

PROMOTING NON -TIMBER FOREST PRODUCTS IN THE HILLS OF NEPAL: A CASE STUDY OF JETHAL AND ATTARPUR VILLAGES IN SINDHUPALCHOK DISTRICT

by

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DEDICATION

This study is dedicated to my beloved mother Mrs. Dhaba Devi Gautam who immensely struggled for her son to get education right from schooling to this stage.

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ABSTRACT

This study examines NTFP collection, marketing, and management activities and the prospect of their promotion in two villages of Sindhupalchok district, with controlled and uncontrolled management systems. Qualitative and quantitative information were collected through household survey and RRA methods.

NTFP have been an important source of income for a considerable proportion of households. However the, indiscriminate collection and lack of domestication due to the absence a comprehensive promotion program, several species of NTFP have been vulnerable to extinction. Relatively low farmgate prices of NTFP caused by very weak market price information dissemination system and lack of well-organized marketing have been other serious constraints of NTFP domestication. NTFP in national forests are being collected in a unsustainable way due to the open access status of these forests. The collection system is relatively sustainable in community forests. There is good prospect for the promotions of NTFP domestication as it contributes to generate income and employment opportunities. Majority of farmer' appreciate economic value of NTFP. Education status, land holding size and household labor force are important factors influencing NTFP collection and farmers' willingness to domestication.

Biophysical conditions in the study area are suitable for NTFP domestication. Despite farmers' small land holdings it is possible to grow NTFP species on terrace risers, edges of uncultivated land, pakho land kharbari and gullies. NTFP should be promoted as an integral component of agroforestry. Emphasis should be given to the provision of effective extension and credit and marketing systems. It is necessary to hand over the government forests to local community as a strategy for sustainable management of NTFP. And there is also need to carry out NTFP promotional activities in community forests, such as thinning, pruning, coppicing, and planting NTFP species in forests and degraded community lands. NTFP domestication, improvement and introduction of promising NTFP species in the existing farming system should be the focus of farm based research.

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ACRONYM

ANSAB: Asian Network for Small-scale agricultural Biotechnologies

Bari: Rainfed upland cultivated for maize and millet

CBS: Central Bureau of Statistics

FAO: Food and Agriculture Organization

Household: A group of family members, who live in a common house, share the same resources and kitchen, and bear the common financial transaction

ICIMOD: International Center for Mountain Development

IFAD: International Fund for agricultural Development

Kharbari: Private grassland usually closed by compound wall

Khet: Paddy field in low land and hill slope

Labor Force: Group of Population aged between 10-60

NACRMP: Nepal Australia Community Resource Management Project

NAF: Nepal Agroforestry Foundation

NPC: National Planning Commission

NTFP: Non-Timber Forest Product

NWFP: Non-Wood Forest Products

Off-farm income: Income obtained other than own farm

PRA: Participatory Rural Appraisal

RRA: Rapid Rural Appraisal

SAARC: South Asian Association for Regional Cooperation

SPSS: Statistical package for social sciences

VDC: Village Development Committee

EQUIVALENTS

1 ropani = 0.05 hectare

1 hectare = 20 ropani

1 US \$ = NRs 68.15

INTRODUCTION

Nepal is a mountainous country with an area of 147,181 square kilometers, where 90 percent of the economically active labor force is engaged in agriculture sector (CBS, 1993). Agriculture, fisheries and forestry production make up 60 percent of the gross domestic product (GDP). Export earnings from these sources amounted to Rupees 71 billion in 1993-94. The forestry contributes 15 percent to GDP (Edwards, 1996). The country is divided into three ecological regions extending parallel from east to west, namely the Tarai, the Hills, and the Mountains, accounting for 23, 42 and 35 percent of the total area, respectively (Table 1). About 2.4 million hectares of land is under agricultural which is 16 percent of the national territory. Thirty percent of the country is occupied by mountains with moderate elevations, ranging from 200-3000m. normally referred to as the hills. They include extensive agricultural and forestland and support two fifths of the population.

Table 1: Area and Population in Nepal by Ecological Zone

Ecological Zone	Total area (km ² .)	Cultivated area(000 ha) 1991	Population (000) 1991	Population density/Km ²	Population density/ha. cultivation
Mountain	51817	163.1	1442.3	27.8	8.8
Hill	61345	878.8	8413.4	137.1	9.6
Tarai	34019	1311.8	8635.3	253.8	6.6
Total	147181	2353.7	18491.0	125.6	7.8

Source: CBS, (1995) *Population Monograph of Nepal*, Kathmandu

Reportedly, about 70 percent of Nepal's population is below the poverty line (SAARC, 1991), although the official estimates put it at 49 percent (NSAC, 1998). Incidence of poverty is more severe in rural areas, owing to very limited non-farming employment opportunities and very small landholdings. Of the total 3.2 million land holdings, approximately 70 percent are with small farmers possessing of less than one hectare, which account for 31 percent of the cropped area (Shrestha 1996:3). By ecological region poverty has been a more serious problem in the hills. According to the recent survey, the incidence of poverty of the small farms occurs 63 percent in the mountains, 54.7 percent in the hills and 44.9 percent in the tarai (CBS, 1996). Rapid population growth, deforestation, unemployment and land degradation are the major causes of poverty in the Hills. In the past, there was relatively low population pressure, contributing to maintain balance between population and resources. But the accelerating population

pressure on limited natural resources led to environmental deterioration especially after 1950s (Sharma and Minhas, 1992). People were compelled to expand arable land on steep slopes and encroach into forest to meet basic needs (Thapa and Weber 1989).

1. The Issue

The farming system of the Hills is crop-livestock-trees mixed. Livestock is an integral component of the system. According to FAO (1991), livestock and livestock products provide 55 percent of the total on-farm income to small farmers in the Hills. However, due to large livestock population Nepal has been among the countries with highest livestock density per unit of cultivated land in the world (Joshi, 1988). To fulfill requirements of draught power, manure and dairy products, hill farmers have raised livestock (Thapa and Weber, 1990). Small land holdings and limited non-farming employment opportunities make rural communities heavily dependent on forest products, including fuelwood, fodder and leaf litter, food, herbs and other commercially valuable products. Collection of the leaf litter from the forest for animal bedding and composting has been an important tradition of the hill communities. Since compost is the main source of supplying nutrient to crops, livestock are means of nutrient transfer from forest, grassland and crop byproducts to cultivated field. Compost application to agriculture land ranges from 3-21 mt./hactare (Heuch, 1986). Thus sustainable biomass production is indispensable for maintaining livestock and soil productivity in the Hills.

To meet the growing demand for food, fuelwood and fodder requirements of the hill people, there is need to increase land productivity. Due to mountainous topography, there is not much scope for increasing cropping intensity and enhancing crop productivity. Government programs implemented to increase crop production through modern technology could not be successful as expected, as it is not suitable to the Hills. Although various agricultural and forestry technologies have been developed and attempted to improve cash income, it is insufficient to meet the peoples daily requirements. A lot is yet to be done to alleviate poverty and improve environment. Besides agricultural and forestry development, concentrated effort on promoting agroforestry technologies is perhaps one of the viable options to address farmers problems. Technologies such as cultivation, management and utilization of non-timber forest products and promotion of multipurpose tree species, and fruit could be considered as some of the viable opportunities. There is a need to produce more from the existing land through technological diversification. Therefore, identification and exploring other alternative sources of income has become necessary.

Promotion of non-timber forest products (NTFPs) through the community forestry and agroforestry could supplement food requirement and income in the Hills. Which are the sources of a large number of NTFP, including medicinal plants, leaves ferns, edible nuts, oil seed, fruits and fiber. Other products obtained from wild plants and used at the subsistence level are dyestuffs, gums, and resins. These traditionally known minor forest products are important particularly for rural poor who have access to few resources. Assorted varieties of nuts, fruits, vegetables, spices are particularly important during the period of food deficit.

Every year ten to fifteen thousand tons of crude medicinal herbs are collected from forest and pastures of the Hills and high mountains of Nepal, many of which are traded to foreign countries. The trade in crude medicinal herbs is an important source of livelihood

and cash income to the rural people. In some areas non-timber forest products including medicinal and aromatic plants, provide up to 50 percent of the family's income. The forestry sector contributes about four percent to the national economy, while the revenue from the NTFP accounts for five percent of the total revenue collected from the forestry sector (Edwards, 1996). There is potential for improvements in NTFP trading in order to increase income. To tap this potential, it is necessary to explore the varieties of NTFP and analyze their marketing and processing systems.

Despite suitable biophysical environment and economic benefits, domestication of NTFP has not been a practice. Domestication of NTFP might help to, even their yield as compared with the yield in wildness. There is a lack of systematic effort made for sustainable conservation of NTFP. Some of the high-value herbs, including *Dactylorhiza batagirea*, *Nardostachys grandiflora*, *Rauvolfia serpentina* and *Valeriana jatamansi*, are being over exploited, and thus have become vulnerable to extinction (Edward, 1996).

2. Rationale of the Study

NTFP can contribute to conserve environment balance and enhance the local economy. Their role is more important in the subsistence hill economy, as these resources have potential for significant contribution to improving the livelihood of people. Management of these resources partly depends on the economic activities being practiced by the people, and partly on the government policies. There is a general tendency of steadily increasing demand for NTFP due to their high commercial value. But the sustainable supply of NTFP depends mainly on the available stock and rate of regeneration. It is essential to establish equilibrium between demand for and supply (regeneration) of these resources to improve the economy without inflicting damage on their stocks.

Sustainable production of NTFP is an issue of concern to farmers, traders, middlemen, planners and policy makers. The purpose of community forestry program has so far been limited to fulfilling fuelwood and fodder requirements. Besides fulfilling these needs, community forests offer considerable income and employment generation opportunities as of NTFP are found there. However, the attention has not been paid towards sustainable management and production of NTFP. Effective management of community forests and domestication of NTFP contribute to increase their production. Sustainable harvesting of all forest products is essential to ensure a steady flow of income from community forests, but this appears to be a neglected issue (Messerschmidt and Hammet, 1993). The knowledge base about the nature and utility of NTFP and particularly information about their extraction, processing and marketing is still lacking. Community forestry can play a major role for development through strengthening local organization and enhancing economy by promoting subsistence agriculture and animal husbandry (Jackson and Ingles 1994: 115).

Numerous types of NTFP are found in forests. It is necessary to take an inventory of NTFP found in specific areas. Poffenberger, 1992:19 pointed out that "a more intensive study would need to be conducted for non-wood forest products collecting for marketing purposes. More precise measurement would need to be taken of volume flows for these items. Since commercial NTFP are often over exploited, it would be important to assess the volume flow of the commodity over time to identify trends, and whether over exploitation may cause declining yields for collector groups."

Studies have not covered sufficiently about extraction, processing and marketing of NTFP in Nepal (Messerschmidt and Hammett, 1993). Conservation and sustainability measures are not fully understood by local NTFP collectors, forest user groups (FUGs), non-government organizations and traders. This constrains sustainable production of NTFP.

3. Objectives

The major objective of this study is to examine the prospect of sustainable NTFP production in private and community lands.

The specific objectives are:

1. to identify main NTFP commonly found in community forests and farm lands;
2. to analyze production, collection and marketing of NTFP;
3. to assess contribution of NTFP to farm household economy;
4. to examine the prospects of sustainable production of NTFP in both forests and farm lands; and
5. to suggest policies for NTFP promotion.

4. Hypotheses

1. Annual cash income of collectors and non-collectors is different.
2. Annual cash income from NTFP is different in controlled and uncontrolled management systems.
3. Collectors and non-collectors perception based on education status towards NTFP domestication is different.
4. Collectors and non-collectors perception based on landholdings is different.

4. Scope and limitation of the study

Given the limited time, financial and human resources it was not possible to cover all the aspects of the NTFP. Thus the study was mainly focussed on NTFP practices in national forests, community forests as well as in private lands.

The study was based on collection, marketing and institutional role for NTFP promotion and domestication in controlled and uncontrolled management systems. It is anticipated that the study would be able to explore the potential of NTFP in the Hills of Nepal. Out comes of the study would be applicable to other parts of Nepal with similar socio-economic and biophysical conditions.

CHAPTER I

RESEARCH DESIGN

This is an exploratory type of research. Data obtained through household survey, group discussion, key informants interview and secondary sources have been used for analysis and interpretation. Purposive sampling method was employed for the household survey, as all households were not engaged in NTFP collection. This led to select areas where it was practiced. Attarpur and Jethal Village Development Committee (VDC) areas were selected as per the information provided by Nepal Agroforestry Foundation (NAF) and Nepal Australia Community Resource Management Project (NACRMP). The NTFP related practices (collection, processing and marketing) were adopted more extensively in selected areas compared to other areas of Sindhupalchok District.

