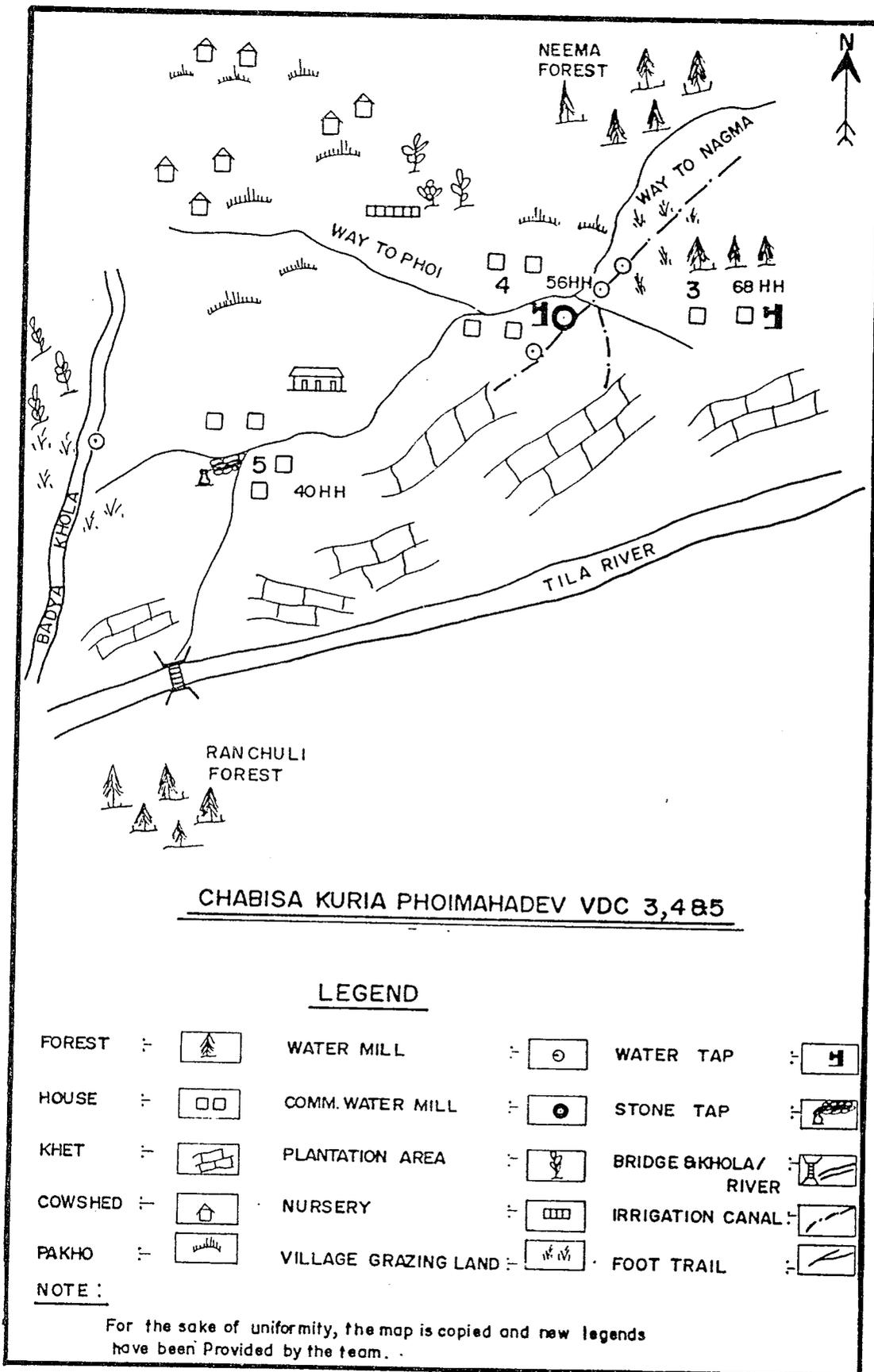


Fig. 6.1 Social and natural resource map

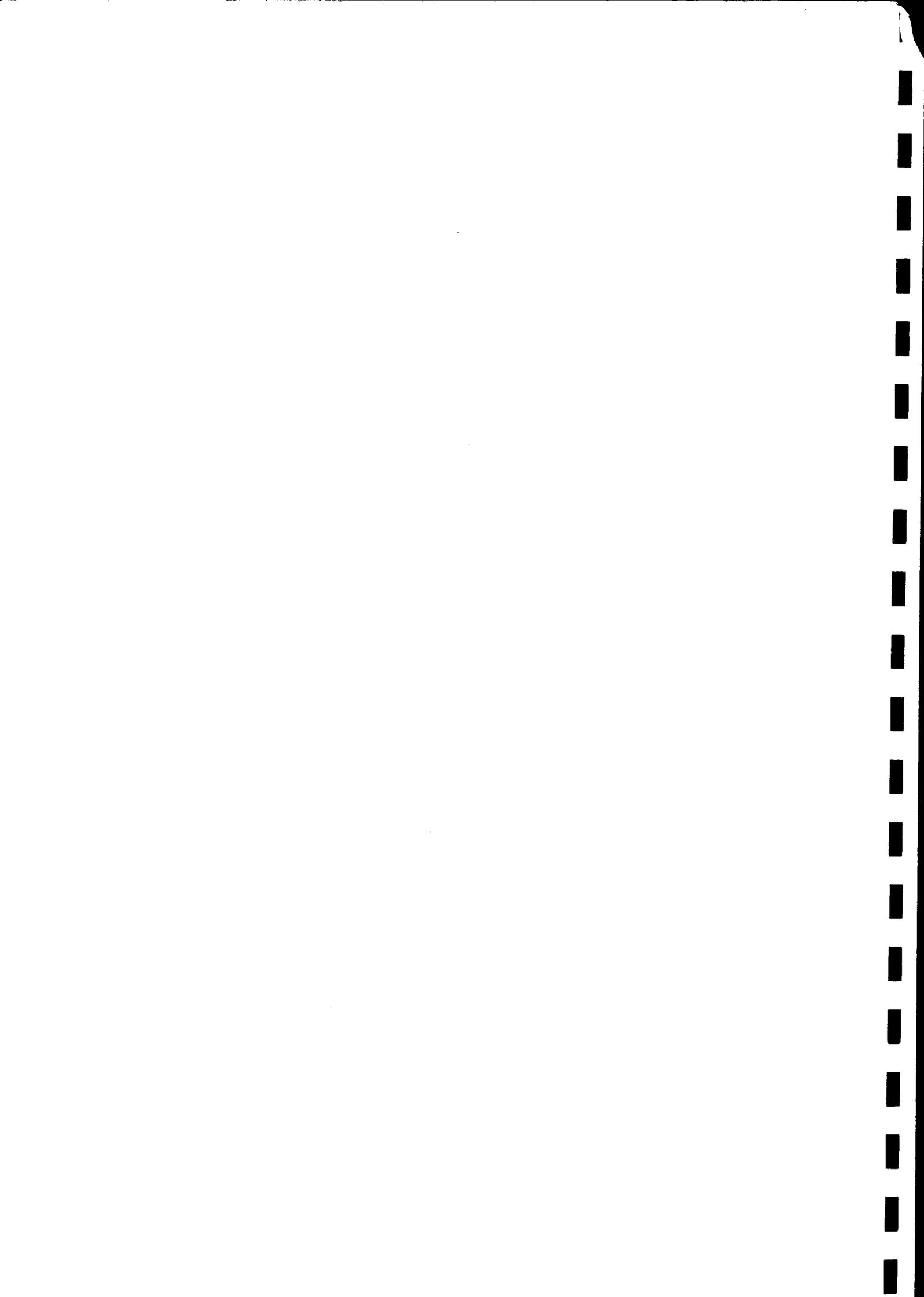




Photo 6.1 Mapping in Dhandi Vigma

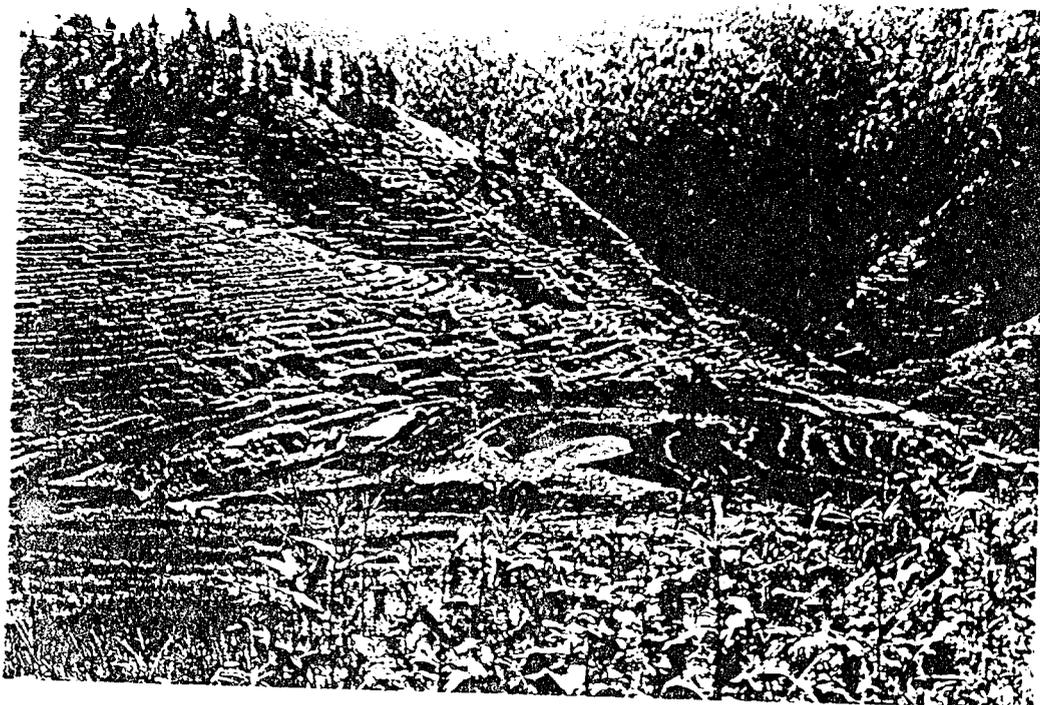
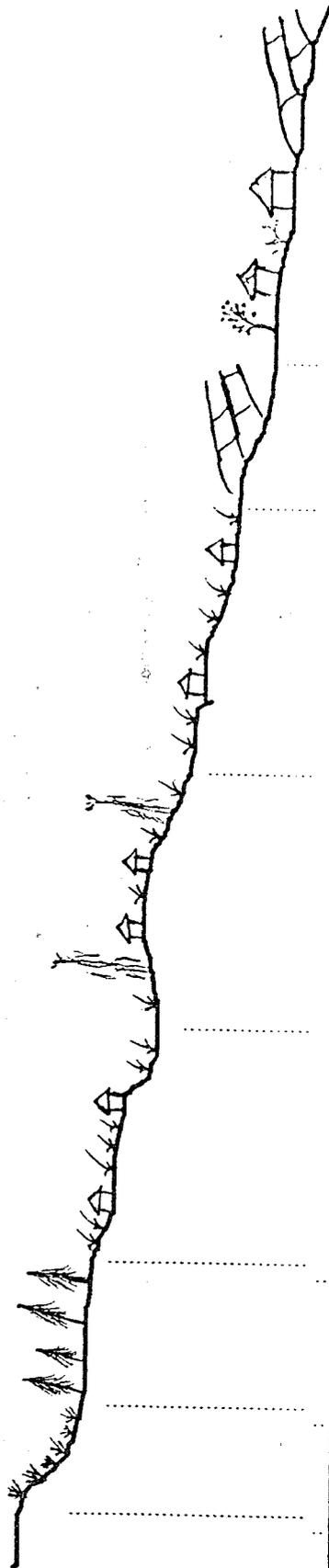


Photo 6.2 Terraced agricultural land in Phoimahadev





Land use	Pasture (Patan)	Forest	Cattleshed No 1 Bari	Cattleshed No 2 Bari	Cattleshed No 3 Bari	Khet	Gharbari	Khet
Soil	N/A	Black soil	Sandy loam	Sandy soil (Tore mato)	Sandy loam, stone, gravel	Gray soil, sandy loam	Sandy soil	Black, Clay loam
Vegetation	N/A	Salla	Dhatailo	Dhatailo, Bhango, Wild roses	Dhatailo, Chuli	Bans, Chamlayo Tile pati, Kovo grass	Tilepati, Bhango	Idk ho, Bedufai ns Phurke, Chamlayo, Khin Khine, Thakkailo
Fruits and vegetables	N/A	-	Potato	Apple, Radish	-	-	Apple, Pome Walnut, Tomato Cauliflower, Chilli, Pumpkin.	White soybean on terrace risers
Cropping pattern	N/A	-	Wheat-Fallow-Maize (3yrs) Wheat+Potato-Fallow Maize+Potato-Fallow	Wheat-Fallow-Maize (2 years) Fingermillet+ Soybean +Chino-Fallow	Wheat-Maize Barley-Maize Maize+Bean+Kaguno+Chino+ Amaranthus-Barley	Rice-Barley Rice-Fallow Rice-Wheat	Maize+Bean-w/ Barley Maize+Kaguno+Chino+ Amaranthus-Wheat Barley	Rice-Wheat Rice-Barley Rice-Fallow
Problems	N/A	Declining supply of firewood	Declining soil fertility Labor shortage	Declining soil fertility, Lack of market for apples, Conflicts in the use of land (grazing land)	Labor shortage Soil fertility declining Shortage of manure	Low fertility, Weeds, Lack of irrigation	Lack of labor Soil fertility declining	Lack of irrigation Low productivity, Weeds, Rat

Fig. 6.2 Transect of Dhandi Vigra



6.2 Land use

During the transect (Fig. 6.2), villagers' participation was encouraging. Dhandi Vigma was the only village during the study where women guided the team. While walking, the women explained about the uses of many local trees, shrubs and grasses found. For a detailed description we refer to annex I-8-1.

Chabisa Kuria has some very nice well terraced fields for rice and wheat (photo 6.2). People have a good understanding about the inter relationship of the different land use types, in terms of inputs and outputs. An illustration is given by the resource flow map (Annex II - 6 - 2), which has been prepared by the villagers themselves.

6.2.1 Cropping system

The major cropping pattern found in the low land is paddy-wheat/barley. Before sowing the winter crops on the land people decide to select either wheat or barley. In case of an early sowing season people will tend to decide to sow wheat, in case of a late sowing season barley. The reason is that the growing season of wheat is longer than barley and when the harvest will be late, there will be a risk of the crop being damaged by grazing animals. On the edges of the khet soybean and black gram are planted.

Because of variation in altitude, soil type and accordingly the fertility status of the soil, people adopt very diverse cropping patterns on the upland (*Bari*). On high and medium altitude bari, the main crops found are wheat and barley. If wheat is sown on high bari land, the medium altitude bari will remain fallow in that particular year, and vice versa. For barley a similar crop rotation is practised. On low bari land intensive mixed cropping is practised, no fallow is found.

6.3 Local natural resource management systems

6.3.1 Farm management system of Chabisa Kuria

Multiple cropping dominates the home stead (*Gharbari*) areas. According to the villagers, it has two advantages. Firstly, it enhances efficiency in the use of land and labour and secondly, it reduces the risk of food shortage compared with mono-cropping. Photo 6.3 shows an encouraging example of multiple cropping practised in Dhandi Vigma: fox-tail millet and beans are grown simultaneously in the same piece of land. Some times amaranthus can also be found. When asked why beans were intercropped, the villagers said that it especially improves soil fertility.

Vegetables are grown on a limited scale only in the kitchen gardens. Apple trees were found in the homesteads. People seemed reluctant there to increase the number of apple trees because they have a marketing problem. Nevertheless, some commercial apple orchards were found in ward no 4.

In general, farmers grow local varieties of crops. Improved varieties were not found in Phoimahadev, although some seeds have been distributed by the DADO in the past. Farmers cannot recall the names, nor anything about the quality of these varieties.



Photo 6.3 Dhandi Vigma's multiple cropping

Table 6.1 shows the main crops with their seasonality.

Table 6.1 Seasonal crop calendar

SN	Particulars	B	J	A	S	B	As	K	M	P	Ma	F	C
Weather condition													
1.	Rainfall												
2.	Snowfall												
3.	Frost												
Low land crops (Khet)													
1.	Rice		T	T	W			H					
2.	Wheat			H				S					
3.	Barley		H						S				
Upland crops (Bari)													
1.	Wheat				H		S						
2.	Barley			H				S					
3.	Maize					H							S
4.	Potato						H	H				S	
5.	Chino	S	S				H	H					

T = transplanting W = weeding S = sowing H = harvest

Note : intensity of the weather condition shown by clouds' darkness

Threshing

Due to lack of sufficient threshing space for each households in the village, neighbours have joined together to share a common threshing yard. People have a good understanding for when to thresh whose crops. This is also a part of *Parma* system.

During threshing both man and women work together and move wooden sticks specially designed for the purpose of threshing wheat and barley (see photo 6.4).

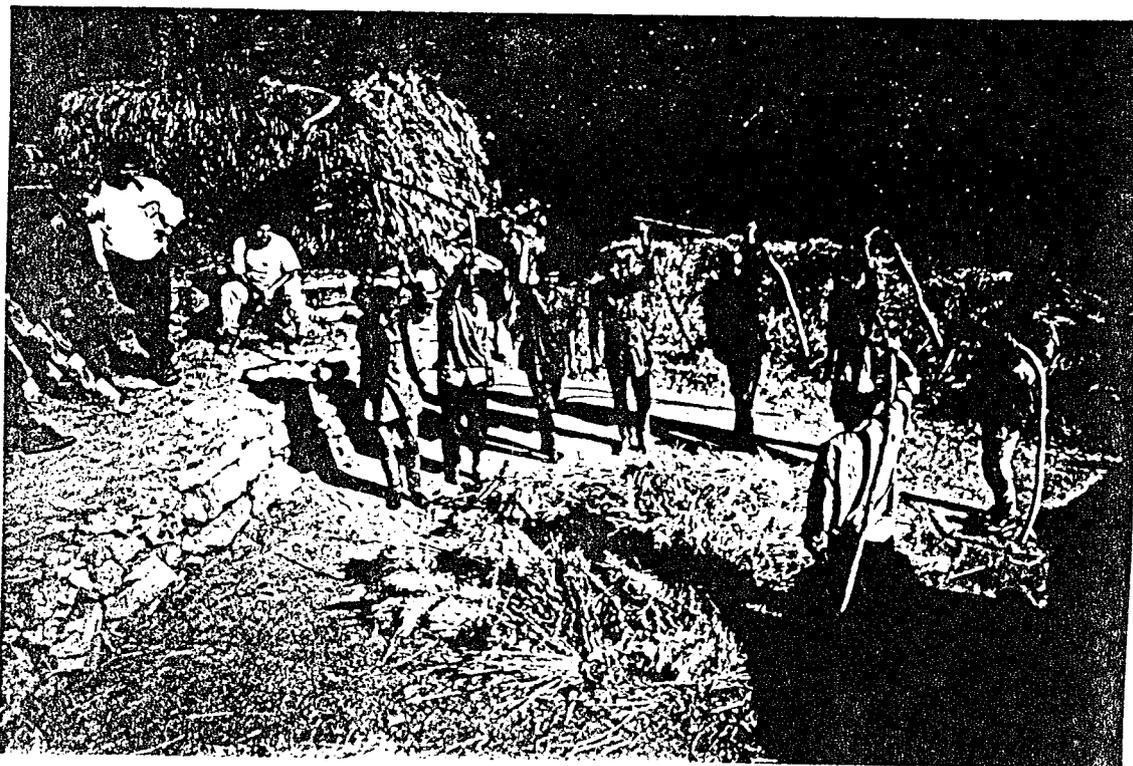


Photo 6.4 Threshing barley in Dhandi Vigma

Soil fertility management

In Dhandi Vigma, people were conscious for maintaining soil fertility and have been giving much priority to improve the soil fertility by adopting many different mechanisms:

FYM. Farm yard manure from the homestead cattle sheds is used at the gharbari, at the khet and at the lower bari (near the home). People have been trying to increase the amount of fertiliser by adding sufficient litter to the FYM. Due to lack of suitable vegetation, people use Salla leaves for composting. However, it takes almost a year to get well composted. Many said that they have been using this despite that the soil might become acidic (*Amilo*). All in all the amount of litter used is not significant as people have to collect the litter from the other side of the Tila river. This often takes too much time for the women (as collectors) because there are too many other tasks to do.

In-situ-manuring. Almost all people have at least one cattle shed at the high altitude bari. During the summer season, animals are left for free grazing which adds manure to the bari.

Mixed cropping with legumes. All types of land have their own fertility management system. For example, especially on lower bari cereal crops are mixed with legumes, not only to minimise the risk of crop failure but also because it improves the fertility status of the soil.

Fallow. In response to declining fertility status of the soil on bari land located around cattle shed number 2 (see transect), people have started to practice fallow on a rotational basis especially in combination with barley and wheat some 20 years ago. People have divided the land in such a way that if there will be crops on the one half in the first year, the second half will remain fallow in the second year. This practice of fallow is a typical coping mechanism of people in a reaction to shortage of manure. As manure availability decreases, the farmers need to make a choice where to apply the scarce resource. The fallow permits the land to regenerate slightly. Sometimes beans are planted to add extra nitrogen. The same fallow lands are also used for grazing the animals, which adds extra manure to the land.

Plant diseases and protection

Apple trees are often affected by woolly aphis.

Rice production is reduced by Sama weeds. For controlling weeds, these days people are facing the problem of labour shortage. Therefore, many have begun to apply herbicide ("Butachlor") for the first time in 1995. The DADO is promoting the use of this chemicals. It is however not concerned with neither the long term effect of the chemicals on the environment, nor its timely availability and the cost factor.

Harvesting

In Phoimahadev, people are bound by social norms for harvesting crops, which is illustrated by the following example. The harvesting date for crops is decided communally and everybody should harvest on that date. This one the one hand ensures the availability of labour for all people. On the other hand it discourages people to harvest before other people (because there could be a food shortage in the house), because the land which still has crops has a higher risked to be grazed by animals.

Irrigation management.

Four to five hundreds years ago, in the era of Kalyani King Bhanu Shah and Queen Bhanu Mati, the people of Chabisa Kuria were permitted to construct an irrigation canal and received the right to use the water from the river which now belongs to Jumla. From then onwards, people have maintained the present canal and formed rules and regulations for the use of water. This old and traditional management system is still existing and operational at present. There are many legends about the origin of the canal and in memory of one of these legends every year people offer a goat to a ghost which is still supposed to live in the irrigation canal today.

The irrigation management system is built upon three pillars (see Figure 6.3):

- The *users* represented by the users committee
- The *Kulal*: the person who is responsible for the maintenance of the canal. The name "*Kulal*" is also given to the canal management system.

- The *Noralo*: the person who is responsible for water distribution at command area level. It also refers to the system of water distribution.

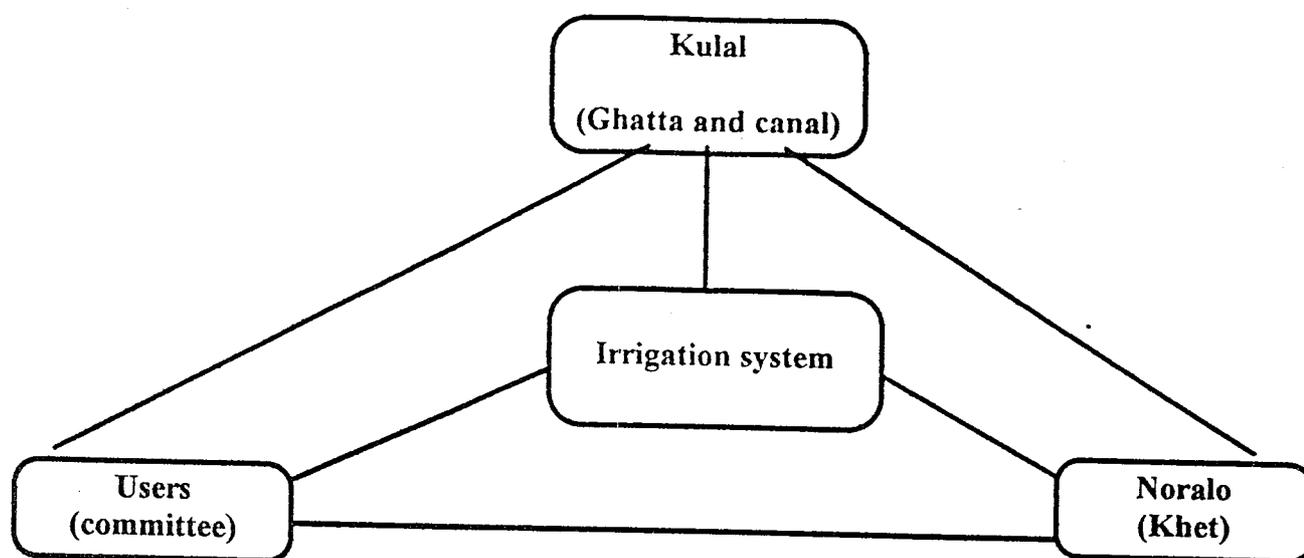


Fig. 6.3 Relation between *Kulal*, *Noralo*, users and the irrigation system

The figure above illustrates the linkage between *Kulal*, *Noralo* and the users. The overall responsibility of the functioning of the system lies with a local irrigation management committee. Not only is this committee responsible for the construction and maintenance of the canal but also for raising a fund, which is to a large extent collected from fines and other sources. Presently, the fund has Rs. 6,000.

The following Box 6.1 describes how people have been successful to manage the canal very effectively for such a long period (500-600 years). It should be mentioned that until now, people belonging to Chabisa Kuria have neither requested nor received any sort of support for rehabilitating/repairing canal from any external supporting agencies such as DIO and DDC (formerly District Panchayat)¹.

It is mainly because of the impressive skills of the people in bringing water from steep rock (*chhattan*). Photo 6.5 shows the architecture in using wooden aqueduct (*Kath ko Doond*).

¹ This year KLDP has been supporting local people to rehabilitate this canal. People said that they would not have asked KLDP for support if it was not nearly to collapse. Major rehabilitation is felt necessary and people said that through KLDP support, the Kulo has now become *pucca* (cemented, strong, firm). Although without KLDP support they would have repaired it themselves using local materials, they would have to struggle every year and again, due to the physical characteristics of the site.



Photo 6.5 Century old irrigation system in Phoi

The canal operation and maintenance did remain intact till today because people have a strong feeling of ownership. They manage it efficiently and the system is founded on their own local rules and traditions. They know that no canal means no rice and, therefore, no food. People fine any one who violates the rules by not contributing voluntary labour when this is requested by the *Kulal*. People return from India before *Chaitra 12*, because they have a obligation to repair the canal.

Box 6.1 *Kulal, Users and Noralo: Phoimahadev's Irrigation Management*

As shown in Figure 6.3, Phoimahadev's (*Chabisa Kuria*) irrigation system has three major actors: *Kulal*, *Users* and *Noralo*. Every year the *Kulal* is selected by all users, but always from Bajedi (ward no.3). People from Bajedi have taken this responsibility for this job for generations. The *Kulal* is responsible for minor repairs of the canal and informs all the users when a major repair is necessary. Working as *Kulal* means receiving the right to operate the communal grain mill (*ghatta*). Not only will he receive income from the *ghatta*, but users also pay him two (local) *pathi* of cereals/ year by each household for his services. The interlinkage between the management of the irrigation canal and the *ghatta* works very efficiently because when water does not flow through the canal the *ghatta* immediately stops, after which the *Kulal* will take a look at the canal to assess the nature of the problem. If it requires minor repair, he will take care of it himself, otherwise, he will inform other users for repair. The committee will manage the labour needed and the user who is unable to participate for various reasons needs to pay fine as decided by the committee.

Once water flows out of *Ghatta*, the *Noralo* sees that every user receives water fairly so that all will get the water in time for transplanting rice. To avoid conflicts regarding the allocation of water, people have set rules when and by whom, and at what time the rice should be transplanted.

Furthermore, he looks after animals so as to protect standing crops from free grazing by animals. For his services all users pay 1 (local) *pathi* of cereals per year, irrespective the landsize each user owns.

There are also a few users of ward no.2 who use the water from this system. They have their fields near the head of the canal. Because they are not requested to provide voluntary labour for the maintenance of the canal, in the past they were required to contribute a male goat each year to the irrigation committee of Chabisa Kuria for an annual feast. However, a few years ago, users decided ask for a contribution of Rs 300/ year, rather than a goat. Now they could use the money to maintain and repair the canal. Fortunately, people of ward no. 2 are paying this amount jointly, as it is cheaper for them than giving a goat.

The irrigation system is considered vital for the livelihood of Chabisa Kuria people, especially ward no 3 and 4. Some people of ward no 5 do not receive water presently because khet land located in Dhandi Vigma has no branch canal.

Other local institutions

Parma labour exchange. The *Parma* (or *Padima*) system is very much interlinked with the *Noralo* system. It deals with the management and distribution of labour and comprises the planning of all farming activities from planting to harvesting in order to manage especially rice cultivation to support the management of the irrigation system. When a person receives water on a certain day for transplanting rice, the *Parma* system takes care that people from other households assist during this activity. This is a response to labour and cash shortage. Because of *Parma* system, people do not require cash immediately at every time for each activity. People keep an account for who worked in whose field for how many days. This makes it easy to calculate who is to receive additional money/grains for extra work and from whom. This will be cleared usually on *Chaitra* 12. Those people receive 1 local *pathi* (women) or 2 *pathi* (men) of cereals for their labour.

Food bank. People in Phoi used to have a local grain bank. They collect grains, and in time of shortage they can lend the grains and pay them back with interest in the following year.

6.3.2 Livestock management systems

In Phoi mostly sheep, goats and cattle are held. Not many buffaloes can be found as there is no market for milk and ghee, and therefore it is not profitable to have large numbers of buffaloes. Table 6.2 shows the movement of the animals for grazing.

Table 6.2 Seasonality of livestock grazing practice

SN	Grazing area	B	J	A	S	Bh	As	K	M	P	Ma	F	C
Sheep and goats													
1.	Grazing low altitude area (Achham, Dailekh, Surkhet)	■							■	■	■	■	■
2.	Grazing at Village Bari land		■					■					
3.	Grazing at high altitude area			■	■	■	■						
Cattle and buffaloes													
1.	Grazing at high altitude area (Around cattle shed area)					■	■						
2.	Grazing at village communal land (<i>Gaucharan</i>)	■	■	■	■			■	■			■	■
3.	Stall feeding (Hay)									■	■		

Because sheep and goats are better adapted to a cold climate, these animals are kept at a comparatively high altitude. Also the grasses which are available there are more suitable for sheep and goats than for other animals. Besides these reasons, cattle and buffaloes are kept at a lower altitude for in situ manuring of the khet and bari.

Each locality appoints responsible persons (*Noralo*) on a rotational basis to look after the animals of the whole community in order to optimise the use of labour. The *Noralo* is also responsible to prevent the animals from grazing the crops. If an animal does destroy crops, the *Noralo* is supposed to pay a fine by himself.

People are not allowed to keep animals in the homestead between the 10th of *Shrawan* and the 10th of *Aswin*. If other than sick or pregnant animals do stay in the homestead, the responsible person is fined by the community. Through this mechanism, people protect grasses in the village grazing land from being cut for feeding the livestock.

6.3.3 Forest management system

Chabisa people go to different forests (Parighat Ban, Nima Ban, and Jum Chaur Ban) for the use of different types of forest products.

Parighat Ban. The system the people from Phoi have developed with the people from Ranchuli for the use of forest products is quite remarkable. People of Chabisa explained that they have been using the Parighat (Ranchuli) forest since King Bhanu Shahi gave them users' rights more than 400 to 500 years ago. They added that since that time each household has been paying cereal grains to Ranchuli each year. Because Phoimahadev has good khet land and a year round irrigation system, it should give food to Ranchuli village and for this food Ranchuli needs to provide access to their forest for the people of Phoimahadev. Many said that they have been giving cereals to Ranchuli village even though they did not bring forest products from Ranchuli. Who ever initiated this system, it is indeed a sound arrangement which has remained intact and effective till today². This suggests how people do negotiate among themselves for using natural resources.