These VDCs were selected in order to examine the two distinct management systems, which are given as;

Controlled Management System

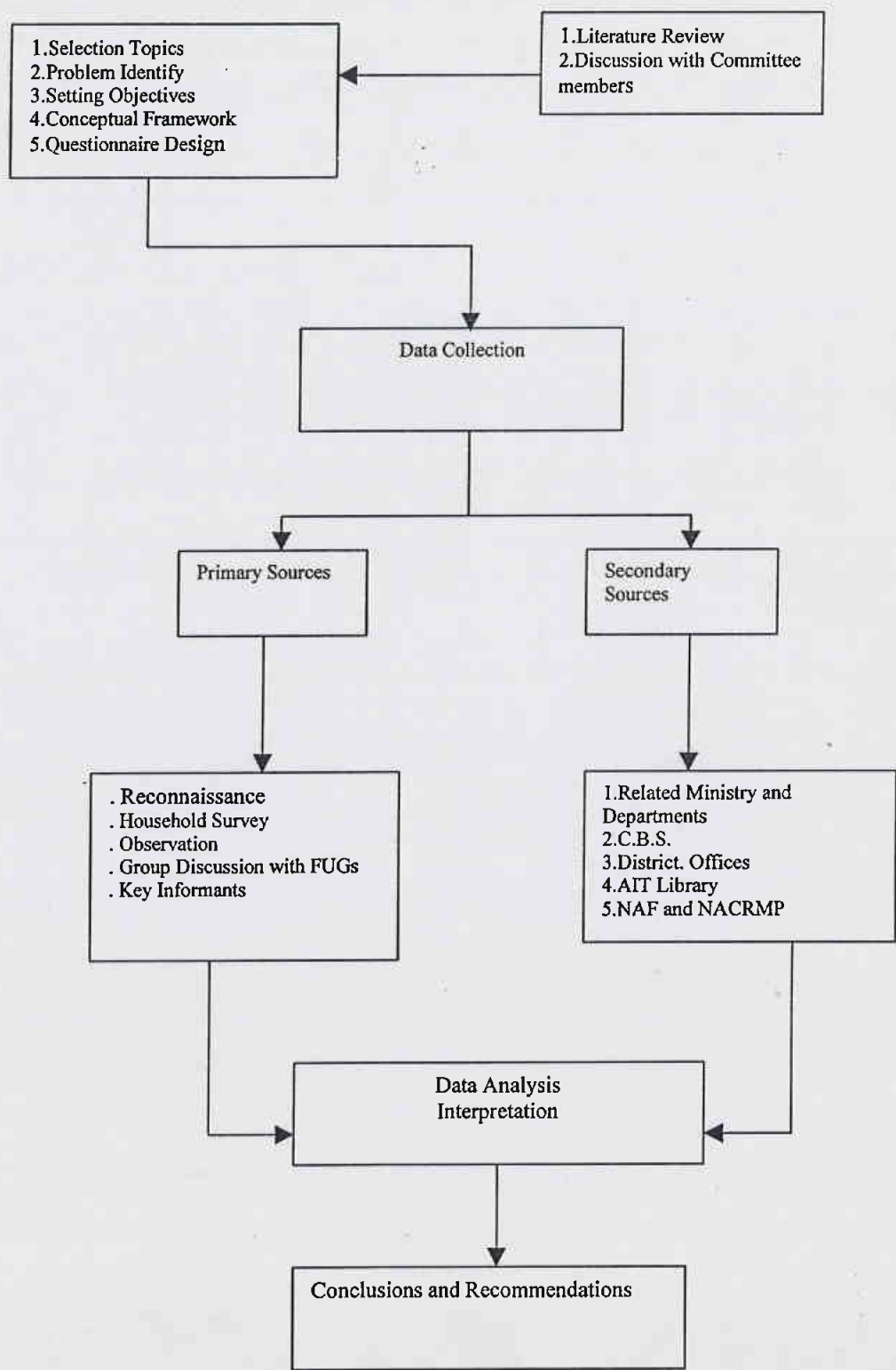
In this system all community forests are handed over to the local communities and fully controlled by the FUGs for better management of forests. These forests are not freely access for collecting NTFPs and grazing the animals.

Uncontrolled Management System

These are national forests and not managed by the local communities. Their status is open access type every one can access for collect and harvest the forest products and free for grazing the animals.

Since all of these households in study area were not engaged in collection of NTFP, those involved in this activity were identified and considered as collectors, and similarly those who were not engaged in NTFP collection were taken as non-collectors. Thus out of the total 343 households of two areas, 110 were selected as samples, among which 60 were collector and 50 as non-collectors (Table 1.1.2).

Figure 1.1: Research Design



1.1 Primary Data

Information on socio-economic characteristics of respondents, forests management system, NTFP collection and marketing systems, NTFP's role in household economy and constraints of and public attitudes towards conservation of NTFP were collected through household survey and RRA.

1.1.1 Household Survey

A standard household survey questionnaire was prepared to collect information on socio-economic characteristics of collectors and non-collectors, and role of NTFP in household economy, NTFP collection, marketing and management practices, and farmers' perception of the importance of NTFP and attitude towards domestication. Two enumerators were employed for the household survey.

Table 1.1: Sample Size

Category	Total no of HH	Sample			
		Collectors HH	Percent	Non-collectors HH	Percent
Controlled system	197	42	23.31	34	17.25
Uncontrolled system	146	18	12.32	16	11.00

Source: Field Survey, 1999

HH = Households

1.1.2 Rapid Rural Appraisal (RRA)

RRA method was applied to collect additional information on NTFP collection, marketing and management systems. Well-experienced persons aware of the local situation since long were requested for information. Besides, topography, land use system, resource management practices adopted by the people were observed during the field survey.

1.1.3 Field Reconnaissance Study

To develop initial understanding about the study area, and be familiar with villagers, a field reconnaissance study was performed. The researcher visited the two primary schools, forest range office and VDC offices to sharing the idea with each other in order to avoid any kinds misunderstanding during the fact-finding interview with the respondents. Such discussions were very useful and important for the field surveys and build trust with the villagers.

1.1.4 Key Informants

Local people having good knowledge about the local area, and resources such as school teachers, forest users group, development workers, VDC chairman, Ward chairman were consulted through interview, conversation and panel discussion for broader information collection.

1.1.5 Group Discussion

Information on specific issues was collected through group discussion. Group discussions were held with farmers, NTFP collectors, forest user groups, local political leaders, school teachers and village heads in order to get clear understanding of NTFP species their collection, processing and marketing systems.

1.1.6 Direct Observation

Relevant information regarding two different management system of forests and NTFP related activities like nursery, collection, processing, storage and marketing system were also collected by direct observation in the study area.

1.2 Secondary Data

Relevant secondary information were collected from various sources, including Central Bureau of Statistics, National Planning Commission, Departments of Forest and Soil Conservation, Topographical Survey, Herbs Production and Processing Company Limited, and local government and non-government organizations.

1.3 Data Processing

Information collected through household surveys were processed and analyzed using SPSS method. This method was used for quantitative and for descriptive statistics such as frequency, percentage, arithmetic mean and standard deviation in relation to the research. For analyzing data, simple frequency distribution, cross tabulation, arithmetic mean, standard deviation and t-test, chi-square test were used.

CHAPTER II

LITERATURE REVIEW

2.1 Poverty

Out of Nepal's population of 21 million more than 18 million live in rural areas. Overwhelming majority of them rely on agriculture and other common property resources for their livelihood (Banskota and Sharma 1996:1). Different indicators are used to measure poverty. Definition and quantification of the level of poverty in Nepal was first made by the National Planning Commission in 1976-77 through a survey on unemployment, income distribution and consumption pattern. At present per capita earnings remains about US \$ 200 with a lower level of other socio- economic indicators (CBS, 1996). The poverty level is reportedly as much high as 70 percent, although official estimates put it at 49 percent (SAARC, 1991). The number of poor in Nepal is growing in about half of million per year (Smith, 1991:379) and major share of that live in rural areas.

The incidence of poverty is more prevalent in rural areas than in urban ones, more in the hills than in tarai and more in disadvantaged ethnic minority and lower caste people than upper caste people. About 95 percent of the poor live in rural areas with scarce non-farming employment opportunities and small land holdings. Of the total 3.2 million land holdings, approximately 70 percent are small farms of less than one hectare, which account for 31 percent of the total cropped area (Shrestha, 1996:3). Since rural farmers have very limited non-farm employment opportunities, land-holding size is still considered as a parameter in measuring poverty. Although the average size of land holding is 0.96 hectares, farmers possessing one or less than one hectare of land are considered small farmers. According to a recent survey the incidence of poverty occurs 63 percent, 54.7 percent and 44.9 percent of the small farmers in the mountains, hills and tarai, CBS, (1996).

2.2 Unemployment

In Nepal, out of the total population, 81.23 percent are engaged in agricultural sector who do not have year round employment. According to the national living standard survey, shows 67.2 percent of the total population or above 10 years age is categorized as employed, 3.0 percent as unemployed and 29 percent as inactive (CBS 1996; CBS 1998). In this context, it is necessary to create new employment opportunities for the hill people who considerably depend on forest and forest-based products to fulfill their subsistence requirements. Jeanrenand (1987) concluded that harvesting, daphne barks in local manufacture of paper have considerable potential in generating employment and

providing income in hill areas. Lokta (*Daphne Spp*) are the basis of a cottage industry with an annual turn over of around ten million Rupees, which provides direct employment about 1500 families some of them the poorest of the poor living in remote and back ward areas. Banskota and Sharma 1994; Oslen 1997 documented that NTFPs are the major source of off-farm employment and income generation for low-income households.

So it is pertinent to establish small-scale agroforest-based industries. In order to provide employment and income generation opportunity to the rural people. Banskota and Sharma 1994; Oslen 1997 documented that NTFPs are the major source of off-farm employment and income generation for low-income households.

2.3 Landholdings

The mountain accounts for less than 7 percent of the total agricultural land, with much of the region being covered under snow and rangelands. The tarai serves as the food store of the country, which has the largest, share (53%) of the total arable land. The hill region has about two-fifths of the agricultural land, which supports the 40 percent of the country's population (Table 3). In the hills, the cultivation is practiced in ridges, slopes, and valleys.

Table 3. Distribution of Agricultural land by Ecological Zone, 1991-92 ('000' hectare)

Region	Arable land	Non-arable Land	Total
Mountain	162	15	177 (6.8)
Hills	872	175	1047 (40.3)
Terai	1290	85	1375 (52.9)
Total	2324	275	2599 (100)

Sources: CBS agricultural Census 1991

Figure in parenthesis indicates percentage

Land fragmentation is considered as one of the structural problems inhibiting the modernization of agriculture. Fragmentation of holdings and landlessness among the rural households without alternative sources of employment has resulted in low agriculture productivity and poverty. Farmers are hindered from adopting productivity enhancing technology that is otherwise readily available for them to benefit from.

Similarly poverty arises from inadequate production opportunities for small holders and landlessness. Small farm size and low productivity threaten to undermine livelihood of farmers. Farmers of more than two-thirds of the total holdings with one hectare of land own less than one-third of total farm area. On the other hand, 1.5 percent of the holding in the more than 5 hectares holding class account for 13.9 percent of the total farm area CBS, (1993).

2.4 Deforestation

Land degradation and deforestation are considered major problems in the hills. Exponential population growth has produced multiplier effect in the hill economy. In hills of Nepal, forest has degraded due to combined practices of cutting large quantities of fuel wood, intensive grazing. As a result, several of valuable tree species have disappeared or rare Jackson, Nurse and Chhetri, (1993). There are conflicting reports about fuel wood collection as a cause of deforestation. Metz, (1994) states livestock is the main cause of deforestation, owing to greater households needs of fodder and fuelwood. Similarly Fox, (1983) indicated that grazing and fodder collection as the major causes of deforestation. According Mahat et al. (1987) collection of fodder and fuelwood are causes of deforestation, where as Bajracharya, (1992) found deforestation caused not by mainly expansion of agricultural land to fulfill for food requirement.

2.5 Community forestry and NTFPs

In Asian countries community-based NTFP can contribute significantly to the national economy and constitutes major source income and employment. For example, in Vietnam NTFPs are the vital sources of the income generation where Ministry of Forestry has targeted to earn US\$ 150 million by exporting NTFP within the five years from 1986 Sah. and Dutta, (1996). Similarly in Nepal Australia Community Forestry Project (NACEP) suggests that community forestry can play pivotal role in providing local employment opportunities as well as NTFP promotion and local markets (Malla 1993; Jackson and Ingels 1994), quoted by Sah and Dutta, (1996). Likewise another experience from Koshi Hill Community Forestry Project showed that the net income 62450 Nepalese rupees (US\$ 1200) per annum can be generated by one hectare of chiraita cultivation Maharjan, (1995). The forest user groups believe that such income can support their forest management program as well as community welfare activities. It is also clear that community forestry has the potential to generate substantial economic benefit for local people. However sustaining both the income and forest depends on the socio-economic, political and institutional issues Sah and Dutta, (1996).