Nima Ban. Chabisa people use Nima forest mainly to collect firewood. Some years ago people from wards no. 1 and 2 started to use this forest as a grazing area, built cattle sheds and cultivated crops around the cattle shed area. When people from Chabisa Kuria realised that this resulted in an increasing shortage of firewood, they started to protect the forest. Rules and regulations have also been established. Since then nobody from ward no. 1 and 2 are allowed to use the forest as a grazing area. They have removed their cattle sheds. People are allowed to collect firewood when ever they require, but this counts only for dead firewood. Nevertheless, in the last decade availability of firewood has decreased dramatically as women from Dhandi Vigma state that nowadays it takes a full day to fetch one *doko* (20 - 25 kg) of firewood as compared to 2 *dokos/day* 10 years ago. Litter is collected twice a year, once in the month of *Jesth* & other during *Magh/Falgun*.

Jum Chaur Ban which is situated in ward no.3 is used to collect mainly litter and firewood by the people of ward nos. 1, 2, 3 and 4 of Phoimahadev VDC. After the restoration of the democracy, people of ward no. 3 denied access to the people of ward no. 4 as they claimed that the products from the forest would not be sufficient for both the wards. This was not acceptable to the people of ward no. 4, who claimed the right to use the forest for litter and firewood. A while ago, people from these two wards have started negotiating about an understanding for the use of the forest: ward no. 3 required the right to install a drinking water system for which a pipe line has to pass through ward no. 4 and which has a water source located in ward no. 5.

Although recently a Jum Chaur forest management committee has been formed as result of an intervention of the District Forest Office, all internal conflicts for the use of the natural forest have not been solved yet. However, the DFO and the users are trying to settle these problems.

² Some villagers reported that some people in Ranchuli have begun to halt them entering the forest. This could not be confirmed.

Community plantation. People of ward no. 4 have started to plant trees on communal grazing land (Chimal Ban) since 2026 BS. Because of this, people from Bajedi tole (ward no. 3) forwarded a case to the court mentioning that there would be a shortage of grazing land. However Bajedi people changed their opinion since then and eventually agreed to participate with the people of ward no. 4 for joint community plantation. In 2032 BS both wards together planted 12,000 forest saplings on the same land which had been the reason for the dispute mentioned above, a few years earlier. Unfortunately, this attempt has not been successful because a fire destroyed the seedlings.

The People of Chabisa tole continued their efforts to restore the natural forest. With support of the DFO a nursery was established in 2050 BS. This encouraged people to plant trees on different pieces of communal land. Two different community plantations which a total area of 30 hectares were established, which are managed by one forest management committee. Respectively 13,000 and 25,000 trees were planted in 2051 and 2052 BS. In this year the women of ward nos. 4 and 5 have planted 10 trees each, motivated by CSD staff. A management plan has been prepared by the DFO and the conservation plantation area has been handed over to the users.

The Chimal Ban management committee has Rs. 8,500.- on its saving account. The fund has been collected by fining people who did not work when they were supposed to do so and by fining the owners of animals entering the community forestry area.

Fodder. No fodder trees can be found in the villages. The main reason given is that there is competition with grazing areas, or, if planted on the edges of the field, competition with the crops on the field will occur.

6.3.4 Gender considerations.

As can be seen in Table 6.3, in Chabisa Kuria most of the agricultural work is done by women and men both. However weeding, a labour consuming job is done by women only. Also visible from the table is that the collection of forest products is mostly the responsibility of women. Because of the heavy workload especially for women it is not possible to spend sufficient time for other farming activities, like carrying enough litter from the forest for making compost.

Table 6.3 Gender seasonal activity calendar for different activities in Chabisa Kuria

ACTIVITIES	B	J	A	S	Bh	As	K	M	P	Ma	F	C
Rice cultivation												
Land preparation	M	M										
Soaking seeds												M
Transplanting		F	F									MF
Weeding			F	F								
Harvesting												
Carrying bundles of paddy to homestead								MF				
Threshing								M				
Wheat cultivation												
Land preparation					¹ M	M	M					
Sowing seeds							F					
Harvesting			MF									
Threshing					MF							
Barley cultivation												
Land preparation								M				
Sowing seeds						F ²	F	F				
Harvesting		MF										
Threshing					MF							
Maize cultivation												
Land preparation												M
Sowing seeds												F
Weeding			F	F								F
Harvesting							MF					
Others												
Carrying manure to the bari	F							F				F
Collecting litter for the cattle	F	F			F						F	F
Grazing animals ³				M								
Cut and carry of grasses						MF						
Collecting firewood	F	F	F	F	F	F	F	F	F	F	F	F
Collection of Nigalo							MF	MF				
Collection of NTFP					MF	MF	MF					
Collection of timber ⁴	M											M

M= male F=female

as needed

Women also have less time to attend meetings and especially in Phoi the meeting pressure is already quite high (visitors, CSD saving program). Still, compared with other villages the impression was that the overall status of women in Chabisa Kuria is relatively better than the other villages studied.

¹ High altitude wheat

² High altitude barley

³ High altitude pasture

⁴ No income is derived from timber and NTFP's

It is during the agricultural slack period (winter season) that men go to India for extra income, and return back on and before *Chaitra* 12 for they need to participate in many communal affairs such as the following:

- Selecting/appointing the *Kulal*
- Selecting/appointing the *Noralo*
- Working for the repair and maintenance of irrigation systems

6.4 Problems and constraints

6.4.1 Overall declining resource base

In Phoimahadev it becomes more and more difficult to the apply same amount of manure to the fields, due too lack of litter, lack of labour and lack of dung. Forest resources are becoming scarce, and it takes more time to collect these resources.

Due to this scarcity, there are some clear conflicting interests as competition between the use of communal land for reforestation or for grazing purposes.

Also the mentioned weed problem in rice may be due to bio-physical reasons as poor soil quality and lack of sufficient water. People have started to use "Butachlor", without knowing the dangers and constraints of this input.

6.4.2 High seed rate and low yields

The data in Table 6.4 illustrate the marginality of the agricultural system, with declining trends of rice and maize yields (Figure 6.4) despite that the people are using high seeds rates.

Table 6.4 Seed rates and average yield of major crops

SN	Crops	Seed rate in		Average yield in	
		Local unit Pathi/Murimato	Std. unit Kg /ha	Local unit pathi/Murimato	Std. unit Kg/ha
1.	Rice	0.9 - 1.0	70 - 90	15- 16	1500- 1600
2.	Wheat / Barley	1 - 1.25	140 - 175	7 - 8	1100 - 1200
3..	Maize	0. 4 - 0.5	30 - 40	6 - 7	1000- 1100

4 Muri mato - 1 Ropani

For conversion rates it is referred to chapter 4 of Part II.

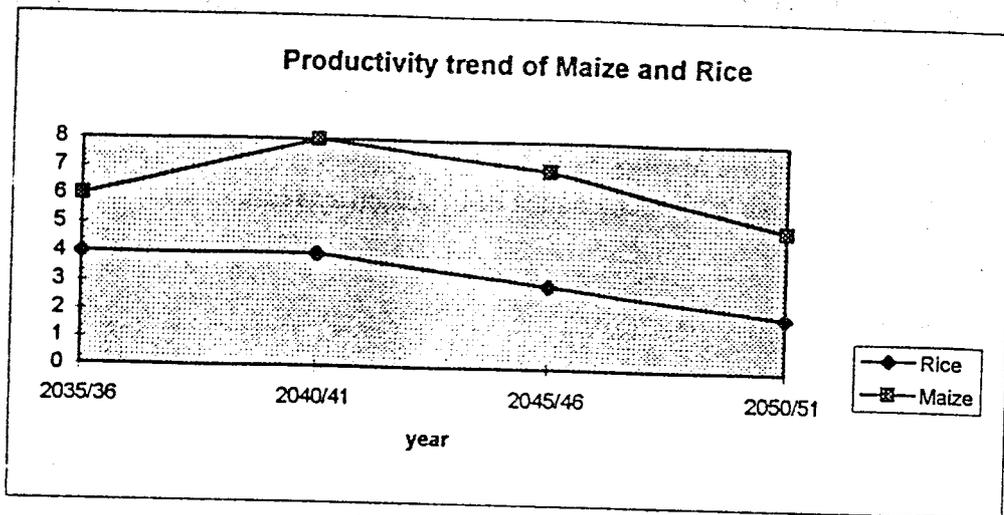


Fig. 6.4 Trendlines of rice and maize

The declining trends for the productivity of maize and rice are explained because of an overall decreasing soil fertility and an increasing labour shortage in the peak season which hampers optimal management. For example the weed infestation in rice is growing every year probably due to some bio-physical reason. The labour input increases for this particular activity, but on the cost of other activities. For maize it was mentioned that manure is applied only once a year whereas farmers used to apply twice a year previously. Twenty/thirty years ago productivity rates of maize were still growing as it was just introduced and farmers were in the process of optimising their cultivation techniques

6.4.3 Declining trends of Livestock

The declining fertility base in Phoimahadev has every thing to do with the declining trends of cattle, goats and sheep as can be seen in figure 6.5.

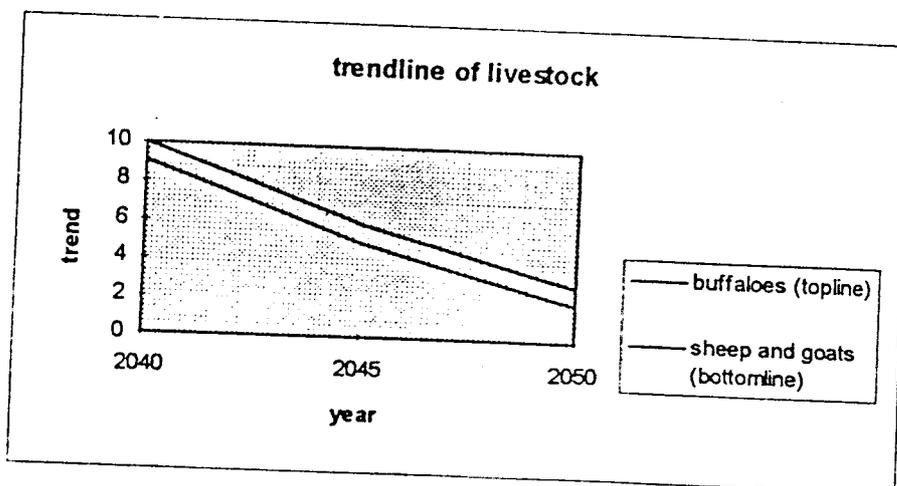


Fig 6.5 Livestock trend

The reasons for declining sheep and goats trend are:

- Shortage of sufficient grazing land inside and outside the VDC. Like in Humla the tradition of migratory grazing of sheep and goats (outside the VDC) is getting more and more difficult for the same reasons as mentioned for Kharpel in chapter 5. Within the VDC there is an increasing trend to close the forests for animals(protection).
- Outbreak of diseases were also mentioned as specific reason.
- Imposing tax by people living in lower lying areas for grazing.

For cattle and buffaloes the especially the lack of grazing area's within the VDC were mentioned. Also the declining quality of grasses has been mentioned as a factor.

An increasing workload is also indirectly responsible for less cattle as there is less manpower in the family to look after the herds.

6.4.4 Community conflicts

Although relatively little conflicts can be found in Phoimahadev a few issues are noteworthy to mention, in view of changing environments and changing socio-cultural settings (e.g. outside interventions).

Grazing field or cattle shed with upland bari. According to the people of Chabisa Kuria, they are allowed to graze their animals and grow crops in two cattle shed areas above the village (as indicated in the transect). But people from wards nos. 6, 7, 8 and 9 (Phoi *samuha*) do not accept this. The latter claim that no one is allowed to cultivate the land because it is their grazing land (*Gaucharan*) and they need it during the summer. The case is with the land survey office of Kalikot district. Although the office seemed to be mild to the people belonging to Chabisa Kuria, no one knows what will be the final decision.

Political division of Chabisa in three wards. Because of the constitution of the village *panchayat* followed by the political division of the VDC into wards, the unity of Chabisa partly broke down. This is reflected in the forest dispute between ward no. 3 and 4.

Irrigation for ward no 5. Although there is no dispute, there is clearly some misunderstanding going on concerning the irrigation facilities for ward no 5 (Dhandi Vigma). The people claim that they have no facilities from the present system although after rehabilitation more water will be available. The other party (ward no 3 and 4) claim that the people from ward no. 5 can secure their share of water only when they provide voluntary labour during the rehabilitation works.

What ever the reason may be, the people of Dhandi Vigma cannot be motivated to give their share of work, even though they claim that the lack of irrigation facilities in their ward is one of the biggest constraints they face.

6.4.5 Development interventions and lack of co-ordination

It has been only a few years that Phoi Mahadev VDC receives support from outside institutions (Table 6.5). Like in other villages, in case services are provided from the side of GOs, the quality is not always satisfactory. This has mainly to do with the lack of follow-up services, resulting in less effective output. There is an apple production group but it is not active and not performing well.

The improved seeds from the DADO are nowhere to be found any more, farmers cannot recall names nor qualities.

From the NGO side too little co-ordination is sought with the GO service centres on field level, whereas the latter do not contact the intermediate NGO working directly with the farmers.

Table 6.5 Development Interventions in Phoimahadev

Name of Institutions	Services available through field based staff	Since when	Major activities
District Forest Office		2050	-Established forest nursery, -Facilitated for community plantation
Agriculture Development Office	In Jubitha	2050	-Introduced improved (Cardinal) Potato seeds -Demonstrated training and pruning exercises on apple trees for the owners
Livestock Service Unit	In Ranchuli VDC, Ratada	2050 Poush	Vaccination for HS & BQ diseases of animals
Centre for Self-help Development (CSD)	Yes	2046/47	-Saving and Credit Program, -Kitchen Gardening, -Pit Latrine construction -Provided financial and technical support to establish Drinking Water System,
KLDP	Yes	2051/52	- Providing financial and technical support to repair existing irrigation system .

6.5 Conclusions

The people of Chabisa Kuria have sound local management systems, often based upon very old village institutions with communal rules and regulations. Some of these even go beyond ward and VDC level. The level of awareness on the need of conservation and a rational use of resources is considered high.

Despite sound management systems and a good understanding of the dynamics of the farming system, there are severe limitations to what people can do. Labour shortage in the peak season is a serious constraining factor. There is an overall increasing scarcity of natural resources, and the no. of conflicting issues centred around the use of these resources (forest and grazing areas) is also on the rise.

People and especially women have to spend more time to collect essential resources as litter and firewood, leaving less time for other agricultural practices. Workload is quite high for women although the overall status seems to be better than compared with women in other villages.

The intensity of development interventions is increasing, but the quality of the services can be improved. Also the co-ordination between the intervening actors needs attention. Especially at field level at the interface between farmers and outside agencies, in particular the role NGO working in Phoi Mahadev VDC, much can improved.



CHAPTER 7

LOCAL RESOURCE MANAGEMENT SYSTEMS IN LALU

Of the four villages selected for the study, Lalu VDC of Kalikot is the last one. This chapter discusses the natural resource systems, the management of natural resources and some important issues related to the use and sustainable management of natural resources as viewed by the people living in Lalu VDC.

7.1 Natural resource systems and their location

Figure 7.1 presents the VDC Map of Lalu with focus on natural resources. The map is a compilation of the group mapping by the villagers and the adjustments made by the team through triangulation.

During the mapping exercise, a few people dominated and happened to determine the outcome of the exercise, despite that the large mass had gathered (> 60 persons). The participating people asked the local head master to prepare a map of the village. Although a few people were seated at the side of the chautara, neither they participated actively in the exercise, nor did the head master request them to. When a few people from ward no. 1 (Damai caste) made an attempt to give some inputs, the headmaster did not like it. He seemed not accepting the comments of these people. Thus the facilitator had to take a more active role. He encouraged and asked for people's active participation. This, in turn, enhanced people's participation. Although women observed the whole mapping exercise with curiosity, they did not participate actively.

With regard to the location of natural resources, the following were some major observations:

- First of all the water sources were indicated (water problems in the dry period). Subsequently, two major landslide areas were shown in the map. People showed footpaths as a reference.
- In the map, Rani Ban was shown next. During the discussion, it was known that this forest at present is closed for collection of firewood etc. The villagers said that they were in discussion with the DFO to formalise the gement of *Rani Ban* forest by the community. The forest management emerged as an important issue in Lalu VDC. However, when asked how people meet their daily for forest products such as fuelwood, people showed forest located in Achham district (at the border of Lalu VDC). Until this moment, the head master had not indicated about this forest. This could imply that he himself might not have been much occupied with tasks as collecting firewood and forage from the forest.



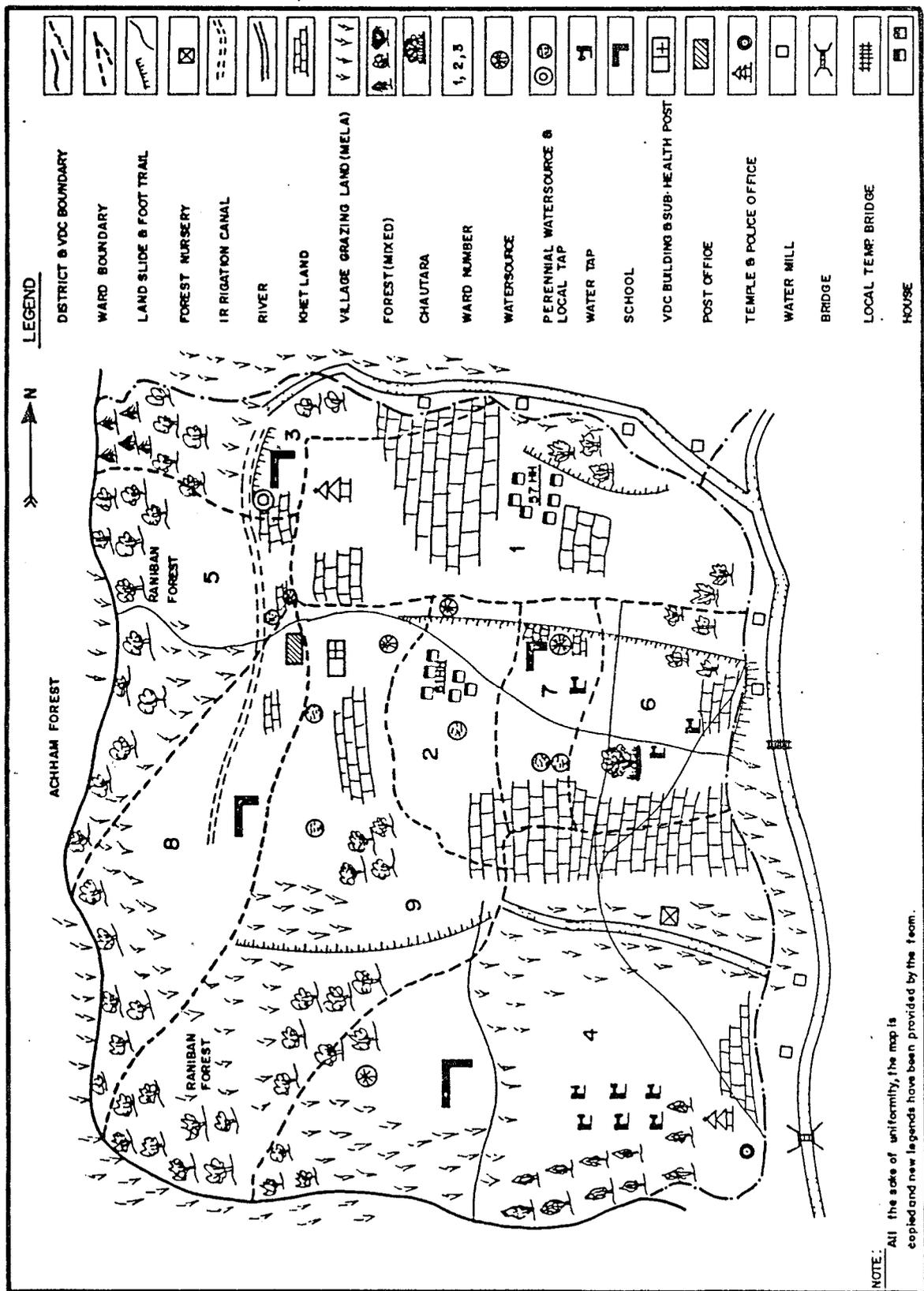


Fig. 7.1 Social and natural resource map of Lalu



7.2 Land use

Heavy rains after our arrival to the village made it difficult for the people to participate in the transect walk. Therefore, the transect presented in Fig.7.2 is a compilation of information gathered during the week from many discussions held with many farmers who were there at the spots visited by the team. The transect provides information mainly from ward no 5 (higher elevations) and ward no 1 (lower elevations).

The transect shows two types of land use at higher elevations: forest for grazing and Bari (with cattle shed). Like wise, four types of land use have been found at lower elevations namely khet and bari, ghar bari, khet and bari, and bari (with cattle shed). This suggests a high diversity in land use types. Cropping patterns changed with the changes in land use types. The transect (Fig. 7.2) gives the details.

7.3 Local natural resource management systems

The previous section described the available bio-physical resources at farm level. This section discusses how they are being used by the farmers and how these resources are interlinked with other resources like labour, knowledge and time.

7.3.1 Farm management system

From the transect it can be concluded that there is a great diversity of cropping patterns. This is mainly due to factors such as differences in soil types, climatic conditions (altitude) and availability of water in the rainy season. The dominating cropping patterns are rice - wheat in lowland and maize - wheat in upland. All households have both upland (*bari*) and lowland (*khet*) to some extent. The *ghar bari* is surrounded with upland.

For maize cultivation people use a local variety with a long thin stalk, nearly 9 inch long cobs, with robust seeds. The name is not known. Probably it is a cross-pollinated variety. According to people, someone brought a dwarf variety from Musikot some time ago. When people planted the dwarf variety along with the then local long stalked variety, the new type or variety developed. The new variety adapted itself very quickly to the specific bio-physical conditions of Lalu (water availability, good soil fertility management, suitable climatic factors) and has become a high yielding ('local') variety (Photo 7.1). Although the DADO attempted to introduce some improved maize varieties, people are not very satisfied with the performance and quality of these improved varieties.

Because strong wind is likely to lodge maize plants, farmers practice earthing up of the maize plants.



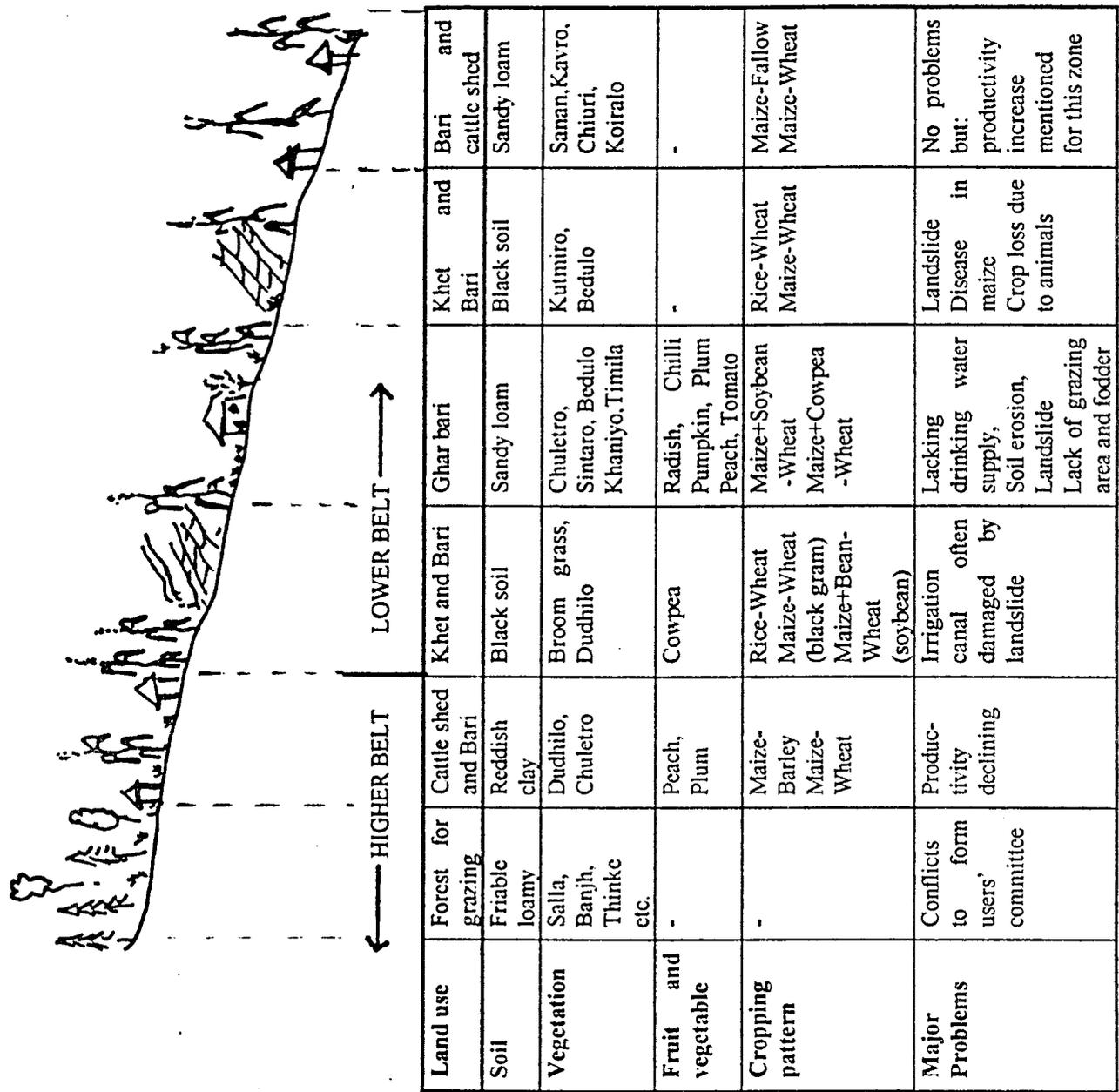


Fig. 7.2 Transect through ward no 1 and 5

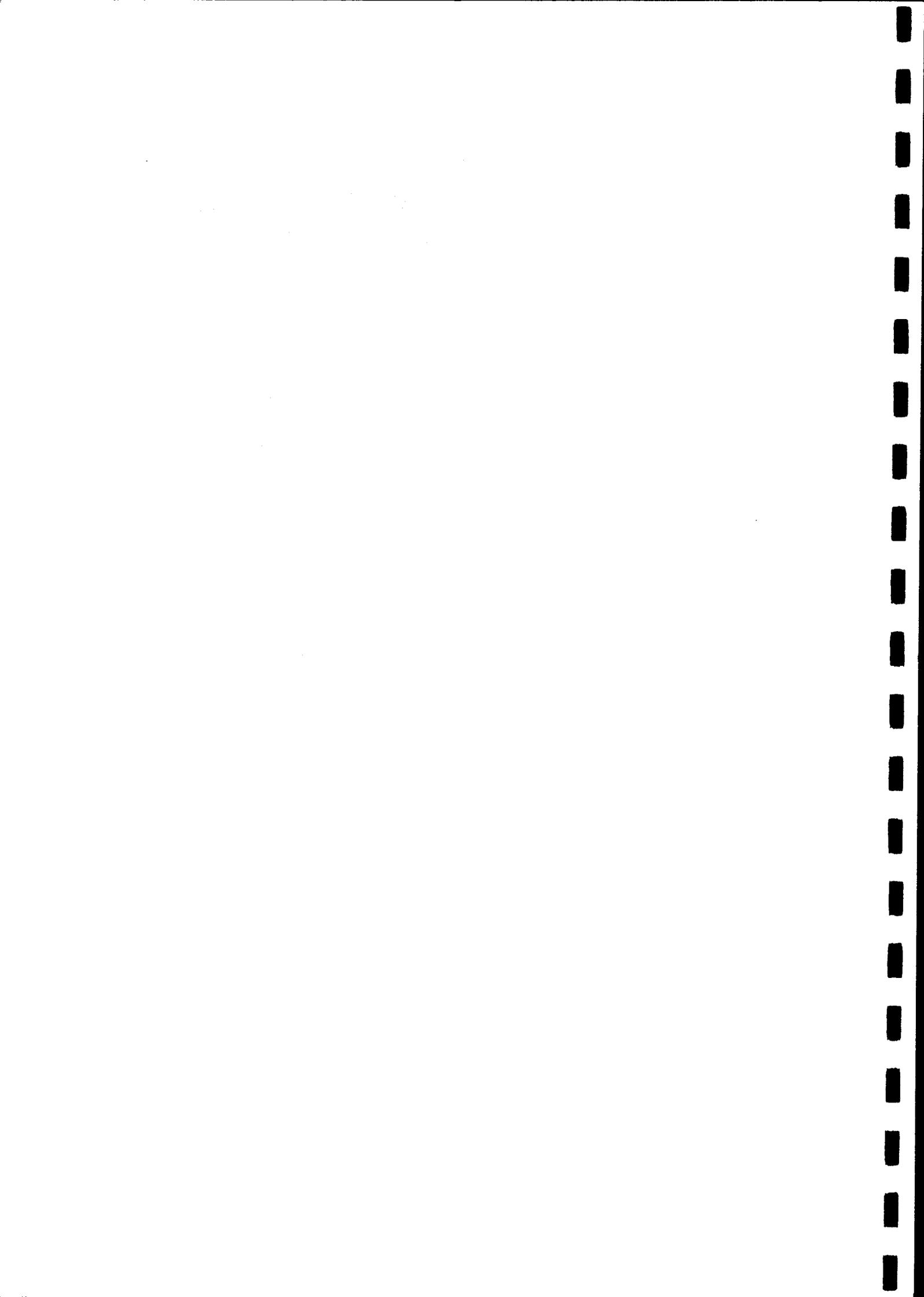




Photo 7.1 Lalu's popular local maize variety

Table 7.1 shows the seed rate and yields of the major crops at two elevations: the upper and lower belts. Wards 3, 5, 8 and 9 are located at the upper elevations and wards 1, 2, 4, 6 and 7 are located at the lower elevations.

Table 7.1 Seed rate and yield of major cereal crops in Lalu

SN	Crops	Seed rate		Average yield	
		local unit ¹ (pathi/ropani)	standard unit ² (kg/ha)	local unit (pathi/ropani)	standard unit (kg/ha)
1	Maize				
	upper belt	0.80-0.90	25-30	24-28	830-1150
2	Wheat/barley				
	lower belt	0.80-0.90	25-30	45-60	1850-2500
3	Rice				
	upper belt	3.5-4.0	120-140	35-40	1200-1400
	lower belt	3.5-4.0	120-140	50-70	1700-2400
	upper belt	2.0-2.5	50-60	40-60	975-1500
	lower belt	2.0-2.5	50-60	80-110	2000-2700

¹ Local pathi is half the rate of a standard pathi

² 1 standard pathi = 2.44 kg for rice and 3.48 kg for wheat and maize

Table 7.1 reveals that the average yield of maize and wheat of the lower belt is nearly double to that of the yield as found in the upper elevation, although farmers apply nearly the same seed rate. Differences in soil types and intensification on labour management are two major reasons for the difference in yield.

While trends of productivity of major cereal crops was decreasing at the upper elevations, at the lower elevations, the opposite has been found. At the lower elevations, interestingly, the productivity of major crops seemed to increase because people have given due attention to improve the soil fertility there. This becomes clear when the issue of soil fertility management is discussed in the following section. It also indicates that there is a difference within Lalu regarding access to good quality soils (located in ward no. 1,2,6,7,4).

Seasonal calendar of major crops

Table 7.2 gives an idea about the seasonality of the major crops and the activities performed at the lower belt of ward no. 1 and 2.