"Forests are an integral component of the subsistence agricultural practiced by the majority of the rural people in the Middle Hills" (Branney and Dev 1994: 136). Hill farming system of Nepal is heavily dependent on forest and forest based resources, providing more than 50 percent of the livestock feed is estimated come from the forest. A

considerable transfer of nutrients from forest to agricultural land is mostly facilitated by cattle, buffalo, goat and sheep Carson (1992). Collection of leaf litter from forest for bedding and composting materials is another part of hill community's dependency on forest. The survival of hill people depends on their capacity to manage the sustainable agricultural production through preservation of forest and forest based resources.

The management and use of Nepal's forest have undergone several radical changes over the past fifty years. Up to 1957 forests were under the constant watch of land revenue collectors, and records were kept by over lords. No one was allowed to cut or use forest products indiscriminately. With the nationalization of forest in 1957, all forests products were brought under the government regulations. As a result land ownership became uncertain, and forest encroachment began in an attempt to establish ownership right and expand agricultural land Edwards and Maharjan (1994).

Alarmed by the extensive clearing of forests, the government passed legislation in 1978 establishing several categories of forests- Panchyat Forests, Panchyat Protected Forests, Leasehold Forests, and Private Forests-which provide the legal foundation for community management forest lands Edwards and Maharjan (1994). Local control of forest further strengthened in 1982 with the passage of decentralization act. With the advent of democracy after the people's movement of 1990 a radical changes came in community forestry act of 1993. A new Forestry act has been passed in 1993. Under this act, the government authorized District Forest Officers to turn over part of the national forest to forest user groups (FUGs). The act specifically entitles the community to develop, conserve, use, and manage sale and distribute forest products by independently fixing prices according to an operational plan. But the actual ownership is retained by the state (Jackson and Ingles 1994: 120). The act aims at an effective management of forestry by communities. New act empowers of local communities to enhance the sustainable use and management of forests through more motivated efforts in decision making.

At present, the community forestry program focussed on natural forests, because the villagers preferred to take them over rather than establishing plantations. Still the forestry user groups have not been able to derive expected benefits. NGOs are also playing active role in convincing local people to take over forests. The formation of user groups and handing over of forests is slow. Over half of million hectares of government land have been handed over to local community forestry user groups FUGs. Community forestry has been implemented for employment generation and for fulfilling the needs of food, fuel wood and fodder. Production promotion of non- timber forest products (NTFPs) in community forests could be an additional source of the income and employment generation. There lies the great potential to promote NTFP in community programs.

Community forestry provides not only the timber but it also provide several other forest resources including leaves, grasses, resin, charcoal, honey, medicinal herbs, fiber and bamboo. These non-timber forest products are more important to the farmers and others such as village harvesters, middlemen and small-scale entrepreneurs who are

devoted on collection, transportation, value added and processing, home consumption and market sale. Sustainable harvesting of all forest products should be an important part of the community forestry planning but it appears to be a neglected issue Messerschmidt and Hammett, (1993). The knowledge base about the nature and utility of NTFP and particularly information about their extraction, processing and marketing are missing in current forestry management planning. Recent development in Nepal suggest that community forestry can play a major role in community development especially strengthening local organization and raising fund for increasing rural welfare by promoting subsistence agriculture and animal husbandry. Community forestry provides two important advantages to the rural people. Firstly it provides role of decision making for forestry management. Secondly it provides effective participation of local people to make sustainable use of the forest resources (Jackson. and Ingles 1994).

2.6 Agroforestry and NTFP

Agroforestry refers to the system of land use where annual agricultural crops and livestock combined with forestry crops like trees, shrubs Raintree, (1991). This practice provides an important opportunity for domestication of useful NTFP by incorporating with agricultural crops at biophysically suitable specific location. Thapa and Weber (1990) found that the fodder fuel wood trees and fruit trees plantations on private land have direct relation with income of farm households. Their study also shows that farmer who has small number of fruit and fodder trees have earning below minimum subsistence level unlike large size. This study also suggests that since agroforestry program have been implemented in environmentally degraded marginal land. There is the potential of growing fodder trees and domestication of suitable NTFP on private farms, which can be an important inception to maintain and conserve the environment as well to provide the income and employment opportunities to the rural people.

Promotion of NTFP through agroforestry in the hills of Nepal has gained little attention on medicinal and aromatic plants due to long history of collection from natural forests and traded to the neighboring as well as overseas countries (Edward 1995; Oslen 1997). In addition to medicinal and aromatic plants (MAPS) lokta paper, pine resin, sal seed, katha, sabai grass and bamboo can be grown in agroforestry system of Nepal (Durst et al. 1994).

Before domesticating the NTFP with agroforestry model, it is necessary to know about whether domestication of NTFP help to alleviate the existing situation or will it contributes to increase the present situation of forest and agricultural development. Who will be the beneficiaries from domestication: foresters, planters or small land holder farmers and how can rural development efficiently and sustainably incorporate the minor forest products in to the farm land Michon and Foresta, (1996). Authors further argued that what kind of agroforestry is suitable for the NTFP development is the crucial issue towards domestication. Most agroforestry researcher has given more emphasis on fast growing trees or shrubs, not old-growth forest species, more crops than tree based. When

dealing about domestication and cultivation of NTFP agroforestry research should go simultaneously in order to find out the most suitable species as per the specific location and biophysical condition.

Thapa and Weber, (1993) stressed on private forestry in terms of biophysical, financial and social feasibility. Authors further stated that the financial benefit per unit of area of forestry are relatively low in comparison of field crops in upland and low land terraces in Mid Hills of Nepal. However, there is high possibility to gain more benefit from private forestry in marginal land like kharbari and other unutilized land by domesticating non-timber forest products, which has high commercial value. As for example, in Nepal asparagus not domesticated despite its commercial value, but in Thailand it is cultivated at large scale.

2.7 Non- timber forest products

Oslen, (1997) defined “ NTFPs all those products of biological origin excluding timber, timber derived products firewood and fodder, from forest or any land under similar use including pastures, utilized to the benefit to local communities.” Similarly Lal, (1989) stated that the term non-wood forest products (NWFP) is used to describe all goods biological origin other than ecological services derived from forests. The utility of NWFP ranges from “food to medicines, cordages to clothing, from oil to perfume, from paints to dyes and from detergent to disinfectant. And Chandrasekharan, (1998) defined “all goods and services for commercial, industrial, or subsistence use derived from the forests and allied land uses, other than timber, fuelwood and fodder”.

Hammet, (1993) classified NTFP into two groups consumptive and non-consumptive. Consumptive are those products utilized by people to satisfy their household needs. Examples, are foodstuffs, medicines and domestic necessities such as baskets, rope and clothes. Non-consumptives are those, benefits can be realized indirectly. Examples, are watershed protection, environment quality, religious and aesthetic values and wildlife protection. Similarly Ashton and Ashton, (1993) categorized NTFP as follows;

1.Raw materials for craft-based industry, 2. Fruits and nuts, 3. Vegetables and mushrooms, 4. Charcoal, fuelwood and fodder and 5. Specialized products such as latex and medicines

Edward, (1996) categorized Nepalese NTFP into two groups:

1. High-value products from high-altitude (2000-3000m. and 3000-4000m.). Examples are mostly ‘medicinal and aromatic plants such as *Swerita chirayita*, *Nardostachys grandiflora* are harvested 90% for trade to India.
2. Low- value products from low- altitude (120m. - 2000 m.) and relatively low qualities products and traded in large quantities in home country as well as to India. For example,

leaves of *Cinnamomum tamala*, bark fruits and seeds of *Zanthoxylum armatum* and *Sapindus mukorosis*.

2.7.1 Marketing of NTFPs

To formulate the marketing system of NTFPs we need to know the elasticity of demand, the cost and benefits of collection, the availability of substitutes, historical trend in supply and demand, the role of middlemen and the distribution of profits within the trade structure Hammet, (1993). In same manner Poffenberger, (1992) addressed "to assess potential income flows from community managed natural forests to explore the values of selected commodities in village, district, national and international markets." Similarly, Messerschmidt and Hammett, (1993) stated that well improved market information mechanism ensures to villagers to get good prices of non-timber products and reduced dependency on monopolistic buyers (middlemen). Authors further argued that if market system is improved, higher quality could be rewarded. Local income is improved which facilitates better NTFP management. For marketing of NTFP, government should not have a monopoly, as nationalization does not help collectors in the long run. Monopoly purchase by government requires stable or sustained political support and highly efficient bureaucratic machinery. Otherwise it is difficult to ensure these over a long period. Ultimately nationalization has often increased exploitation of the rural poor Saxena and Gulati, (1993). Developing countries in most case the poor and marginalized groups do most of the harvesting of NTFPs. They either peddle their wares within the local community or else sell them to middleman, who take the products to distant markets where better prices are available. Where harvester-collector receive a pittance while middleman make profit Taylor, et al. (1996). Behari, (1994) recommended that standardization and grading are the important aspects of the any marketing system. Grading facilities, price fixation helps to growers/collectors to receive good price of the products. In case of minor forest produces are not subjected to grading prior to the sale. The individual collection is rather small to resort to grading. Further the required facility is not available in most of the centers. Collectors are not aware of the advantage of grading.

In Nepalese context NTFP market channel which links consumer resources at different levels of middleman collectors oftenly depends on local traders or middleman for to market their products. This dependency reduce the collectors return margin and the lavel of value added to the products Chandrasekharan, (1998). Likewise D.M. Edwards (1993) stated that collectors could market directly to the road heads or town centers by passing the local middleman in order to get reasonable price of NTFP. In Nepal much study has not been done yet about non-timber forest products, their extraction, processing and marketing Messerschmidt and Hammett, (1993). Specifically medicinal products, their cultivation, processing and marketing, whether from indigenous, technical, scientific or economic sources are lacking in Nepal. Conservation and sustainability measures are not fully understood by local medicinal product producers and collectors. This hinders sustainable cultivation of non-timber species of plants. Research is needed to learn more

and utilize the knowledge about, species, location, seasonality, growing and harvesting methods, processing and marketing situations of NTFP.

2.7.2 Sustainable use of NTFPs

Several studies reported that certain NTFP species or groups of species are being over used and degraded (Edward 1994; Malla et.al 1995; Hertog 1995; Karki 1996; Sharma 1996). The reason for this over use and degradation are complex but include the lack of local control over these resources, rural poverty, and traditional and cultural traditions. Many forest users expressed a desire to gain formal control their resources and initiate activities to gain financially from harvesting and processing the NTFPs (Maharjan 1994; Hertog 1995; Edward and Maharjan 1995; Karki, 1996). Therefore, it is important to help to forest user gain or retain in a formalized manner, control of the forest and pastures lands they use. A strong care can be made for supporting Forest User Group (FUGs) as they work to organize and develop operational plan for their forest and pastureland so that the resources can handed over the FUGs and sustainable harvest can be done.

It is necessary to manage and harvest non-timber forest products in a sustainable way (Singh, 1994). It is evident that collectors, middlemen do not know adequately about resource growth and marketing to tap the best use of existing opportunities for NTFP development. Evidence from many countries has shown that local community management systems can indeed work sustainably. So well trained forestry developers are needed to take such useful knowledge local communities about NTFP planning and management (Clark1995; Fisher1988), quoted by Sah and Dutta, (1996). To ensure the sustainability of the NTFP an understanding about ecological and biological suitability of the species is essential.

The social implications of, and technical necessities for, sustainable management needs to be understood Hammet, (1993). Similarly Behari (1994) argued that collection methods of forest products are based on traditional systems. Very little attention is paid to the quality aspects while plucking / picking. Further, the season of collection has a direct bearing on the maturity and availability of the products. Ruthless and physiologically immature collection may lead to total destruction of the habitat particularly for medicinal plants and herbs. Likewise the destructive harvesting and overexploitation of non-timber forest resources adversely affects the environment and genetic composition of the plants Charles,(1994). Author further recommended that to make sustainable use of non-timber forest resources we have to have sufficient information about the density and distribution of resources within the forest, information about population and productivity, and information about the ecological impact of differing harvest level. For this purpose we have to under take six major steps.

1. Species Selection;
2. Forest Inventory;
3. Yield Studies;

4. Regeneration Surveys;
5. Harvest Assessment; and
6. Harvest Adjustment.

2.8 Role of GO and NGOs in NTFP

Several GOs and NGOs are involved in community development programs in Nepal. They are also involved in agroforestry and community forestry activities. So there is prospect to involve them in NTFP promotion through agroforestry and community forestry programs. In Nepal there are several examples of local groups being very successful in managing natural resources. There are 25 NGOs and bi-and multi lateral funded projects have an interest in forestry research and management program (Fairclough et al. 1993) quoted by Edwards, (1996). For example, Asian Network for Small-scale agricultural Biotechnologies (ANSAB) and Nepal Agroforestry Foundation (NAF) are providing technical support for the NTFP promotion in mid western hill mountain region and central Mid Hills respectively.