Table 7.2 Seasonal crop calendar of Sitala and Naula Ghar

SN	Activity	B	J	A	S	B	A	K	M	P	M	F	C
Rice													
1	Soaking seeds												
2	Sowing seeds												
3	Land prep + ploughing												
4	Transplanting												
5	Weeding												
6	Harvesting/threshing												
Wheat													
1	Wetting field												
2	Ploughing												
3	Sowing seeds												
4	Weeding												
5	Harvesting												
Maize													
1	Sowing												
2	Weeding												
3	harvesting												
Others													
1	Carry manure to khet and bari	B/ K	B/ K				B	K					

Soil fertility management

In Lalu, people have been following many strategies and activities to sustain soil fertility level at individual and at the community level. The following discusses some techniques being used by the people in the study area.

Increased stall feeding. The shift to buffalo management (refer to next section) made people shift from free grazing practices to stall feeding (Photo 7.2). This facilitated compost making in large quantities by mixing cattle and buffalo dung with litter collected from the forest, khet and bari.

People then began to construct cattlesheds near the fields, at the upper and lower belts, where the cattle could be stallfed. Construction of the cattlesheds near the field saved labour needed to carry the manure to field. Cattle dung/compost prepared in the sheds could thus be applied directly to the fields surrounding the cowshed. All these facilitated not only the intensification of the farming systems due to increased amount of nutrients, but also less amount of manure is lost as compared to free grazing systems.



Photo 7.2 Stall feeding of buffaloes

In-situ manuring. When the maize crop is harvested, many households join together informally and allow grazing of their buffaloes in the field turn by turn so that the field of all the households can be enriched with nutrients. While following this practice, the male buffalo becomes a reference: the female buffaloes are moved according to the movement of male buffalo. Here people have other purpose of facilitating breeding of their buffaloes.

Sowing leguminous crops. Soybean and black gram are planted extensively especially on the bunds of the rice and maize fields (Photo 7.3). People prefer mixed cropping of maize with cow pea or bean, instead of mono cropping. This is not only to reduce the risk of crop failure but also to increase the nitrogen content of the soil.



Photo 7.3 Maize inter-cropped with beans

Slicing terrace risers. Slicing of the terrace risers on the khet and bari is another local method to increase the organic matter content of the fields.

Using chemical fertiliser. Only a few people apply urea because it is not always available as often is the case in remote areas. People who do apply urea, mix it with organic manure. According to local people, the combination of these two increases the yield by 25-30% compared with an application of cattle manure alone. More important, as farmers explained, the combination is not likely to destroy the soil structure, as happens when only urea is applied. Also it reduces the risk of complete failure of the crops in the following year, in case there would be no supply of fertiliser.

It is for the above reasons that improved fertility management in combination with favourable conditions (soil, climate) has resulted in increasing production trends for the main crops maize and rice for the lower belts (focus area of the study in Lalu). Fig. 7.3 shows this trend.

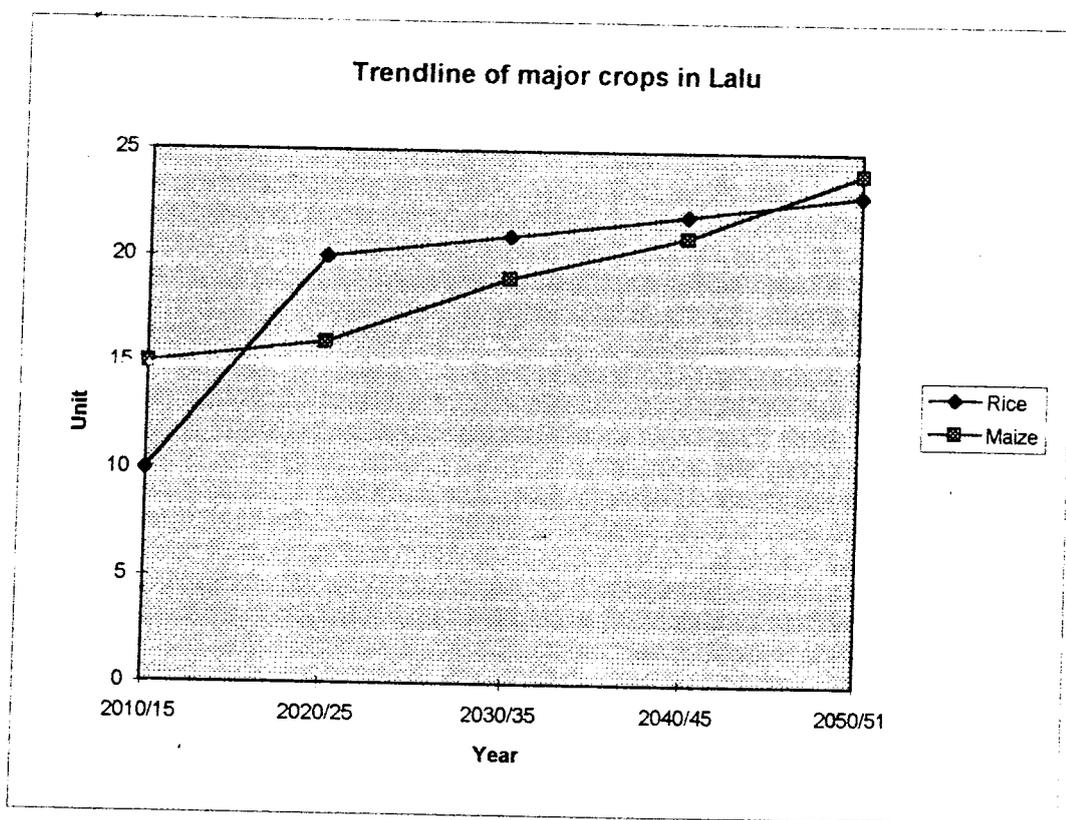


Fig. 7.3 Trend line for yields of Rice and Maize in Lalu (Lower belt)

As already mentioned, the main reason for increasing production levels for maize is the overall improved fertility management resulting in higher manure production and application.

The increasing trend in rice production is due to an intensified fertility management and the introduction of an improved variety ("American" variety) from Jumla about thirty years ago. Farmers do not know the name of this variety.

In case of wheat, the yield seems not declining, some even said that the yield is slightly increasing, while some said that it is stagnating. This is mainly because people give first priority to the fertility management and inter-culture operation for maize and rice crops. Although the DADO introduced some new varieties for wheat (and barley) 2 years ago, people did not experience any difference in yield.

The production trends for the higher belts are declining due to a combination of factors:

- different soil types which reacts less direct to manure applications
- larger landholding size, therefore less intensive manure and labour management
- different climate regime: therefor different (longer growing season) and other cropping practices.

The higher belt has, however, not been the focus of our study. For this reason this issue is not elaborated here.

Irrigation management system

The people of Lalu have built a small channel in 1954 AD which enabled them to irrigate only at a small scale, as there was little supply of water. To improve the system the Remote Areas Development Committee (RADC) provided Rs. 5 lakh in 1982, which was used for channel construction and the command area expanded (ward nos. 1, 2, 4, 6 and 8). However, seepage from the canal and lack of adequate drainage facilities have resulted into one of the major landslide problems in the area, despite two major repairs with the financial assistance of the DDC (RS 60,000) and HMG's BYVY program (RS 50,000). To manage the distribution of water to the fields, people have made a provision of a *Kulal* who is also responsible for minor repairs. For the service of the *Kulal*, people pay a fixed amount of cereal grains annually.

Plant protection

In Lalu there is not much insect infestation except for stem borers in maize, 'loose smut' in wheat, 'blast' and 'white heart' in rice. Furthermore, wild animals like bears, monkeys, porcupines, parrots and crows eat the crops. Scare crows are used to prevent damage from the birds.

One pesticide sprayer has been provided free of cost to the farmers through a subsidy of the DADO (25%) and CSD (75%). However, it seems that people have been using this sprayer just to control fleas and bugs inside the house.

To prevent maize cobs from rotting in the rainy season, people cut a part of the plant just above the cob to let the cob dry in the open air.

7.3.2 Livestock management system

Buffaloes and cattle

Livestock is the main source of income of the people living in Lalu. All households have one or more buffaloes and/or cattle. In Lalu, the history of buffalo raising begins 600 years ago when a person from the Yadav caste (originally livestock farmers) from the Tarai migrated to Lalu. However, improvements came when a bull was brought from India by the people of Lalu nearly 50 years ago.

A real boost was given when people, who previously cultivated cotton, abandoned this and shifted to maize cultivation some 35 years ago. This was due to the availability of cheap clothes else where and decreasing prices of ready made clothes. After all, processing and making clothes from raw cotton is a tedious and labour consuming job. People in Lalu were thus less motivated to continue with cotton cultivation.

People finally switched on to large scale maize production in combination with buffalo raising. This had the following advantages:

- The by-products of maize could be used as feed for the buffaloes,
- Less labour was needed,
- Cash income increased because of the sale of diary products, even accelerated by the rising prices of ghee on the outside markets,
- Maize production increased because of an increased manure production.

Altogether, it resulted in a massive intensification of the livestock-agriculture system in Lalu.

Buffaloes are mostly stallfed throughout the year. Almost every household has at least one cowshed and homestead at the upper or lower belt, and one cowshed and homestead near the house, where the animals are kept permanently.

To understand the many strategies that the people from Lalu adopt to use the natural feed resources optimally, an overview of feed sources is given in Table 7.3 below. The period that people face a shortage is from *Magh* till *Asad* when hay and agricultural residues are fed, and little grazing is practised.

Grazing in the forest does takes place but mainly by goats and sheep, and to a very little extent by cattle.

Few households follow a rotational livestock management system instead of stallfeeding. The cattle and buffaloes are brought to high altitude areas within the VDC during the summer season. This is to make optimal use of all the available grass in the VDC and furthermore the quality of the grass is particular high in those areas.

Table 7.3 Seasonal calendar for feeding buffalo/cattle

SN	Months (Nepali)	B	J	A	S	B	A	K	M	P	M	F	C
Stall feeding													
1	Cut and carry grasses from private sources (farmland)			■	■	■	■						
2	Cut and carry grasses from <i>Mela</i> (next section)							■	■				
3	Fodder, rice straw, dried maize residues									■	■	■	
4	Hay										■	■	■
5	Wheat and Barley straw	■	■										
Grazing													
2.1	Grazing after harvest on the khet and bari							■	■				
2.2	Grazing in <i>Mela</i> (communal pasture land) at village	■	■					■	■	■	■	■	■

Note: B for Baisakh and C for Chaitra

Fodder trees (kutmiro, bedulo, sintaro) are found mostly in the higher belt, where people, on their own initiative, have planted fodder trees in response to scarcity of this resource. The reason is that the effect of shading is regarded less harmful for the upland crops than for rice.

The trees are lopped to feed the animals in *Poush-Falgun*, in addition to the grazing which takes place at the *mela*. Also during this period people start to feed rice straw and dried maize stalks, which people would use to throw away some 15-20 years ago.

A mix of barley, bran and salt is fed to lactating and pregnant buffaloes and ploughing oxen. Also are these oxen provided with barley's bran every day during the ploughing period and once in a fortnight during other periods. People are very conscious about the high need of energy of the animals during these periods.

Another particular practice is that breeding bulls are given beaten, condensed milk mixed with salt. The milk is collected from all households in the locality.

Mela

What is quite remarkable in Lalu is the pasture management system of the "*Mela*", the grazing area around the village. Every household "owns" a plot, which is marked by stones. The management of the *Mela* illustrates a unique combination of private ownership with communal ownership and accordingly communal rules and regulations. It makes clear how people try to cope with shortage of grass by adopting strict rules and regulations on grazing. The seasonality of the use of this common property resource is given in the following figure.

Seasonality of Mela management											
B	J	A	S	B	A	K	M	P	M	F	C
						cut and carry					
communal grazing		no grazing allowed no cutting allowed				communal grazing					

During the summer, from *Ashad* to *Karthik* (4,5 months), the grass needs to regenerate and nobody is allowed to cut or to graze. Then during the months of *Karthik* and *Mangsir* people start cutting the grass on their private plots. This grass is mainly used for making hay to feed in the period of shortage. After it is cut everybody is allowed to go to that plot and graze its animals there. This period of grazing overlaps the period of cutting, as can be seen in the above figure, as all plots are not cut at the same time. What happens is that during the months of *Kartik* and *Mangsir* one can find communal grazing together with cutting the grass on the privately owned plots at the same time. The period for communal use ends at the end of *Jesth*.

To prevent livestock entering the *Mela* during the 'no grazing' period (when the grass needs to grow, or that people are allowed to cut it), the *Noralo*³ has to look after the fields. He is to control theft of grass by local people.

Resource poor people are reported to suffer from shortage of cattle feed and forage especially during the month of *Falgun* (Feb.-March), because they have little or no access to the *Mela*. Some people buy hay (at the cost of RS 3.00 per bundle) to feed the animals during the scarce months.

The *Mela* management system is people's response to decreased fodder resources combined with an increasing demand as a result of shifting to buffalo raising.

Another remarkable practice in *Lalu* is also related to people's response to fodder shortage. Almost 99% of the households give the young male buffaloes free of cost to the *Sarki's* (occupational caste), who contrary to people from other caste are allowed to eat meat. Because the male buffalo is not used for ploughing and for breeding purpose, it can only be used in the future. Therefore, people do not prefer to keep it. Furthermore, people state that when the young male buffalo is immediately weaned after birth, the milk production of the mother cow will be doubled.

³ The *noralo* system is also found in agriculture, to prevent animals entering the field, but also to prevent theft of crops by people.

Livestock trends

Lalu shows an interesting picture when the trend for buffaloes and cattle is shown (Fig. 7.4).

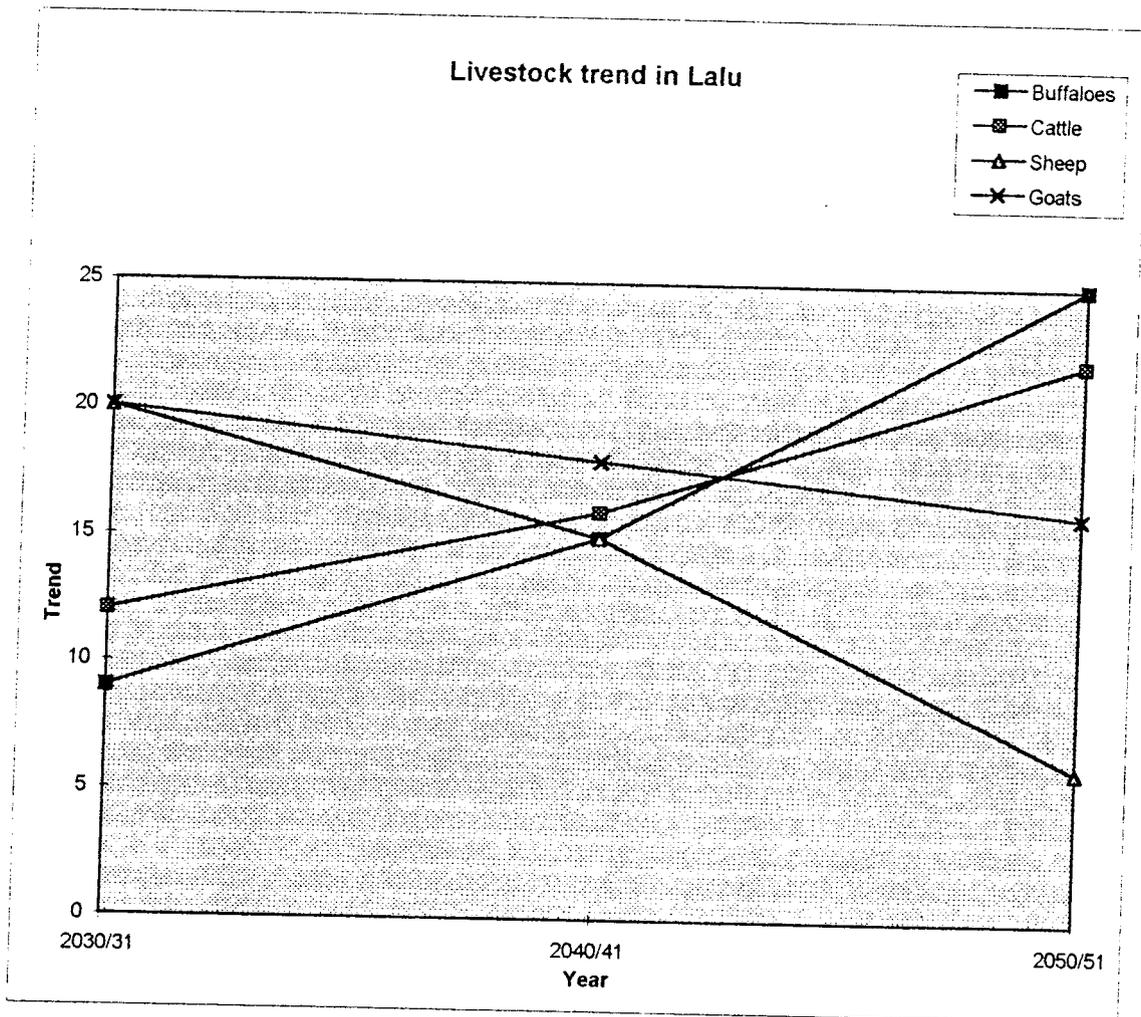


Fig. 7.4 Livestock trend in Lalu

The increasing trend for buffalo and cattle is mainly due to:

- High milk yield: 8-24 manna/day (buffalo), from which ghee is prepared and sold (30-60 kg/buffalo, equals Rs 4,000-8,000).
- Maize which provides fodder is grown instead of cotton, which used to be cultivated before.
- Quantity of manure of buffaloes is high
- Increase of oxen due to increased number of households

Sheep and goats

These days only few people have sheep, whereas most of the household have one or more goats. The grazing pattern for goats and sheep is as follows:

From Karthik - Jesth : lower belts of Achham (only large herds), *Mela*, homestead
From Baisakh - Asadh : forest areas, high altitude areas

Especially for sheep there is a declining trend because:

- forests at lower altitude (Achham, Dailekh) become more and more closed for outsiders (spreading of the concept of formalised community forestry), leaving less grazing area's.
- death of many due to scabies
- one person of the family is required to herd the sheep which increases the pressure on the families' labour resource
- for profit one needs to have many sheep, but going to the lower lying area's becomes more expensive, and is therefor less profitable.