CHAPTER III

BIOPHYSICAL AND SOCIO-ECONOMIC CONDITIONS OF THE STUDY AREA

Sindhupalchok is a mountain district of the central Nepal (Figure 3). Latitudinally it lies between 27° 36' and 28° 13' East and 85° 27' and 86° 16' North. Agroecologically it lies in the Mid Hills. The altitude of the district varies from 850 m. to 7080 m. above the mean sea level (MSL). The climatic condition varies from sub-tropical in the river basins to temperate type in the upper hills and Alpine type in high mountains. The annual average temperature ranges from 22.5° C. to 11.4° C. this district is linked with capital city Kathmandu. The district headquarters chautara is about 90 Km east of the capital city.

The total area of the district is 2,542 Km². Votekoshi river, which originates in Tibet divides the district into the two parts. The total population of district as of population census 1991 was 261,025 of 131,523 were males and 129,502 were females. Brahmins, Chhetries, Tamangs, Magars and Sherpas are the major ethnic groups. About 30 percent of the population are literate which is lower than the national average of 36 percent.

Due to wide climatic variation between narrow valley floors and ridge tops, cropping systems of the district are very diverse. There are several fertile terraces on either side of the Votekoshi river. Slightly more than half of the area has been covered with forest followed by agricultural land accounting for one fourth of the area (Table 3.1).

Out of the total cultivated land of 41,585 ha. as of Nepal Research Associates 1994 only 12,276 ha. is irrigated. Major crops grown are rice, maize, wheat, millet, barley and buckwheat. In high hills potato and wheat are the main crops. In terms of the area under cultivation maize is the most important followed by millet, potato and rice. Besides household consumption farmers cultivate potato for sell as seeds to the neighboring districts.

Table 3.1: Land use pattern in Sindhupalchok district, 1994

Type of land use	Area (ha.)	Percentage
Agriculture	63,904	25.75
Forest	126,543	51.00
Grazingland	19,305	7.78
Others	38,344	15.45
Total	248,096	100.0

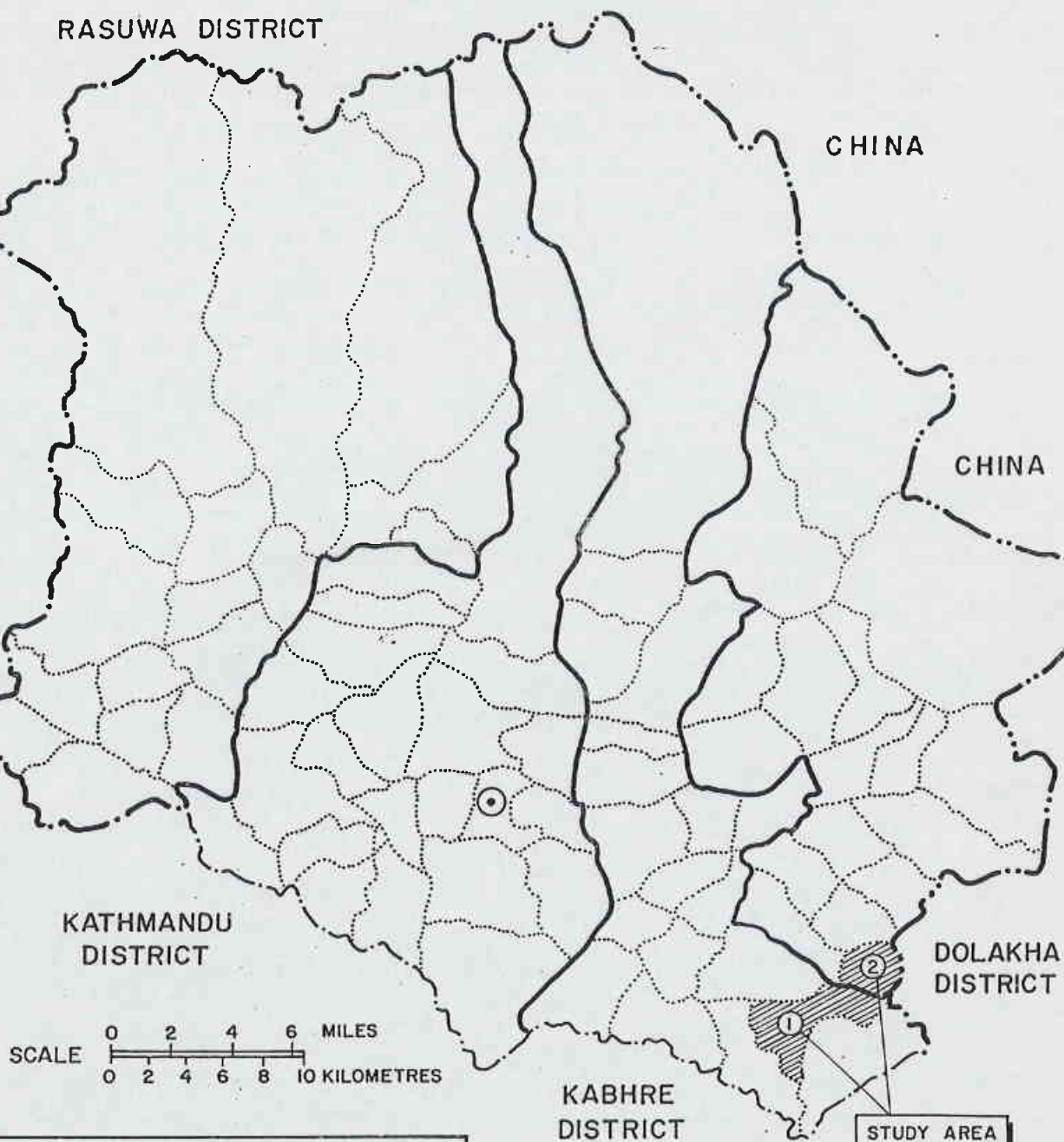
Source: *Nepal District Profile*. Nepal Research Associates, 1994

Sindhupalchok district is also popular for citrus fruits like orange and lemon. At the higher elevations, apple, pears, peach and plums are grown. Although growing vegetables in the kitchen garden has been a traditional practice of farmers particularly around the district headquarters have adapted to intensive vegetable farming as they have access to market centers.

The study area comprising Jethal and Attarpur Village Development Committee areas is located in the upper elevational zone of Sindhupalchok district. Approximately the area lies between 2100 and 3000 m. above MSL in the eastern part of the district transversed by the Kathmandu - Jiri highway. Normally it takes about 4 hours far to reach the capital city of Kathmandu and 3 hours to reach the district headquarters from the study area by a bus (Figure 3).

Figure 3: Study Area

BAGMATI ZONE SINDHU PALCHOK DISTRICT



NEPAL

INDEX
MAP



KABHRE
DISTRICT

LEGEND :

- · — · — International Boundary
- · — Zonal Boundary
- · — District Boundary
- V.D.C. Boundary
- D.D.C. Region
- ⊙ District Head Quarters

STUDY AREA

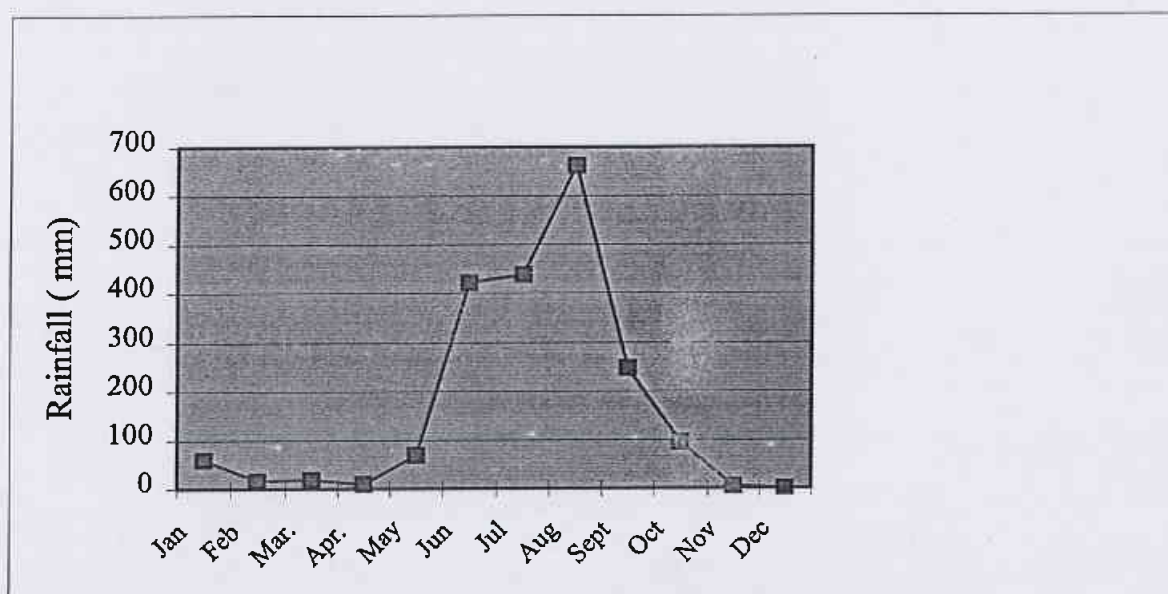
1. ATTARPUR
2. JETHAL

3.1 Topography and Climate

The topography of study area is undulated and hilly. The climate is influenced by the southeastern monsoon from June to September, during which almost 80 percent of the rainfall occurs (Figure 3.1). The “dry” southwestern monsoon in the remaining months contains very little moisture resulting in relatively dry weather which constrains crop cultivation. Farmers have adopted different cropping pattern systems in accordance with the soil moisture contents.

The temperature is strongly influenced by altitude. It is estimated that every 200m. elevation, the mean temperature drops by one degree centigrade. The temperature of the research area ranges from -2 to 24 degrees C. (Figure 3.2). Snow occurs at higher elevations. North facing slopes are cooler than south facing slopes even at similar altitude. Since the study area is located in the northeast-facing slope, it is cooler than other parts. The variation of temperature as influenced by elevation and slope aspect has a strong influence on the performance of farming systems.

Figure 3.1: Mean monthly rainfall in 1997



Data source: Department of Hydrology and Meteorology, Kathmandu

perennial trees. A farm household in the hills would normally possess at least a plot of the land under khar partly because of the need for roofing materials, and partly because of the need for grass for livestock. Perennial trees and some NTFP species could be inter-planted with khar. In regard to NTFP, these lands have greater productive potential, which could contribute substantially for the well being of the rural households.

3. 3 Population of the Study Area

Jethal and Attarpur VDC have mixed ethnic population with Newar and Tamang as dominant groups the settlement pattern is clustered villages. representing different ethnic groups who share close kinship relations. There are total households of the two VDCs are 834 in which 110 were selected for survey. The population of the study area was found to be 307 from collectors and 201 from non-collectors (Table 3.3).

Table 3. 3: Population of the Study Area

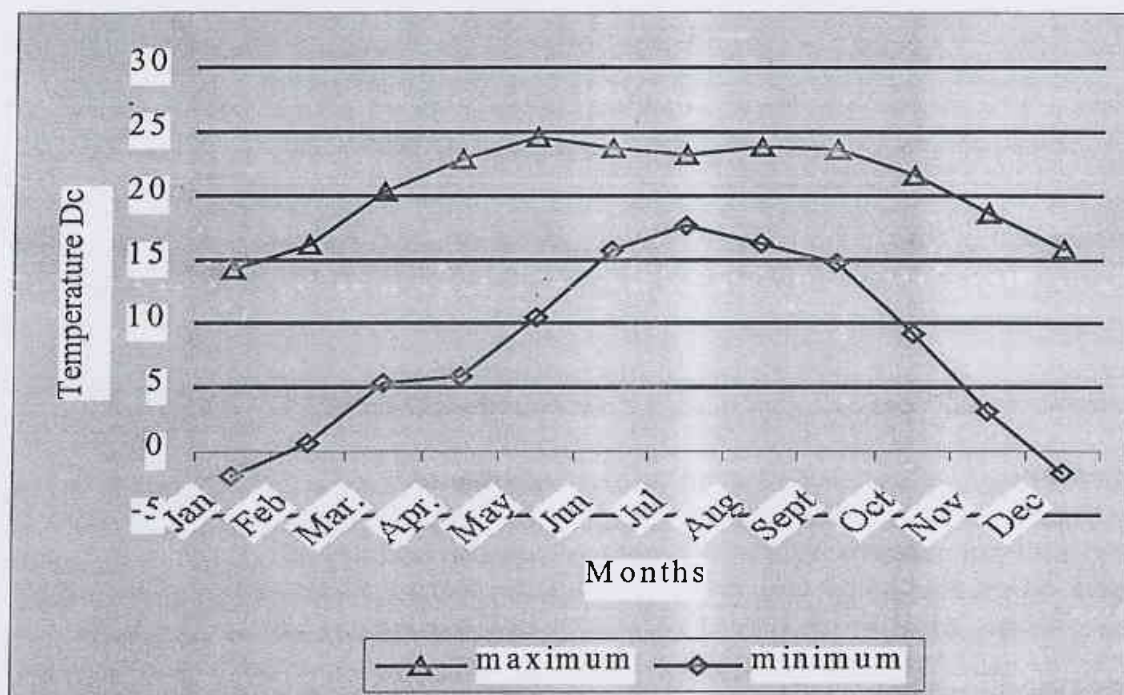
Age group	Collectors (n = 60)		Non-collectors (n = 50)	
	Population	Percent	Population	Percent
< 5 years	55	17.9	30	15.0
5 –10 years	69	22.5	51	25.3
10 – 59 years	165	53.7	102	50.7
> 60 years	18	5.8	18	9.0
Total	307	100.0	201	100.0

n = Sample size
Source: Field Survey, 1999

By age children aged below 5 years accounted 18 percent of the total population in the collectors where as, non-collectors comprised 15.0 percent and 5- 10 year's age group was occupied 22.5 percent in collectors and 25.3 percent in non- collectors. The population aged between 10- 59 years age group, which comprised 54.0 percent in collectors and 51.0 percent in non- collectors.

By gender distribution male and female population comprised more or less same in collectors and non-collectors respectively (Table 3.4).

Figure No.3.2: Monthly Air Temperature 1997



Data source: Department of Hydrology and Meteorology, Kathmandu

3. 2 Land and Soil

Generally, the land in the study area is sloppy with terraces. Soils in the high hills vary in respect with the slope. On the other steeper slopes soils are granite type with shallow depth attributed to relatively high rate of erosion caused by rainfall. Clay soils, normally found in river terraces are deeper and relatively stable. Farmers distinguish their lands according to soil quality and type. Two most important types of land are khet (lowland) and bari (upland); kharbari or pakho is another type of land with respect to its land use characteristics. Being located upper elevational zone, only bari lands are found in the study area. These are characteristically terraces on moderately to steep slopping (5-30 degrees) areas. They have well-drained soils with varying depth. Maize, finger millets, barley, buckwheat are the staple crops. At location with moisture, wheat is cultivated after maize or millet.

Bari soils are normally acidic (Neupane, 1996). The fertility status is considered to be lower than khet. Erosion and leaching appear to be the important factors in the decline of soil fertility in the higher elevation bari land. Thus, it is important to keep these lands more covered with vegetation in order to minimize soil losses through erosion as well as to maintain the soil fertility and the flow of down streams as long as possible after the monsoon rain.

Kharbari are steeply sloped wasteland or eroded marginal lands that are not used for field crop cultivation. These lands are permanently under khar (*Typha angustata*) and

Table 3.4: Gender Distribution

Gender	Collectors (n = 60)		Non-collectors (n = 50)	
	Population	Percent	Population	Percent
Male	149	48.5	101	50.2
Female	158	51.5	100	49.8
Total	307	100.0	201	100.0

n = Sample size

Source: Field Survey, 1999

3.4 Occupational Structure

Agriculture was the main occupation of both groups followed by study (Table 3.5). While the overwhelming majority of people were engaged exclusively in agriculture, the involvement of females was considerably higher than males. This is partly explained by pursuance of study by relatively higher percentage of males in both groups. A small percentage of household labor force in both groups was engaged in service, business, teaching, construction and cottage industries.

Table 3.5: Occupational Structure of the Household Labor Force

Occupation	Collectors (n = 60)				Non-collectors (n = 50)			
	Male	%	Female	%	Male	%	Female	%
Agriculture	98	65.77	121	76.6	66	65.0	76	76.0
Agri +Service	1	0.67	1	0.63	7	7.0	8	8.0
Agri +Business	7	4.69	3	1.9	2	2.0	2	2.0
Agri + Teashop	6	4.02	7	4.43	2	2.0	2	2.0
Teaching	1	0.67	-	-	1	1.0	-	-
Cottage industries.	2	1.34	1	0.63	-	-	-	-
Study	26	17.44	19	12.02	20	20.0	8	8.0
Wage labor	8	5.36	6	3.8	3	3.0	4	4.0
Total	149	100.0	158	100.0	101	100.0	100	100.0

Source: Field Survey, 1999

n = Sample size

3.5 Educational Status

Education is an important indicator of development and influences various aspects of the human life. It helps to change people's attitude, skill and knowledge in order to get success in his/her life and for the development of the area region, and entirely of the country. However, the study area was backward as only about two percent people had obtained higher secondary school level education in collector's group and about one percent in non-collectors group. Similarly about 15 percent each of collectors and non-collectors had obtained secondary level education (Table 3.6).

Table 3.6: Educational Status of Labor Force

Education level	Collectors (n = 60)		Non-collectors (n = 50)	
	No.	Percent	No.	Percent
Literate	54	30.5	45	34.9
Illiterate	51	28.8	38	29.4
Primary level	43	24.3	27	20.9
Secondary level	26	14.7	18	13.9
High. Secondary	3	1.7	1	0.8
Total	177	100.0	129	100.0

Source: Field survey, 1999

n = Sample Size

Notably about one third of the people in both groups were simply literate with of skill of reading and writing, while 29 percent were illiterate. One fourth of the collectors and one fifth of non-collectors had obtained only primary school levels education. The quality of human resources, which strongly influenced by the level of education, plays a great role in facilitating development. But apparently the quality of human resource was very poor among both groups.

3.6 Village Economy

NTFP collection and seasonal wage labor are the major sources of cash earnings of villagers. Employment opportunities other than farming are very limited and available as wage labor which provides employment for short-term. In view of this situation collection of NTFP has been an important sources of earnings, though it could not create gainful employment. Most of the time people are engaged in agriculture activities.

3.6.1 Land Tenure

Land tenure plays a significant role in economic development of rural households, as it determines farmers' access to land and agricultural produces. Apparently land tenure was not a problem in the study area, as 70 percent of collectors and 75 percent of non-collectors were owner operators (Table 3.7). While about one fourth of collectors and one fifth of non-collectors had rented-in land, only a small proportion of households had rented out their land holdings.

Table 3.7: Land Tenure Status

Land Tenure	Collectors (n = 60)		Non- collectors (n = 50)	
	No of HH	Percent	No of HH	Percent
Owner operator	59	69.42	46	75.40
Rentedout	5	5.88	4	6.56
Rentedin	21	24.70	11	18.04

Source: Field Survey, 1999

n = Sample size,

HH= Household

3.6.2 Farming Systems and Cropping Pattern

Planting trees in association with the field crops is a long established tradition in the study area. Large proportions of households have established fodder, fuelwood and fruit trees on edges of cultivated and fallow lands. The tree species and indigenous type grown naturally and protected by farmers. Livestock is an integral component of the local farming system. Most farmers have ruminants as well as other livestock, and some of them have managed stall-feeding. The farming system in the study area consists of trees, crops, and livestock as an agrosilvopastoral system. According to the availability of resources, land types and soil moisture content, farmers make decision on crops to be cultivated. Farmers cultivate various crops, in a complex array of cropping pattern. The major crops cultivated are maize, millet, wheat, barley, buckwheat, mustard, soybean and kidneybean. These crops are grown by most households though the area coverage under a crop varies depending upon the land holding size, livestock herd size and family requirements. The cropped area is more or less same in both groups (Table 3.8).

Table 3.8: Cropped Area

Crops	Collectors (n = 60)		Non- collectors (n = 50)	
	Area(in Ropani)	Percent	Area (in Ropani)	Percent
Maize	59	25.1	46	25.1
Wheat	56	23.8	44	24.0
Millet	53	22.5	40	21.8
Potato	56	23.8	44	24.0
Others	11	4.7	9	4.9
Total	235	100.0	183	100.0

n = Sample size

Source: Field Survey, 1999

Maize is main crop and commonly intercropped, relayed or followed by the finger millet and Kidney bean. Millet is normally transplanted. If there is sufficient moisture in the soil, a third crop which is normally either wheat or wheat and mustard mixed crop or mustard mono cropped. This system is, however, practiced by a few farmers with fertile land with gentle slopes. The crop occupied per area is more or less same in both groups (Table 3.8).

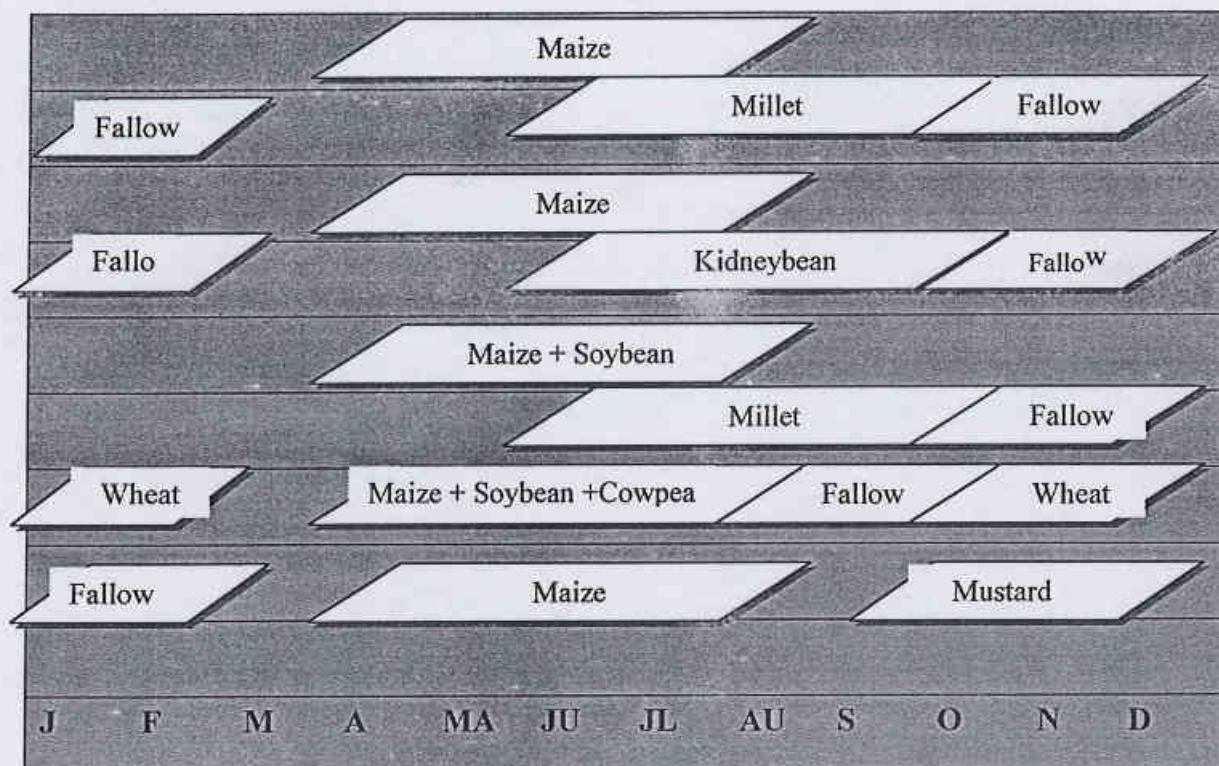
Predominant Cropping Patterns are as follows

- Maize/Finger millet-Fallow.
- Maize/Kidneybean Fallow.
-

Other patterns include

- Maize-Fallow -Wheat.
- Maize + Soybean-Millet-Fallow
- Maize/Millet-Wheat, or Wheat + Mustard or Mustard.
- Maize- Mustard or Buckwheat-Fallow.
- Maize/Millet + Kidneybean + Cowpea + Fallow.

Figure 3.4: Cropping Pattern



3.6.3 Food Sufficiency

Majority of the households in the study area had no enough food throughout the year. Slightly less than one third of the collectors household, nearly one fourth of non-

collectors had enough food only for three months. Nearly half of the households in both groups had enough food for six months (Table 3.9).

Table 3.9: Food Sufficiency

Period	Collectors (n= 60)		Non-collectors (n = 50)	
	No of HH	Percent	No of HH	Percent
3 months	19	31.7	12	24.0
6 months	28	46.7	23	46.0
9 months	6	10.0	5	10.0
12 months	7	11.6	10	20.0
Total	60	100.0	50	100.0

Source: Field Survey, 1999

n = Sample size

HH= Households,

3.6.4 Animal Husbandry

Cow, buffalo, goat and poultry are main livestock raised in the study area. Livestock provide dairy products and meat as well as service in the form of draught power. It plays a key role in transfer nutrient from forest to farm. Livestock herd size is also a symbol of economic status. She buffalo and cow are raised primarily for milk, while male buffalo and oxen for draft power. Goat and chicken are kept for meat and eggs.