Although most of the above reasons can also be applied to goats, the trend for goats stays more or less the same, because:

- no big herds are needed to get a small profit
- doesn't need to be stall fed (for some families a problem because of the labour needed at home). It is even preferred not to have the goats stall fed, because too much forage grass cut would be wasted as goats are very selective in which grasses they eat. Besides this, it is easy to send a child to look after the goats, therefore no extra labour force is needed as compared to sheep.
- quick return is possible (selling of male goat), relative low input cost (one baby goat only costs Rs. 300/-).
- cash also from *pheruwa* (carpet made from goats hair) which gives a double price compared with that of a *liu* (carpet made from sheep wool)

Local knowledge

As already said in the introduction of this chapter, in every village, the study team was surprised by the immense rich local knowledge systems of the people. For Lulu, an example is given related to the treatment of livestock diseases in Lulu.

First of all people request the local witch doctor, the *Dhami*, for help and advise. After this they use their own local treatment methods such as mentioned in the following table.

involved in management decisions. Regardless this DFO intervention, the people from Lahu have recognised the need to protect the forest in Lahu (*Rami ban*) already 20 years ago. At that time they appointed one watchman (*Noralo*) who received grains from the villagers (2 pathi/year/hh). To protect the forest, local rules have been established: people are only allowed to collect litter in the mouth of *Chaitra and Batsakh*. It is strictly forbidden to enter the forest with axe and it is forbidden to cut raw timber and fuelwood. Dried fuelwood may be collected, and grazing

The DFO is actively giving follow-up as there is a conflict in the community: some groups would like to have 2-3 sub-committees, with the watchmen controlled by these sub-committees (ensuring more autonomy), and paid from income from the forest. The present main committee is opposing as in the future much financial benefit can be gained from this forest, and many sub committees might decrease their power structure.

Presently, the people of Lahu VDC are in process with the DFO of having their forest handed over to the community. Through the DFO, a forest management committee has been formed in 1993. The DFO has provided a tour for few people to Nepalgunj, and a nursery has been established 2 years ago operated by a watchmen partly paid by the DFO, partly by the community. Some 5000 seedlings (*sallo, sisso, bansh, churti*) have been planted on community land, which demonstrates people's concern for forest products.

7.3.3 Forest management system

Disease	Treatment
<ul style="list-style-type: none"> • Urine in Blood • Swollen belly • Wounds of cuts, stomach pain, dysentery • Skin disease • Worms in young buffaloes • Leech in the nose of the buffalo • Scabies of goats/sheep 	<ul style="list-style-type: none"> • Juice of wild pear should be given • <i>Pangar</i> seed extraction fruit juice, extraction of radish seed, or apply human umbilical cord to the buffalo. • Extraction of <i>Sarwa</i> (local herb) • 1. seed extract of <i>kaulo</i> (local herb) • 2. burned butter cream of buffalo milk • 3. fish intestines • 1. <i>sisno</i> root extract • 2. <i>Taro chunk</i> root extract • 1. first make the buffalo thirsty (place in the sun), bring water, leach will also appear to drink, then cut the leech with scissors. • 2. <i>Churti</i> bark extraction • 3. tobacco juice • Yellow soil mixed with <i>deodar</i> oil, the medicine from the veterinary office is not regarded effective

Table 7.4 Local practices to cure livestock (and humans)

of animals is allowed. Today the number of watchmen has increased from one to three, each representing three wards.

The main forest for daily use (fuelwood) however is *Achham* ban, beyond *Rani* ban, in Achham district. It is very far away and it takes 4-8 hours to collect one *doko* of fuelwood.

7.3.4 Gender considerations

While discussing the workload of women it became clear that for nearly all livestock management operations women have the main responsibility. Accordingly their workload is enormous, as buffalo raising is a very intensive form of livestock keeping.

The following activities are mainly done by women or children (in case of grazing):

- fodder (bio-mass) collection from bari, khet, Mela etc.
- cleaning of the stall
- making of compost
- transporting it to the bari and the khet
- fetching water (mainly for the buffaloes), especially in the dry season a laborious task due too the lack of perennial sources.
- feeding the animals
- grazing the animals
- making ghee
- collecting litter

During the most busy months (rainy season) women sleep only 6 hours and spend 80-90% of their time in agriculture. In the slack period they work much less. During that time (*Poush-Chaitra*) they fetch firewood which still takes up 40% of their time.

In the resource poor household the women get sometimes help from their husbands, but in the resource rich families women are often carrying this burden alone.

It is noteworthy however, that the older women state that today things are much better in terms of hours one needs to work. In the period that people cultivated cotton women had to work 20 hours a day because they were extremely busy with processing of the cotton.

In Naulo Ghar the women (resource rich) may sell ghee and grains for their own expenses (*pewa* system: the system which determines for which items a woman has the right of ownership).

7.4 Problems and constraints

This section discusses some major problems and constraints that the people living in Lalu have been facing presently. However, it should be mentioned that these problems are not discussed according to priority.

7.4.1 Landslides

In Lalu, the risk for landslides is enormous during periods of high intensity rainfall due to fragile land and steep slopes. People explained that the land slide problem actually started with abandonment of the cotton cultivation and the shifting to maize and rice cultivation, which both required irrigation. The seepage from the irrigation canal and the excessive uncontrolled drainage water results in mass destruction of fertile lands, buildings and threatens to affect drinking water resources and infrastructure in the near future (Photo 7.4).

People are very aware of the problem, but the casual repair of the canal and other relative small scale activities (planting of trees like *Mallanto*, *Uttis* and grasses like *Amlisso*) are far from sufficient seen the magnitude of the problem.



Photo 7.3 Landslide in Sitala, Lalu VDC

7.4.2 Shortage of drinking water

Although Lalu has many temporary water sources, in the dry season there is a water problem because sufficient perennial sources are lacking. KLDP has constructed taps for ward no 4, 6 and 7. The other wards are desperate for water, which needs to come from the main source in ward no 3. Although the people in ward no.3 do claim that the water

is not sufficient for themselves, the main reason for the present conflict seems to have a political origine.

7.4.3 Lack of unity

The issue of drinking water mentioned just above illustrates that like in other villages, also in Lalu conflicts occur about the management of natural resources like drinking water and forest management. On-going political power struggles in the village seems an underlying cause for many conflicts. It hinders people from uniting and solving common problems as the landslide and forest protection.

For example, the nature of the landslide problem shows that the community organisation is rather weak in Lalu. People need to organise themselves to tackle the problem effectively. It also requires technical measures on private lands, and large capital investments to halt the process.

7.4.4 Workload of women

From the sexual division of labour it becomes evident that, especially regarding livestock management the extra labour needed for agricultural intensification is mainly provided by the women, who are the main responsible for the livestock management. This results in a high workload of women. As trends of the availability of forest products (fuelwood) and accessibility of pasture areas are to decline this workload will even increase in the future. Because of their overall low status women are not invited to strategic meetings where relevant matters (e.g. forest management) are discussed.

7.4.5 Lack of proper and co-ordinated development interventions

The performance of the livestock raising group formed through the initiation of DAD)/DLSO shows an example of inadequacy and weak support services of some of the line agencies in Lalu. The DADO/DLSO has formed a livestock group in 1993, which is to provide services to the farmers in Lalu. However, the group has not initiated any activities uptil now, except that it has collected about Rs. 900 as its saving fund. People said that neither the person who received the training, gets any material (kits) support from the office to provide services, nor does the ADO give follow-up itself.

Inputs and advise form the line agencies are not valued very high compared with the local resources people use and develop in Lalu. Follow-up from LAs is meagre or absent.

Also services provided by NGO's need reconsideration. The blueprint approach of CSD for saving groups does not make much sense in such a rich area. The emphasis on non formal education for women and girls however is recognised as useful by the women

involved. It helps create awareness on many issues as health and childbirth, women's rights, the need for education, etc.

Although intervention from the KLDP's side for drinking water is appreciated, the team felt that integration with the community development programme of CSD might have helped to resolve the dispute with ward no 3. Too little joint efforts have been taken in this respect.

People in Lalu are very much exposed to outside areas, which was also reflected by high expectations towards the study team for issues like roads and trucks (to collect and transport fuelwood!), electricity, and a microphone for women's meetings. The intensive trade for Ghee in Chisapani and other areas, the introduction of buffaloes from India, the introduction of a maize variety from Musikot illustrate people's innovativeness and meagre dependency on outside intervening agencies.

Table 7.5 gives an overview of past interventions in Lalu.

Table 7.5 Interventions in Lalu

	Organisation	Field based staff	Activities	Since when
GOs	1. Livestock Service Centre	Kumal Gaon VDC	<ul style="list-style-type: none"> Formed one buffalo raising group One person received a one months VAHW's training Jumla 	92/93 93/94
	2. Agriculture Dev. Office	ASC at Kumal Gaon	<ul style="list-style-type: none"> Food crop development group through ward no 4 Vegetable seed distribution 	?
	3. District Forest Off.	Range Post at Kotbada	<ul style="list-style-type: none"> Nursery established Community forestry meeting organised for mgt. plan prep 	? 92/93 94/95
	4. Farm Irrigation Project/HMG	---	<ul style="list-style-type: none"> Channel rehabilitation 	82/83
NGOs	1. CSD	Yes	<ul style="list-style-type: none"> Saving program Vegetable seed distribution Non formal education for women/girls 	1993
	2. KLDP	No	<ul style="list-style-type: none"> Drinking water supply for 50 hh 	1993

7.5 Conclusion

In Lalu, one finds a relative healthy agricultural system, with very few problems, and even increasing productivity trends in the lower belts.

People have responded to changing circumstances (shortage of resources, changing market prices of ghee and cotton cloth) by adopting different technologies to make optimal use of the available resources :

- conversion to buffalo raising in combination with maize cultivation
- adopting sound grazing management (*Mela*)

- applying higher bio-mass quantities to the agricultural system (planting fodder trees, feeding agricultural residues, collecting more litter)
- stall feeding and in situ manuring preventing nutrient losses
- spreading of livestock over goth bari area and homestead (labour saving mechanism)

People are not very keen on the services provided by the line agencies. They often regard their local resource as the best available.

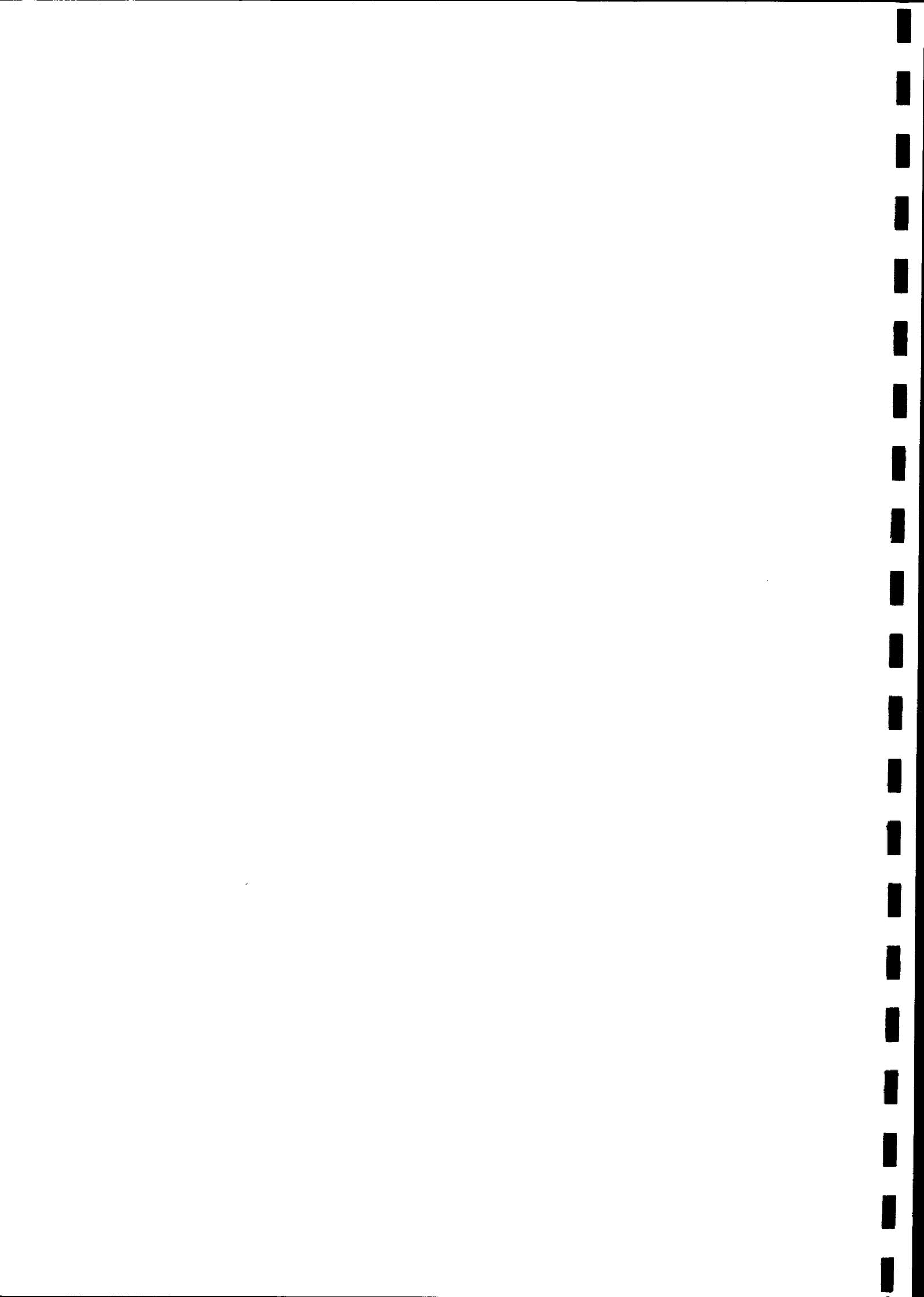
The main problems related to management of the natural resources are:

- Weak community organisation resulting in conflicts for water and forest management
- Increasing workload for women as main livestock managers, as access to forest and grazing resources becomes more difficult.
- Occurrence of landslides destroying infrastructure and land

These problems have been visualised as an input for discussions in the village (Photo 7.4)



Photo 7.5 Flip chart for discussion, illustrating the main problems found by the study team



CHAPTER 8

LEARNING FROM THE PEOPLE IN HUMLA AND KALIKOT: SUMMARY AND CONCLUSIONS

In this chapter we summarise findings and draw conclusions from the village level assessments carried out in Humla and Kalikot. Only when it is considered necessary, we have indicated the name of the respective village. Specifically, this chapter discusses the following issues:

- The nature of the natural resource base and its relevance to the livelihood strategies of the people. Also the dynamics between the natural resource base and the farming system are discussed (natural resources systems).
- The way how people allocate their labour, time and valuable local knowledge to manage the resources optimally (local resources management systems and indigenous knowledge).
- How people cope with changing circumstances and the limitations and constraints which they face (people's responses to resource scarcities, limitations and present state of development interventions).