It was revealed that due to the similar socio-economic and biophysical condition the livestock number of per household is more or less same in both groups (Table 3.10).

Table 3.10: Livestock Population

Type of animals	Collectors (n = 60)		Non-collectors (n = 50)	
	Population	No/HH	Population	No/HH
Cattle	127	2.1	59	2.6
Buffalo	96	1.6	53	1.5
Goat	176	2.9	94	3.0
Poultry	348	5.8	204	4.0

Source: Field Survey, 1999

n = Sample size

3.6.5 Annual Household Cash Earnings

According to the household survey cash earnings from non-agriculture sector is highest among the sectors, which occupied 58.5 percent and 72 percent of collectors and non-collectors respectively. Most of the collectors and non-collectors settlements is near by the Nepal Orient Magnesite Factory where most of the young member of the families are

working as a wage laborer and some of them are doing small business like teashop. While earnings from agriculture is minimal in both groups because peoples are living fragile and marginal lands where agricultural production is very low and they do not have surplus produces in order to earn more money. Besides this earnings from NTFP is more than agriculture sector, which comprised 17 percent of total annual cash income of collectors (Table 3.10). T-test result shows that there is no difference in annual households cash earnings between collectors and non-collectors. Therefore, formulated hypothesis is rejected.

Table 3.11: Annual households cash Earnings

Descriptions	Collectors (n = 60)		Non-collectors (n = 50)	
	Rs/HH	Percent	Rs/HH	Percent
Crops	271	3.2	114	3.0
Non- argil Activities	4,916	58.5	2658	72.0
Livestock	1,818	21.6	920	25.0
NTFP	1,403	16.7	-	-
Total	8,408	100.0	3,692	100.0

Source: Field Survey, 1999

n = Sample size

t-test is not significant at 0.05 level

3.6.6 Market Center

The study area is lacks of a well an organized marketing center. There is a small road head market center named mudhe where basic consumer goods, including soap, sugar, kerosene, cigarettes and clothes are available. Local people sell their, fruits, livestock products, vegetables and collected NTFP at this center.

CHAPTER IV

NTFP COLLECTION AND MARKETING

NTFP collection has been practised as a supplementary source of income since a long ago. Initially a very few households were engaged in collection and selling of specifically chiraito (*Swerita chirata*) and majito (*Rubia manjith*). Not much attention was paid to proper management of these products, as they were not considered as a source of income. But people have been increasingly aware of the economic value of NTFP. In the past, NTFP were collected primarily for household consumption purpose. With the evolution of marketing system facilitated by the construction of highway the number of NTFP collectors has increased substantially due to high commercial value of some of the products. There is an urgent need for management of NTFP in order to ensure their sustainable conservation and supply. NTFP in the study area collected from differently managed forest system.

Uncontrolled Collection from National Forests

Since a long ago households located relatively close started to collect NTFP from the national forest. Which is viewed as the property of the government by officials of the Forest Department and local people. The management responsibility of such forest in principle lies with Forest Department, but in the absence of an effective administration and enforcement, these forests become virtually open access resources (Figure 4.1). There is little or no management activity apart from occasional patrolling by the forest guards. Being a national forest, everyone, in principle, can harvest forest products but no one has duty to conserve it. There is no any restriction on livestock grazing and on collection of NTFP. As a consequence, the pressure on the forest resources including NTFP is very high.

According to the local people, NTFP were abundantly available previously. There was no competition between collectors, as marketing system was not developed yet people used collect NTFP for domestic use. However, with the growing awareness of their economic value of the competition for NTFP collection significantly increased. As a result most of the NTFP were being harvested before they are matured thereby threatening their vulnerability to extinction (Edwards 1996; Behari 1994). For example, chiraito prior to maturity time therefore, the current NTFP collection system unsustainable attributed primarily to the open access to forest has led to gradual depletion of NTFP.

Controlled collection from Community Forests

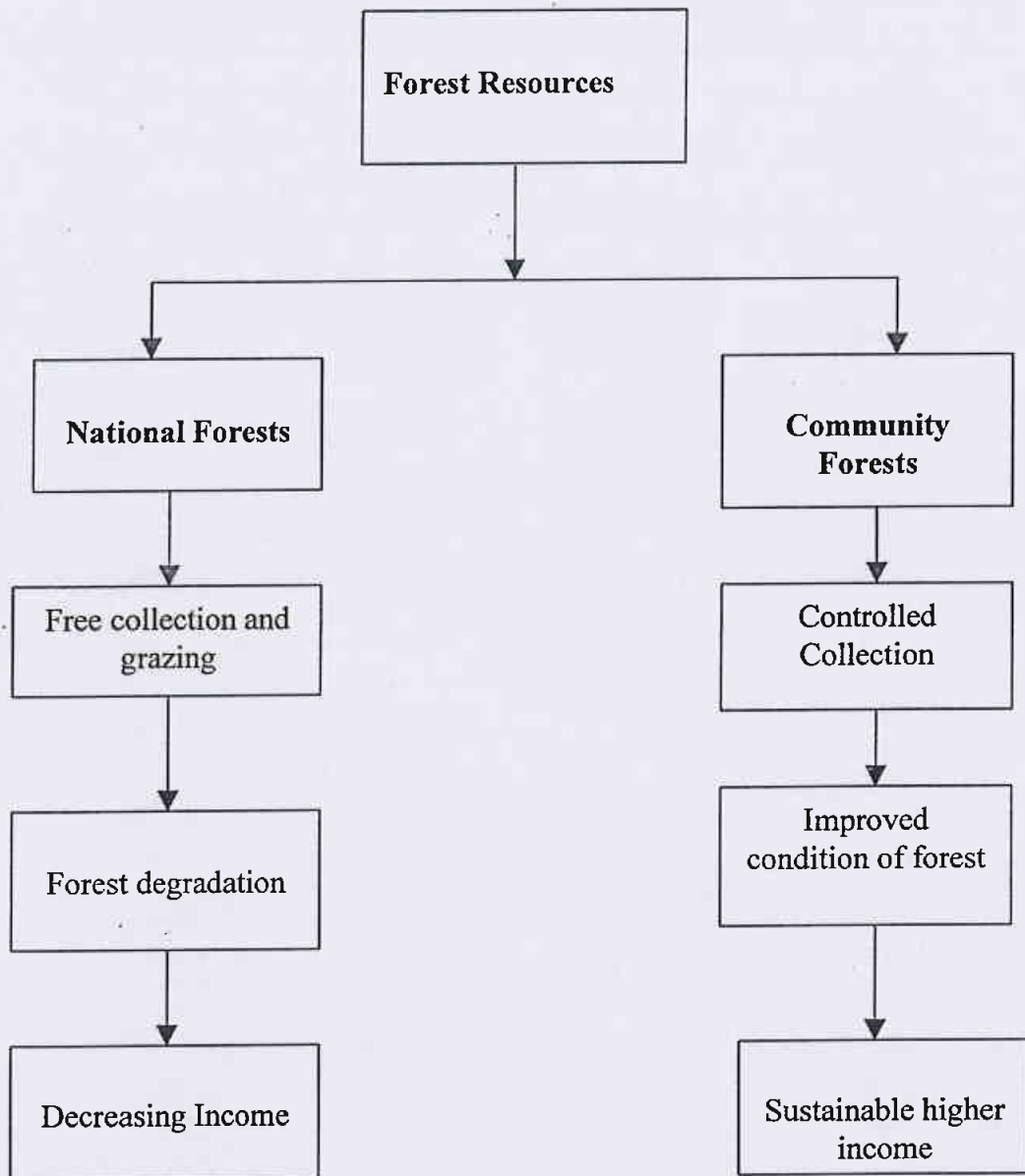
Community forests in the study area are erstwhile national forests handed over to the user groups for conservation, development and utilization for collective benefit. As a prerequisite, each user group prepares an operational plan approved by the District Forest

Office. An important feature of the operational plan is the establishment of village level user committees responsible for the implementation of the plan.

Community forests are controlled and well managed by local people through the forest user groups (FUGs) who have formulated and enforced rules and regulations in order to manage forests and forest products as per their social, cultural and political situation (Figure 4). Users are managing their forests according to the operational plan. Until a year ago forests were not handed over to FUGs. Thus the villagers were free to collect NTFP from community forests. Most of the forests have, however, been handed over to FUGs recently thereby prohibiting free access to forest for NTFP collection and livestock grazing. Forest user groups have made an agreement on thinning and pruning of forests, which is normally done in mid of January this helps to regeneration and development of NTFP. During this period FUGs members can collect fuelwood, fodder and other necessary forest materials except NTFP with minimal charge.

Prior to hand over of forests to FUGs, villagers could freely collect NTFP. Until the time of the household survey, the operational plan was not executed therefore, most NTFP were collected from community forests due to relatively closer proximity to villages. Regarding the NTFP, the users group have taken the responsibility for collection, marketing and benefit sharing among members, and individual member are strictly prohibited from NTFP collection. According to their plan, executive committee will inform to members to participate in collection those who are interested they can join for collection during the stipulated period, and the collected NTFP will be stored in a member's house. The products will then be sold during appropriate time as per user group's decision. The benefit will be shared only among participants according to their share of collection.

Figure 4: Impact of Forest Management Systems on NTFP



4.1 Common NTFP Species Found in the Study Area

Based on the group discussion, with villagers and household survey it was revealed a number of NTFP species are found in community as well as national forests. Forests in the study area are dominated by pine trees, which hinder the growth of other forest species. There is need to enhance bio-diversity through appropriate efforts for the promotion of different species of NTFP in forests. The common NTFP species found by

surveyed households are chiraito, majito, pakhanved, dhasingray, nagbeli and sugandhawal. Most of them are used for medicinal purpose (Table 4.1).

Recently the Nepal Agroforestry Foundation (NAF) has launched a NTFP domestication program in the study area. In this regards NAF provides training on NTFP production, collection and marketing to villagers, the primary aim is to motivate them for NTFP cultivation in their own land. NAF has established a nursery to demonstrate how NTFP species such as chiraito, majito, pakhanved, sugandhawal, and others can be grown and what are the methods and processes necessary for domestication.

Table 4.1 Common NTFP Species Found in the Study Area

Species	Botanical Names	Usable parts	Use
Chiraito	<i>Swerita chirayata</i>	Whole plant	Medicine
Majito	<i>Rubia manjith</i>	Rhizome	Medicine/ Red dye
Pakhanbed	<i>Bergenia liugulata</i>	Rhizome	Medicine
Nagbeli	<i>Lycopodium calvatam</i>	Spores	Medicine
Dhasingray	<i>Gaultheria fragmenstissima</i>	Leaves	Medicine
Sugandhawal	<i>Valeriana jatamansi</i>	Rhizome	Medicine
Indreni	<i>Citrullus colocynthis</i>	Vine	Medicine
Chutro	<i>Berberis aristata</i>	Bark	Dye
Lokta	<i>Daphnepapyracea</i> , <i>D.bolua</i>	Fiber	paper
Thulo Okhati	-	Rhizome	medicine
Pine	<i>Pinus wallichiana</i>	Pine cone and Resin	Chemical and decoration
Bojho	<i>Acorus calamus</i>	Rhizome	Medicine
Padamchal	<i>Rheum emodi</i>	Rhizome	Medicine
Sil Timur	<i>Lindera neesiana</i>	Fruits	Medicine

Source: Field Survey, 1999

4.2 NTFP Collected

As noted above, several types of NTFP are found in study area. The common species collected are chiraito, majito, nagbeli and sugandhwal, as these products have high market price and are easy to sell. While other products like dhasingray, which is available in substantial amount and can be used for medicinal purpose, but due to low market price villagers are less interested to collect it. It was observed that nagbeli and sugandhwal are collected in small quantity than chiraito and majito (Table 4.2). Because the quantity of NTFP is depends on usable parts of the product and rate of availability. Collection of spores is a difficult job as they are sparsely located within the nagbeli plant and rhizomes of sugandhwal are also less available rather than chirato and majito.