Last but not the least, this chapter gives some broad recommendations for areas of facilitation. Because it is not only too early for activity planning, but as it also conflicts with the major concerns of the process approach, no specific activities are suggested here.

8.1 Natural resource systems

Our findings show that people do not distinguish isolated resources as water and land but operate in terms of systems (e.g. khet, bari), in which every component of the farming system has a relation with the other. Farmers are very conscious about these relationships as became evident from the nature of the local management systems found in the study areas. Regardless, in all villages, people's first concern or objective is food security. For food production, water, fertile soil, good quality forests and grazing lands are crucial. If one of these resources is scarce or limiting, food production is likely to affect adversely and induce people to overexploit or encroach natural resources (widespread slash and burn practices in Kharpel).

Table 8.1 gives a short overview of the main findings with respect to the state of the natural resource systems. Because this table is simply a schematic (and therefore very general) presentation of what we have found in the villages, it might not fully describe the very specific character and diversities of each of the four villages. Neither this presentation distinguishes clearly cause and effects or results because many of the mentioned issues are directly related to each other (e.g. livestock trend and forest protection). Therefore, for in depth understanding, we refer to the subsequent chapters.

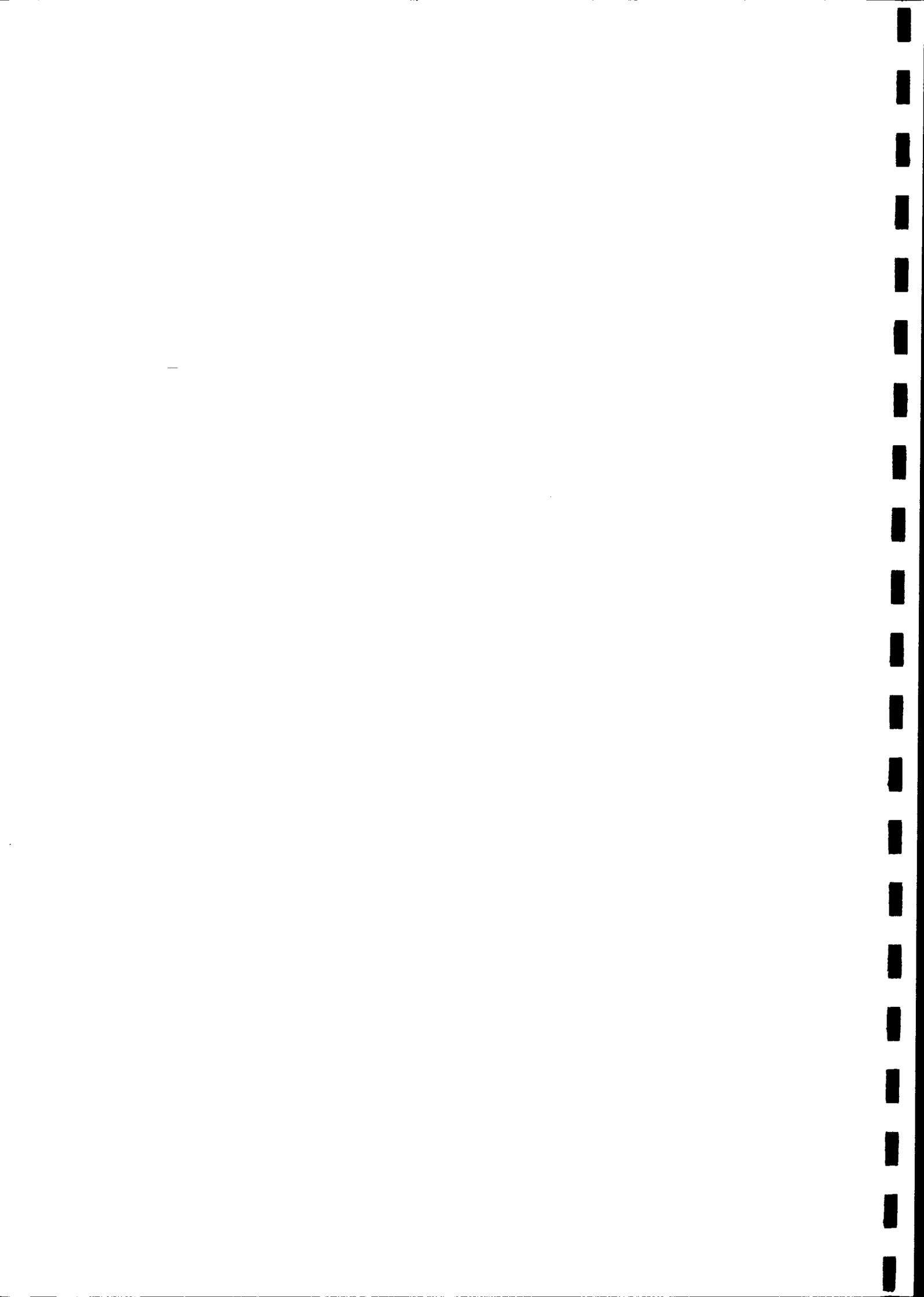


Table 8.1 State of natural resource systems

Resource	Summary of major findings	Some causes	Indicators and observations
Land	<ul style="list-style-type: none"> - High diversity of cropping systems indicating location specific adaptations - Except Lahu all villages are poor in terms of food production - Land degradation (Kharpel, Phoi, Lahu) - Quality and quantity declining - Protection begun in Phoimahadev and Lahu 	<ul style="list-style-type: none"> - Declining soil fertility - High seed rate, comparative low output (except Lahu) - Marginal soils - Cultivation on steep slopes, irrigation 	<ul style="list-style-type: none"> - Many different systems within one village (varying with soil quality and altitude), and between the villages - Dominance of mixed cropping patterns - Local low yielding varieties (Kharpel, Phoimahadev, Piplang). Lahu has excellent local maize variety. - Although along with compost or farm manure, some have begun to use chemical fertilisers in Lahu. - Land slides, sheet erosion, terraces breaking down
Forest	<ul style="list-style-type: none"> - Encroachment of forest and wide spread "slash and burn" (Kharpel) 		<ul style="list-style-type: none"> - Longer walking hours for forest products - Declining trends for (Kharpel) - Decreased access to people and livestock inside as well outside VDC (all villages). - Increasing conflicts around forest management (Lahu, Kharpel) - Breaking down of management structures (all villages) - People are acquainted with community forestry concept and existence of forest management committees (Phoimahadev, Lahu) - Community plantations (Phoimahadev)
Livestock	<ul style="list-style-type: none"> - Decreasing trend in number of sheep and goat - Decreasing trend in number of cattle and buffalo (except Lahu) 	<ul style="list-style-type: none"> - People living in lower areas are restricting movement of sheep - Imposing local taxes for sheep grazing in lower areas - Closure of Tibetan pastures - Decreasing access to good grazing areas resulting reduced forage base for livestock 	<ul style="list-style-type: none"> - Trading through sheep has decreased therefore reduced income opportunities - Diseases (Piplang, Kharpel, Lahu) - Labour shortage - Declining income sources through livestock except for Lahu (Ghee) - Diseases
Water	<ul style="list-style-type: none"> - Limiting 		<ul style="list-style-type: none"> - Drying of sources (Kharpel) - Lack of (sufficient) irrigation (Kharpel, Piplang, Phoimahadev) - Irrigation (Kharpel), Drinking water (Lahu) - Increased work load for women - Use of chemicals to control weeds in rice field (Phoimahadev)
Labour	<ul style="list-style-type: none"> - Increasing disputes/ conflicts - Increasing shortage of labour 	<ul style="list-style-type: none"> - Seasonal migration of male members - Breaking of traditional labour management systems such as Noralo and Rokaya (Kharpel and Piplang) - Poverty, degradation of the resource base 	



8.2 Local resource management systems

With a view to regulate the availability of resources and manage labour efficiently, in the past years, people in Humla and Kalikot have developed several types of local resource management systems. For example: Nora system, Rokaya system, Perma system, irrigation management system. Although at present, some of these systems have broken in Kharpel and Piplang for several reasons, most are still intact in Phoimahadev and Lalu. This is illustrated by the centuries old irrigation system of Phoimahadev and regulation of grazing area's in Lalu (Mela system). Through the Noralo system a person (the Noralo) is assigned to look after the livestock of the whole village so that no animal can graze freely on standing crops of other people. The Noralo is sometimes appointed for managing the common property resources as well (Lalu). For the services of the Noralo, people pay a fixed amount of cereals every year. In turn, they do not need to spend their own labour to protect their crops from their own and other people's animals. This facilitates the villagers to allocate their labour for other essential works. Indirectly, the Noralo system helps to reduce conflicts among rural people. Many villagers in Phoimahadev said that the need for such local resources management systems has increased during the past because the overall resource basis is declining.

According to the view that common property is nobody's property, many often argue that people take less care for sustainable management of common property resources (forest, grazing areas, water) than they do for private resources. Quite contrary, our findings indicated that also the opposite could be true. People in Kalikot and Humla do care and are very conscious about the long term effects of sound management of natural resources. Because people have extensive knowledge about the use and management of the local resources, they have been able to survive and adapt to quickly changing circumstances. The existence of so many communal management systems indicated that people do organise themselves to optimise their scarce resources jointly.

We would like to emphasise that by any means our argument should not be taken to argue that the resource management systems developed by people in Humla and Kalikot are perfect. It is simply to suggest that while formulating and implementing NRM programs, the valuable roles of existing local resources management need to be considered. If a project fails to acknowledge this, an important step is missed in the process. The project needs to explore if such systems existed before, understand why did they have broke down and make efforts for reconstructing them. However, for this, the prerequisite is that the initiatives come from the people themselves.

In addition, indigenous knowledge is the basis of local resources management systems. That people have quite extensive knowledge about the use of the local resources is illustrated by many examples which are documented elsewhere in this report. It also includes the many uses of vegetation locally found in the study areas (Annex II-8-1). For improving the agricultural resource base and maintaining balance among various components of the natural resource system, the importance of this valuable knowledge should be acknowledged.

8.3 People's responses to scarcity of resources: coping strategies

As discussed earlier, in Humla and Kalikot, people have been making efforts to sustain the resource base by improving the management practices of local resources as a response to shortages or scarcity of resources. It is very interesting to find local management systems at the communal level, aiming at proper utilisation of scarce resources. The existence of communal systems and people respecting local rules and regulations, local village based committees, are all very positive features. Equally, people are flexible in adapting their traditional way of working (all villages). This mechanism of adapting to location specific circumstances is probably the reason for the highly diversified cropping management systems found.

The level of community organisation goes beyond village level as natural resource systems cannot be bounded at the household or village level. People organise themselves even beyond villages (Phoimahadev). Also the VDC can not be a boundary as we have seen from the Phoimahadev and Piplang cases where people need to get forest resources from Ranchuli VDC or Mimi VDC. It should be remembered that a VDC (formerly village panchayat) is a recent construction. The findings from Phoimahadev also suggest that people not only know how to negotiate but actually do so for getting access to resources which they need for survival. As people negotiate among villages/communities, logically conflicts can not be confined to one community, or one village only (Kharpel, Lalu, Phoimahadev). An overall scarcity of resources must eventually lead to conflict. This is indeed happening and the amount of conflicts is on the rise (Kharpel, Phoimahadev).

At individual level, farmers have been making efforts to improve the agricultural resource base. Improved fertility management practices, experimenting with different local varieties, using several types of local vegetation for soil fertility management, growing leguminous crops for improving soil fertility, extended the fodder base, intensification of livestock management in combination with stall feeding, rotational grazing, more efficient labour allocation are just a few of the many examples. Likewise, people use a high seed rate for cereal crops when they have germination problem due to the cold climate (Phoimahadev, Kharpel and Piplang) and take short duration crops such as Chino. It seems that as owner-cultivator, farmers have strong incentives to increase the qualitative properties of their private resource base. And finally for spreading the loss of crop failures due to harsh climatic condition or untimely rainfall, people, at the individual level, practice mixed cropping in response (Phoimahadev, Piplang and Kharpel).

Despite all their efforts to improve the agricultural resource base and increase the food production, men from nearly all families go to India during the winter season in search of wage labour and save food for the family living in the house. This characteristic is, however, not specific to Humla and Kalikot but to the whole of Karnali region. Regardless, in Humla, people preferred to stay in the village, provided that there are opportunities to work in development projects as wage labour. People even would be satisfied to work as porter instead of going to India because they are not likely to make a profit by working in India. Not only wages are low there, but they are sometimes cheated as well. They often return back with

no cash at hand. However, unlike people from Humla, people from Kalikot said that they do bring some cash to the village. One possible reason for this perceived difference between Humla and Kalikot might be that the latter go to different places in India, have better jobs and have more bargaining power.

In response to food shortage, wide spread slash and burn agriculture can be found in Humla.

The villages are not homogeneous in terms of people's wealth. The socio-economic profile illustrates that some people can be classified as resource poor. This refers to limited access to and control over land (Kharpel), forest resources (Kharpel), water (Phoimahadev), labour (all occupational caste, women), education (occupational caste, women). Especially, people with little access to and control over land resources were found more dependent on other sources of income to sustain their livelihood. It is, indeed, unfortunate to find that these people are very vulnerable, because they lack own resources, and are therefore exploited in some areas. (Kharpel).

In terms of wealth, Lalu can be classified as rich, compared to the other villages. Even when the socio-economic condition of the poorer segment of the population is taken into account Lalu appears to be a resource rich area. People in Lalu have achieved a relatively healthy agricultural system with even a surplus production through adaptation mechanisms such as initiating buffalo raising, shifting to maize cultivation from cotton growing and constructing irrigation channels.

8.4 Limiting factors

Despite people's efforts to adapt to changing circumstances, aiming at optimal use of scarce resources, they have been facing many limitations.

Fragility and marginality of the area characterised by steep slopes, infertile soils, slides, soil erosion and harsh climatic conditions have been restricting or limiting agricultural practices in Humla and Kalikot. The situation of Humla is worse than Kalikot. This means that KLDP needs to look at Humla and Kalikot from two different eyes and focus them accordingly. As a result of inaccessibility, people cannot find markets even for cash crops such as apples. No agro-industry or fruit processing industry exist in Humla and Kalikot district. Therefore, KLDP needs to explore how it could promote high-value low-volume crops such as vegetable seed.

The development activities taking place in other areas have posed constraints or limitations to utilise natural resources for the people of Humla and Kalikot. For example, sheep raising in Humla and Kalikot is severely hampered these days due to restrictions imposed by the Chinese authorities for access to Tibetan pastures. Also the mid-hills of Nepal are getting less accessible for grazing for outsiders. Despite all advantages of community forestry to local people, for people from Humla and Kalikot, it limited traditional sheep raising practices, because of this limited access to community forests.

In the same line, the weak community organisation in some villages (Piplang, Kharpel, Lalu) is one of the reasons why resource management is hampered. Communal action is needed, but people are not always united and organised (anymore) to tackle complicated issues as improved natural resource management. Breakdown of communal systems and village institutions is aggravated by increasing conflicts. These conflicts origin in changing political settings, or under influence of increasing pressure on the natural resources.