Table 4.2 Collected quantity of NTFP

Species	Uncontrolled		Controlled	
	No of HH	Kg/HH/yr.	No of HH	Kg/HH/yr.
Chiraito	10	9.9	38	7.7
Majito	8	5.8	33	4.0
Nagbeli	7	2.5	31	1.9
Sugandhwal	6	1.6	6	1.0

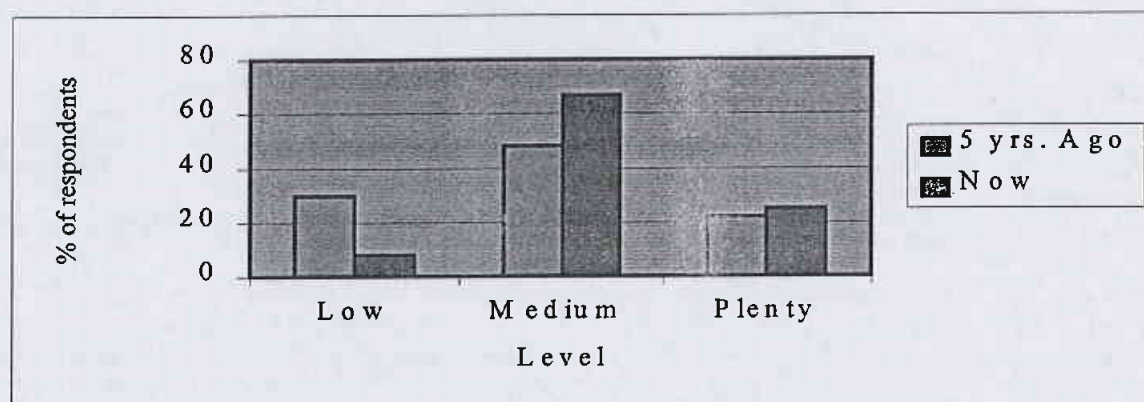
HH = Households

Source: Field Survey: 1999

4.3 Availability Level of NTFP

Until 5 years ago, all forests were national forests in the study area and thus were accessible to every body. There was no management system, which could promote, and conserve forest and forests based resources. Therefore, NTFP were available in small quantity. Following the hand over of forests to the users group, villagers forests have been owned and managed by specific user groups who have imposed ban on free access to forests. This has been helpful to increase the availability of NTFP in community forests, while in the national forests the availability is low (Figure 4.3.).

Figure 4.3: Availability level of NTFP



Source: Field Survey, 1999

4.4 Payment of Tax on NTFP Collection

There is a legal provision payment of tax on NTFP collection according to the species and amount of collection. Tax structure is varies as per the management system of the forests. In case of uncontrolled system by law one should pay royalty to the government as per the species and quantity of collection. While in controlled system after hand over forests to users group, they determined the tax in accordance to operational plan. Normally collectors should pay tax as per the products and their amount of collection. In study area it was revealed that the rate of taxpayers is one third in controlled which is almost double of uncontrolled (Table 4.4). It is mainly because in uncontrolled system no one wants to pay tax due to its open access status and government tax paying system is quite bureaucratic, complex and office is located far from the collectors settlements, which is not convenient to the rural households due to time constraints. So most of the primary collectors could not follow the government process and want to avert to pay tax in one hand and those who wants to earn more money through informal process they never pay tax in other. While in controlled system collectors should not follow the formal process because the management system is more effective and convenient to taxpayers.

Table 4.3: Payment of Tax on NTFP Collection

Description	Controlled (f = 42)	Uncontrolled (f = 18)
	Percent	Percent
Tax payers	33.3	16.7

Source: Field Survey, 1999

f = Frequency of respondents

4.5 Marketing of the NTFP

Marketing provides a set of tools with which people can create more efficiently economic value for the resources and products made of it. Proper marketing also assists in a more equal distribution of the economic value created among the participants. Marketing is, therefore, vital not only to medium and large-scale industrial enterprises but also in helping small family and forestry communities move from a subsistence economy to one which they can start as sustainable and profitable enterprises on their own.

Marketing in the context of the NTFP means discussing in all its possible variations. NTFP comprised such a varied group of the products that meet the needs and wants of all kind end-users. Some of the products find markets with final consumers without any major processing, others have markets with industrial customers which use them as raw materials in making either other industrial products or consumer products.

4.6 Marketing Channel of NTFP

There is a network of NTFP marketing, comprising various agents based at different locations are market centers (Figure 4.5) This network facilitates NTFP marketing through different tiers from local collectors to the exporters in the capital city of Kathmandu. Local and itinerant traders are the key role players in the NTFP marketing because they have more information and knowledge about sources of NTFP and close relationship with collectors. Road-head traders make attempt to increase his/her control over the NTFP collection by providing the cash advances to collectors when greatly needed for their livelihood. This process creates the number of tiers of NTFP marketing which are given as follows:

Local collectors

It is the first tier of the marketing that includes collectors selling their collected products to local and itinerant traders due to their well-established personal relationship and monetary advances prior to the collection. Sometimes a few local collectors directly sell their NTFP to the road-head traders, export agents and informal exporters who offer higher prices. But majority of primary collectors used to take cash advances from village traders before the collection to fulfill their basic necessities so they are bound to sell them collected NTFP. And due to the transportation as well as time constraints they could not bring and sell their collected products to the export agents and market center though offering higher prices.

Village traders and Itinerant traders

Most village and itinerant traders sell their products to the road-head traders, but based at mudhe a few village traders sell NTFP their products to other commission agents if they get high prices. Itinerant traders also sell their products to export agents for the same reason.

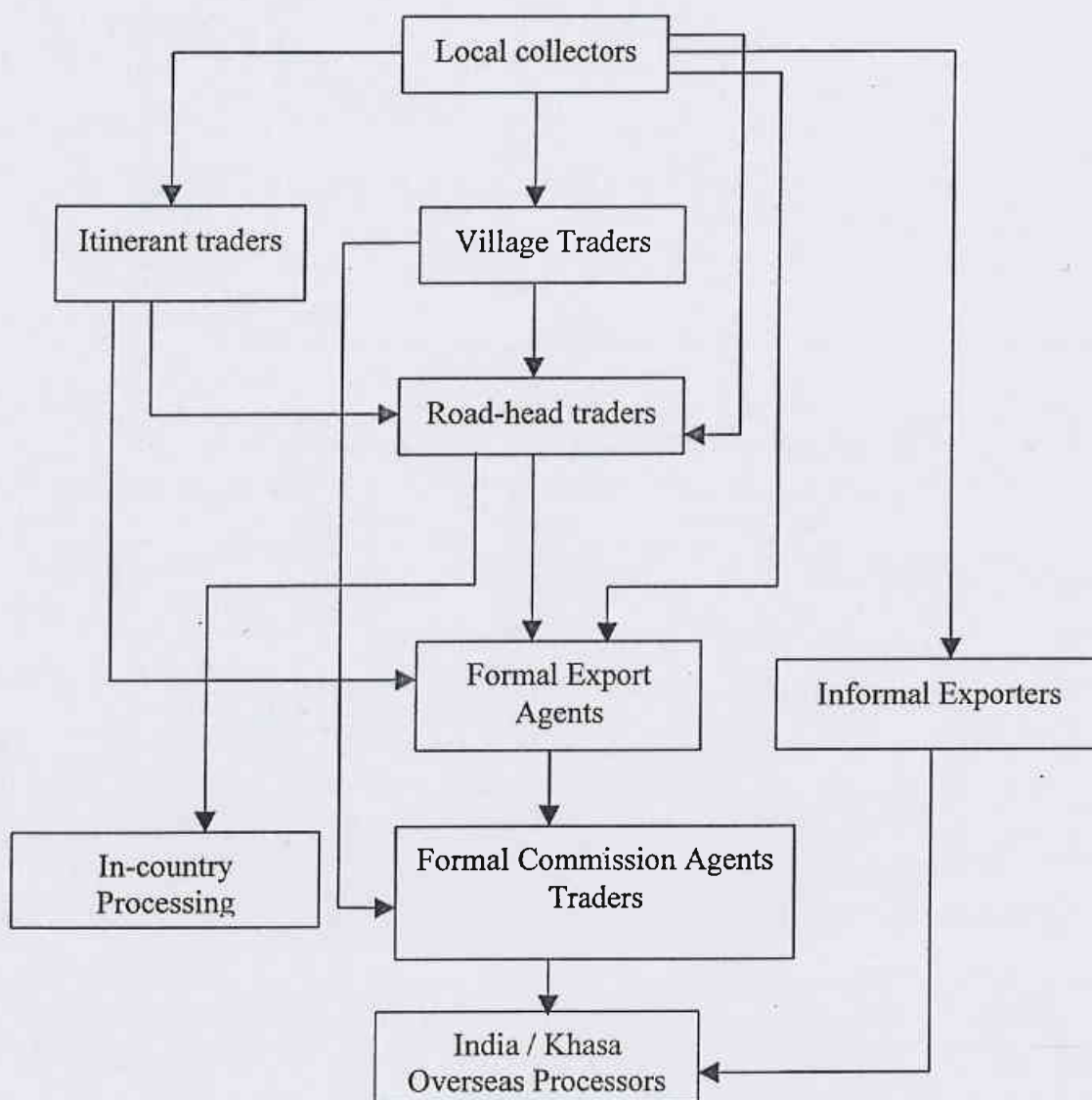
Road-head traders

Most of the collectors get monetary advances from road-head traders through village and itinerant traders to fulfill their subsistence requirements such as kerosene, soaps, sugar and clothes, and other daily necessities. Road-head traders purchase NTFP from village and itinerant traders, and sell most products to the export agents when they get more profit margins. Otherwise they keep products until market are satisfactory. Some times they sell NTFP national-processing industries, for example, to the Herbs Production and Processing Company Limited (HPPCL) located in Kathmandu.

Export Agents

Formally appointed export agents export NTFPs are to India, Khasa of China and other overseas markets through commission agents. Besides some of the informal exporters also directly export NTFP to the foreign countries.

Figure. 4.5 Marketing Channel of NTFP



Source: Field Survey, 1999

4.4 Prices of NTFP

The collection and marketing of NTFP has been one of the supplementary sources of income in the study area. To a considerable extent the livelihood of a substantial proportion of rural households is supported by this source. NTFP products are mostly exported to India in crude form price of NTFPs varies depending on concerned traders at different level of marketing channel. Prices of all products tend to increase as they are transferred from primary collectors to the industry or the export agents (Table 4.6). As most collectors sell their collection, at their farmgates they are not getting proper price according to their efforts. It is to road-head traders and export agents who get larger share from the trade of NTFP (Table 4.6). It is clear that at the collectors level price of chirata and pakhanved is Rs 40/kg and Rs 10/kg respectively. While road-head traders sell chirata nearly two times more and export agents more than three times of collectors price. Similarly road-head traders sell pakhanved nearly more than half time and export agents more than three times of collectors price. The primary collectors of these products get a very unfair price for their labor and in fact it is traded through several tiers of middlemen and the final price is very high compare to the collectors' margin.

Table4.4: Selling Prices of NTFP

Species	Collector's price*	Road-head trader's price* (Rs/kg)	Exporter's price** (Rs/kg)	Marketing Margin (Rs/kg)
Chiraito	40.0	70.0	150.0	110.0
Majito	10.0	30.0	45.0	35.0
Pakhanved	5.0	7.0	15.0	10.0
Nagbeli	100.0	150.0	400.0	250.0
Sugandhwal	25.0	60.0	90.0	35.0

Source: Field Survey, 1999*
NACRMP, 1998**

CHAPTER V

ROLE OF NTFP IN HOUSEHOLD ECONOMY

5.1 Employment Generation

NTFP can be an important source of employment for the rural households in the Hills (Behari, 1995). NTFP involve a diversity of products, which are frequently seasonal in nature, providing important labor opportunities and supplementary income. Their production and management require more labor-intensive tasks that use simple technologies. They provide direct employment to the local community; and perhaps most importantly, they are accessible to low income and socially and politically disadvantaged groups.

In the study area most of the labor forces are seasonally unemployed. All of the family members are engaged only in agriculture activities but the production of agriculture is almost stagnant or declining. This brings the problem of increasing disguised unemployment. NTFP promotion can make significant contribution to overcome this problem. If rural villagers start to cultivate NTFP in their lands, then there is possibility of increase employment opportunities considerably by involving the labor force in NTFP production, collection and marketing. Besides this may facilitate the establishment of small scale processing industries, which will create further employment opportunities to rural people.

5.1.1 NTFP Collectors

NTFPs are mostly found in forests and high elevational zone (2000-3000m), far from settlements. Deprived from vehicular transportation facilities, the only means of transporting NTFP from forest to villages is human labor. Normally it is women and children who make major contribution to NTFP collection under both controlled and uncontrolled system (Table 5.1). They collect while they go to jungle for other purposes such as fodder or fuelwood collection and animal grazing. In majority of the households of both areas specifically children were the one engaged more in NTFP collection. The involvement of children in NTFP collection has deprived them of their basic education. Which entirely leads to illiteracy and poverty.