Trying to interact with women has been a difficult matter during the stay in the villages. First, women had little time to discuss with the study team. Women, as main responsible for farming, livestock management, household chores, etc., are overloaded with survival activities. Women are the main natural resources managers, but they have little time to learn about and accordingly improve the agricultural system. They are occupied with day to day survival. Especially, this is obvious during the summer (agricultural peak season). The shortage of labour during the peak season also hampers women to take part in community affairs as meetings and decision making. This situation is worsening as many resources (bedding material, firewood) have now become scarce. Thus, women have to walk longer hours for bringing forest resources.

8.5 Development interventions

Due to the isolated character and remoteness, outsiders seemed less interested or motivated to provide improved services.

The frequency of interventions is relatively low. People have little access to outside services (Piplang, Kharpel) although this situation is improving with KLDP's interventions. People have no access to knowledge and information regarding improved inputs (the advantages and disadvantages), rules and regulations (community forestry), technical design and estimates of infrastructure works (Piplang and Kharpel).

It is not only a matter of lacking support from (N)GOs. In case support given, quality is questionable (all villages). Lack of proper follow-up after the formation of farmer groups is such an example. Other factors which highly contributed to farmers' expressed discontent about outside support were:

- wrong designs (irrigation, Piplang)
- lack of technical supervision (conservation plantation, Piplang),
- provision of inputs not suitable for the prevailing circumstances (Kharpel, Phoimahadev)
- lack of insight of the intervening agency in the complexities of the local management systems and the needs of the famers at this level (Piplang, Phoimahadev).

Lack of co-ordination between the different intervening actors at village level is one of the main reasons for inadequate support. Instead of mutually reinforcing activities of each other, isolated activities are carried out with little visible impact.

8.6 Suggestions for follow up activities

Taking into account issues raised earlier, as a starting point, this section gives a few broad suggestions for KLDP to work with the villagers (Table 8.2). The suggestions are based on our discussions with people in the respective study areas.

As has been evident from our findings, for NRM activities, a blue print approach, with a pre-designed set of interventions will not be effective. We need to take into account the highly diversified management systems and people's location specific adaptations to changing circumstances. Specific activities are therefore not yet formulated as we feel that a one week stay in the village is not sufficient.

Because the root causes of the problems are found at different levels, different problems and limitations need to be tackled at different levels of aggregation: individual, household, community, inter-communities, and district. The role of outsiders is to facilitate and bring different stakeholders together, enable them to identify, plan, implement and monitor their programmes themselves.

Table 8.2 Recommended areas of facilitation for KLDP within village level

	Piplang	Kharpel	Phoi VDC	Lalu VDC
Priority	High	High	High	Low
Issues for follow up	<ul style="list-style-type: none"> - community organisation for improved NRM on communal level - labour saving devices - improving the forage base - training of innovative farmers as trainer for other farmers - Darma Farm can support NRM activities, explore possibilities - soil fertility management 	<ul style="list-style-type: none"> - community organisation and conflict management for access to land and forest management - labour saving devices - off-farm income generating activities for the low caste people - improved bee keeping - soil fertility management 	<ul style="list-style-type: none"> - soil fertility management - improve the forage base - facilitating the discussion of the irrigation water issue for ward no 5. - income generating activities for the poor - facilitating in conflict management for forest management - train innovative farmers as trainers for other farmers - labour saving devices 	<ul style="list-style-type: none"> - community organisation for forest management and effective landslide protection - on farm demonstration area for exposure visits to other farmers for livestock management - strengthen women's position for access to forest management and grazing and fodder - drinking water

Referring to the lack of adequate services from the district level actors to the farmers (as mentioned before), the proposed areas of facilitation need to be sought mainly on district level. This will has been discussed in chapter 4 of Part I and in Part III.

After having presented the above broad suggestions, it is good to stress that the prime concern of this study was to learn from the people of Humla and Kalikot. This is the foundation for suggesting KLDP suitable approaches, strategies, working procedures, staffing patterns for an NRM component to be initiated shortly.



Women from Phoi explaining the use of local herbs

TIME LINES

ANNEX II-6-1

1. Piplang

Year	Social events	Development events
1939/40 AD	Land slides, crops land destroyed	--
1944/45	--	Constructed an irrigation channel at Deshi Khola which broke after a year
1950	Heavy flooding, crops damaged	--
1978		Repaired irrigation channel constructed earlier at Deshi Khola which again broke down after remaining in operation for about one and half year
1989/90	-	-Initiated a primary school -Lowered the source at Chhare Khola for irrigating the same piece of land as irrigated by Deshi Khola. The assistance for constructing the irrigation channel came through the DDC
1990/91	-	Repaired the irrigation kulo
1991		KLDP initiated women development programme
1992/93	-	DIO supported to rehabilitate the old irrigation channel at Chhare Khola (A 30 lakh project)
1994		-KLDP installed taps for drinking water -Planted forest saplings at village gaucharan / forest
1995		-JTA (DADO) introduced improved wheat and maize seeds -Repaired irrigation channel (Chhare Khola) through the amount available to the village under BYVY scheme - Converted Pakho land to Khet land

2. Kharpel

Year	Social events	Development events
1932 AD	Out break of Cholera disease	-
1938	Two persons died as a result of land slide caused by heavy snowfall	-
1952	Outbreak of animal diseases	-
1962	Loss of land due to land slide	-
1965	-	Establishment of a Primary School
1967	Out break of animal diseases and many animals lost	DADO introduced apple saplings
1968	Received temporary land ownership certificate	--
1971	Great famine which made people eat even rice bran	--
1977	--	-Introduction of improved wheat variety -CDO inaugurated Ghatte kulo canal constructed through the support of DADO under the Agricultural Year which could remain into operation only for about a month (Controversial)
1981/82	District Education Office approved for establishing a lower secondary school	--
1984	Kundilla katne practice begun by people in response to food shortage	--
1985	--	A foot trail from Kharpu to Sinhala constructed by the local people
1986	One house covered under the land slide causing death of two children and wife of Purna Shahi	--
1993	-Drying of water sources -Nine people died of cholera	--
1994	Land surveying by the Department of Land Survey to provide land holding certificate to tillers/owners/tenants	World Bank's Irrigation Line of Credit project approved budget for constructing a sprinkler irrigation project after undertaking feasibility study and survey works
1995	-	-KLDP supported construction of drinking water scheme and initiation of community development programme

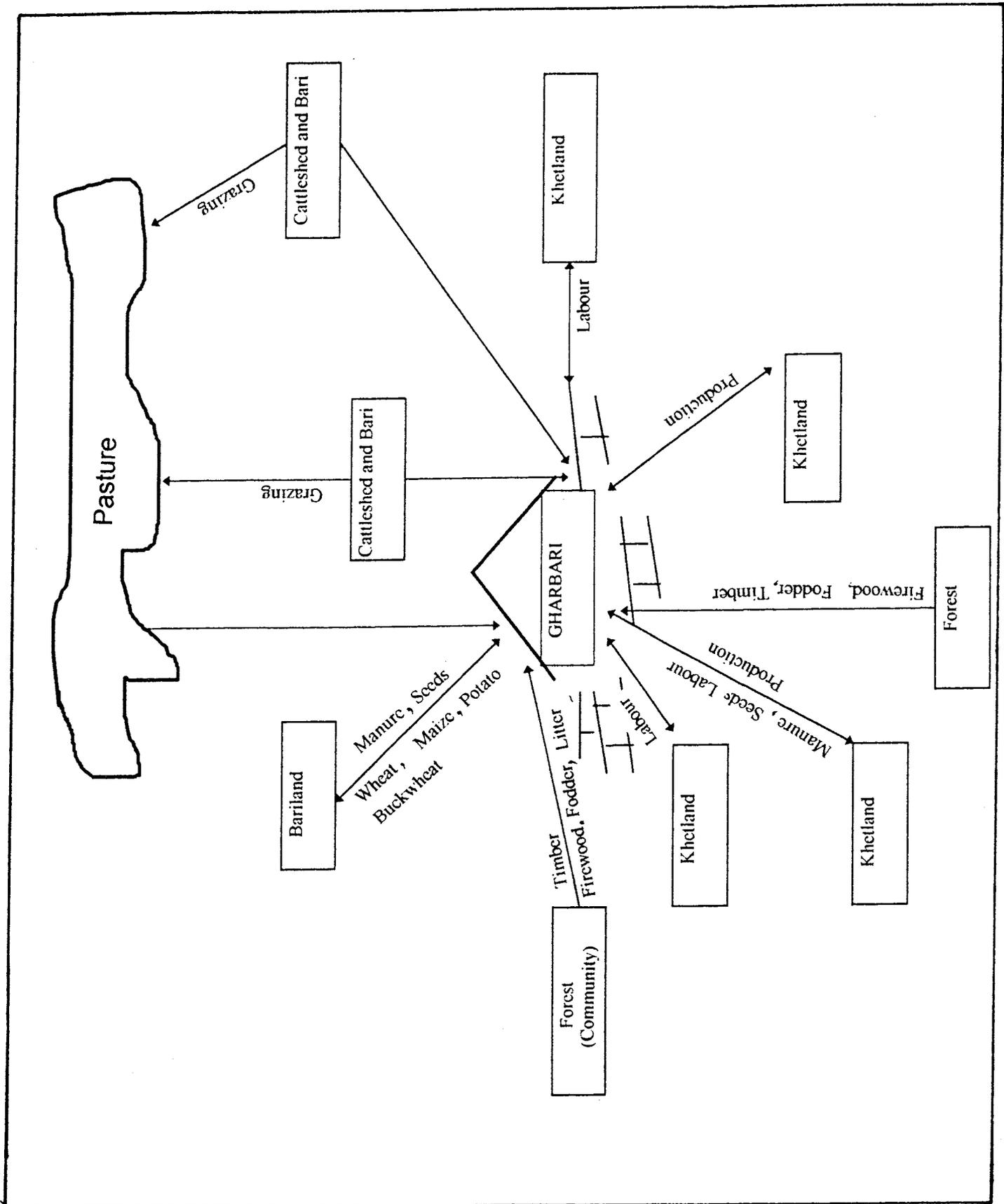
3. Phoi Mahadev

Year	Social events	Development events
1931 AD	Loss of many animals due to diarrhoea	--
1949	Out break of cholera which caused death of many people	--
1950/51	--	--
1967	--	Initiated maize cultivation
1970/71	--	-A few people planted apple saplings -People from Dhandi Vigma constructed a wooden bridge to cross Tila in order to go to Parighat forest (Ranchuli VDC)
1972	--	People constructed Melsera bridge
1975	Initiated Noralo system for the protection of crops at Pakho bari	--
1979	People belonging to Chhabisa Kuria constructed Kalika Primary School	--
1981	Occurred landslide in Ghatte Khola which broke a wooden bridge at Tila River, damaged 4 to 5 Ghette and 20 to 25 Murimato khet	--
1982	--	People constructed bridge at Tila river to go to Parighat forest
1984/85	Arranged Noralo system for protecting standing crops in Khet	-
1991		Installed drinking water in ward no 3 and 4 through KLDP's support
1993	-	CSD initiated the saving programme for women
1995	10 to 15 people begun to apply Butachlor herbicide to control weeds in rice fields.	KLDP supported for the rehabilitation of the old irrigation channel which supplies water for irrigating lands located in ward nos. 3 and 4 and tenants are mainly from ward nos3, 4 and 5.

4. Lalu

Year	Social events	Development events
1743 AD	--	Started cotton cultivation
1897	Great famine due to drought	Begun construction of kulo
1935	Famine due to attack of locust	--
1942/43	Occurred land slide which was repaired later on	Introduced improved buffalo bull from India by Ajane Bohra and Pahalman Bohra
1947	Great famine due to attack of locust	--
1958/59	Great famine due to attack of locust	--
1962	Hailstone destroyed crops severely	--
1963	-Heavy land slide due to torrential rainfall- -Out break of small pox causing death of 13 children	Completely abandoned cotton cultivation and widespread cultivation of maize, <i>Hansaraj Changle</i> local variety
1965/68		Introductions of apple plantations and improved (American) rice variety from Jumla
1972	Hailstone	--
1973/74	--	Government Agriculture Farm introduced citrus plantations (saplings)
1983	--	Repaired irrigation canal through the support received under the Farm Irrigation Project of the MOA (Rs. 0.0.5 million)
1984	--	Initiated forest protection system keeping watchman (<i>Heralu</i>)
1985	--	Repaired irrigation canal again through the financial assistance of DDC (Rs. 60,000)
1986/87	Loss of man, animal and cultivated land die to heavy flood in <i>Rahgad Khola</i>	--
1994	Land slide occurred	--
1995	-	Repaired irrigation canal again through the amount available to the VDC under BYVY scheme of HMG/N

RESOURCES FLOW IN DHANDI VIGMA





USES OF LOCALLY FOUND PLANT SPECIES

SN	Local name	Botanical name	Uses	Location
1	Dhatailo	<i>Prinsepia utilis</i>	-seeds used to extract oil for cooking purposes	Kharpel, Piplang & Dhandi Vigma
2	Bedu ko fal		-fodder -edible fruits	do
3	Khamu	<i>Prunus napaulensis</i>	-nuts used for extracting oil for cooking and also used for body pain	Kharpel
4	Wild pomegranate		-edible fruits -fodder for goats	Kharpel and Dhandi Vigma
5	Chuli		-nuts used for extracting oil for cooking - fodder and fuelwood	Kharpel and Piplang
6	Chamlayo		-best fodder for horses -ropes made from fibres of the small twigs	Kharpel, Phoi
7	Khadik		-fodder -bark juice used for treating wounds/cuts	Kharpel Piplang
8	Dhucchu		-good bee basture -composting materials -litters for animals	Kharpel
9	Tare chuk		-medicinal plants -used in pickles	Kharpel
10	Titepati	<i>Artemisia vulgaris</i>	-green manuring -litter for animals	All villages
11	Ganja	<i>Cannabis sativa</i>	-Juice for treating diarrhoea in animals -grains used to make pickle -fibres from stem used to make rope.	do

12	Ainselu	<i>Rubus elipticus</i>	-edible fruit -fodder for sheep and goats	Kharpel
13	Sisnu/Allo	<i>Urtica</i> spp.	-used as green vegetable -fibre for making ropes	Piplang, Kharpel, Dhandi Vigma & Lalu
14	Raino		-fuelwood -fencing	Piplang
15	Lanka ful		-flower	Piplang
16	Dhaturo		-fodder for goats	Pilang, Kharpel
17	Bhimal	<i>Grewia oppositifolia</i>	-fodder -local soap from bark -stem fibres for rope	Piplang
18	Betaino/ Bakeno	<i>Melia azedarach</i>	-good to control fleas	Piplang
19	Kapo		-fodder for goats -used for pickles	Piplang
20	Mayal	<i>Pyrus pashia</i>	-edible fruit -juice given to animals during hot days	Piplang
21	Chutro/ Til Ghudo		-fodder for goats -edible fruits	Piplang, Kharpel
22	Banjh	<i>Quercus lanata</i>	-fodder for cattle	Pilang, Kharpel
23	Gwale pando		-litter for animals -good for green manure -good for bee pasture	Kharpel
25	Atenno		-root used as soap	Dhandi Vigma
26	Tumale		-ground grass and litter for animals -good for manure -tips used as spices	Dhandi Vigma

27	Koiralo	Bauhinia variegata	-fodder for animals -flowers for pickles	Lalu
28	Tanki	Bauhinia purpurea	-fodder for animals -fuelwood	Lalu
29	Chiuri	Aesandra butyracea	-bee pasture -fodder tree -vegetable ghee	Lalu
30	Thinke	Quercus floribunda	-fodder -fuelwood	Lalu
31	Bedulo	Ficus clavata	-fodder	Lalu
32	Dudhilo	Ficus nemoralis	-fodder	Lalu
33	Kavro	Ficus spp.	-fodder	Lalu
34	Kutmiro	Litsea polyantha	-fodder	Lalu
35	Mulberry		-fodder	Kharpel
36	Batkuro		-fodder, teeth cleanser	Phoi
37	Myseno		- spinach	do
38	Daabo		- grass fodder (for hay)	do
39	Biraalcho		- grass fodder	do
40	Kaunlo		- grass fodder	do
41	Paate gaas		- grass fodder	do
42	Banso		-grassfodder (good milk production)	do
43	Bugo		- grass fodder	do
44	Bethe		- grass fodder	do
45	Khimbu		- fodder	Kharpel

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