Table 5.1: NTFP Collectors

Collectors	Controlled (f = 42)	Uncontrolled (f = 18)
	Percent	Percent
Children	31.0	22.2
Adult Male	14.3	16.7
Adult female	9.5	16.7
Children +Adult Male	19.0	5.5
Children + Adult Female	21.4	22.2
Adult Male + Adult female	4.8	16.7

Source: Field Survey, 1999

f = Frequency of respondents

5.1.2 Time Spent on NTFP Collection and Pre - Marketing Activities

To collect the NTFP households need to spend time. Which depends on the market price of the NTFP, distance of forests from settlements and the availability of products. If some products have high market value and are available in relatively distant forests people are ready to spend more time for collection. Contrarily people will spend less time on collection NTFP with relatively low market price. Remarkably the time spent on NTFP collection under uncontrolled system was double higher than that under the controlled system (Table 5.1). This is explained by the free access to forests under the former system. There is high potential to generate the employment opportunity. So far NTFP have not been able to generate much employment due to availability of relatively small amounts attributed to the open access status of forests. Similarly community forests are recently handed over to the FUGs. Therefore, they are also not rich in NTFP. But in the future there is very good prospect of increasing employment opportunity as the stock of NTFP is expected to improve considerably under the management system controlled by local communities. Before selling NTFP have to be cleaned, sun-dried and packed which require labor investment. The actual amount of time spent depends on species, quantity and quality of the products. As per the household survey it was revealed that households under the uncontrolled system considerably higher number of days spent for on pre-marketing activities than those households under the controlled system (Table 5.2).

Table 5. 2 Time Spent on NTFP Collection and Pre Marketing Activities

Activities	Collectors	
	Controlled	Uncontrolled
	Days/HH/yr	Days/HH/yr
NTFP Collection	5.0	10.0
Pre-marketing	9.0	15.0
Total	14.0	25.0

Source: Field Survey, 1999

HH = Households

5.2 Income Generation

NTFP substantially helps to generate local and national income (Palit, 1997; IFAD, 1999). It is the important source of earnings primarily for subsistence farmers. Earnings from NTFP enable rural people to purchase essential commodities such as salt, kerosene and clothes. In the past, people were not much aware of the economic value of the NTFP. Therefore they did not pay much attention toward their collection. Now people are well aware of their market value and have realized that NTFP could become a vital source of income. It was found that out of total annual cash income NTFP comprised more than one tenth of controlled and one fourth of uncontrolled within collectors (Table 5.3). T-test result shows that there is a significant difference in annual cash income from NTFP in controlled and non-controlled management system. Therefore, the hypothesis annual cash income from NTFP is different in controlled and uncontrolled management system is justified.

Table 5.3 Collectors' Cash Income

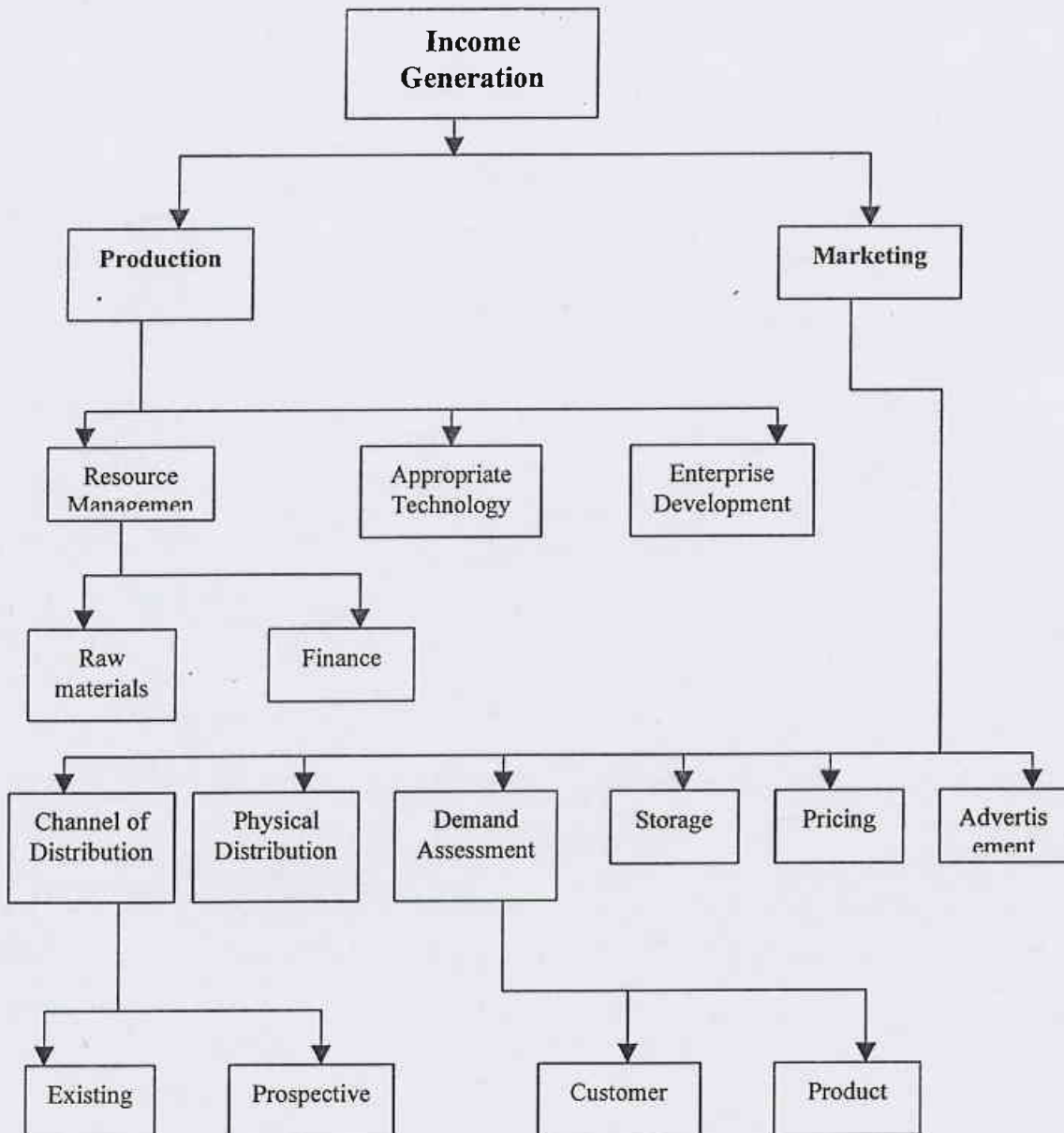
Sector	Collectors				Non-collectors	
	Controlled		Uncontrolled			
	Rs/HH	Percent	Rs/HH	Percent	Rs/HH	Percent
Agriculture	2,14.2	2.6	388.8	4.2	114	3.0
Non-Agriculture	4,809.5	59.7	5166.6	56.0	2,658	72.0
Livestock	2,009.5	25.0	1372.2	14.8	920	25.0
NTFP*	1,023.0	12.7	2288.0	25.0	-	-
Total	9215.6	100.0	8056.2	100.0	3,692	100.0

Source: Field Survey, 1999, HH = Household

t-test is significant at 0.039 level ($p < 0.05$)

Basically income generation from NTFP is dependent upon two factors – production and marketing. Production factors are related to technical feasibility, economic efficiency and organizational set up. Marketing factors, on assess the worth of products in the local and regional markets and their commercial viability. These two factors relationship is shown in given figure no 5.2

Figure No.5.2: Schematic Relations



Source: Campbell, Chattopadhyay and Das (1995).

5.3 Use of Collectors Income from NTFP

As per the household survey and the group discussion, interview and PRA with rural people it was found that most of the collectors do not have enough food to sustain their livelihood even three months. And they do not have sufficient agricultural land to grow agricultural produces. Due to the low agricultural productivity whatever they grow that is not enough to fulfill their basic requirements. In view of this NTFP is the supplementary source of income in order to fulfill their basic needs like food, clothes and medicine. In study area rural households spent their income from NTFP to supplement their daily necessities.

CHAPTER VI

PROSPECT OF DOMESTICATION

The domestication of NTFPs involves the growing of NTFP on private lands. There is a good prospect of commercial production of NTFP under the care of the people who will directly benefit from these species (Michon and Foresta, 1996).

The domestication of NTFP species involves genetic selection and management in order to improve their yields and quality so that farmer would be able to have a good amount of income. Profits accruing from the improved varieties grown under private management provide incentive to plant and manage NTFP species on a sustainable basis. Personal control over the resources gives the strong bargaining power to the farmers in order to get handsome price of the products (Michon and Foresta 1996; Tayler et al.1996; Charles 1994).

Advantages of NTFP Domestication

The major advantage of NTFP can be summarized as follows:

- Meeting the basic needs of indigenous and rural communities for the variety of goods and services, and providing them with income and employment;
- Contributing to household food security and nutrition;
- Supporting environmental management; and
- Sources of foreign exchange earnings.

In the study area some of the NTFPs are like chiraito, majito and nagbeli though at very limited scale. The question arises as to why farmers are not cultivating at relatively large scale, despite good economic value. One of the reasons is that they are not much aware of the prices of NTFP that related processing industries and export agents offer. Farmers are not sure that whether their products will fetch a good price or not. Likewise there is uncertainty whether they will be to sell the products in time. Therefore it is sensible to know the existing and possible problem constraining the domestication of NTFP. Possessing of small land holdings, farmers can not allocate separate parcel of lands for NTFP cultivation. What they have to do use is to make very efficient use of their land holdings by integrating NTFP with the agroforestry, which has been a traditional practice of farmers.

While there is a good potential of NTFP domestication farmers are not quite aware of the species suitable to the local biophysical condition. Besides, due to very poor information dissemination system farmers do not know which products are commercially more viable and profitable.

Domestication of NTFP is more appropriate in marginal land where the yield of cereal crops is very low. Similarly unused lands like edges of terraces, barren and fallow lands and gullies are can be utilized for NTFP production.

6.1 Perception of Profitability

Two thirds of the collectors under controlled system perceived domestication of NTFP profitable. Interestingly so was the perception of slightly less than half of the uncontrolled collectors and only one fifth of non-collectors (Table 6.1). It clearly indicates that under the controlled system due to proper management of community forests people are not allowed to have free access to forests, and users group has controlled the NTFP collection. Thus for them domestication of NTFP is profitable. In uncontrolled system, collectors can freely collect, and they do not care about the economic value of NTFP whether it is profitable or not just they collect and sell as a free gift from nature. So relatively small percentages of them consider NTFP domestication profitable. Regarding non-collectors, majority of them have never collected and sold. This is why they do not have idea about collection marketing and profitability of the products.

Table 6.1: Perception of Profitability of NTFP

Perceptions	Collectors (n = 60)		Non-collectors (f = 50)
	Controlled (f = 42)	Uncontrolled (f = 18)	
	Percent	percent	percent
NTFP are profitable	66.7	44.4	22.0
NTFP are not profitable	33.3	55.6	78.0

Source: Field Survey, 1999

n= Sample size,

f= Frequency of respondents

6.2 Labor force Size of Collectors and Non-collectors, and NTFP Domestication

If farmer's labor force size is large they can allocate labor to NTFP domestication and increase their household economy by utilizing their unproductive lands. If farmers' labor force size is small they will not be able to allocate labor force for NTFP domestication instead of doing their agricultural works to fulfill subsistence requirements. And their perception may not be increased for domestication. In study area it was found that labor force size of

collectors is relatively higher than non-collectors and their perception for NTFP domestication is also found higher than of non-collectors' (Table 6.2).

Table 6.2 Labor Force Size of Collectors and Non-collectors, and NTFP Domestication

Category of labor force (In number)	Labor Force Size			
	Collectors		Non-collectors	
	f	Percent	f	Percent
Small 1-3	1	2.0	11	22.0
Medium 4-6	33	55.0	24	48.0
Large > 6	26	43.0	15	30.0
Total	60	100.0	50	100.0

Chi-square test significant at 0.003 level ($p < 0.001$)

f = Frequency

Source: Field Survey, 1999

6.3 Preferred Species for Domestication

Often farmers prefer to domesticate those species, which have higher market prices and could be harvested and sold within a short period of time. Farmers can not wait for long because they are hardly sustaining their livelihood on one side and do not have proper storage facilities to keep the products for long time on the other. And there is always risk of products being damaged due to bad weather conditions.

The majority of interviewed respondents preferred to domesticate limited number of NTFP species such as chiraito, majito, sugandhwal, nagbeli and pakhenved due to their high market value, rate of availability in the forest and easy to collect and sell as compared to other NTFP. Among these species chiraito is one of them which is more preferred by both collectors and non-collectors due to its relatively high market value and easiness to harvest and sell as the entire plant is used for medicinal purpose (Table 6.3).

Table 6.3: Preferred Species for domestication

Species	Collectors (n=60)		Non-collector (f = 8)
	Controlled (f = 42)	Uncontrolled (f = 18)	Percent
	Percent	Percent	
Chiraito	28.6	33.3	50.0
Chiraito + Majito	19.0	22.2	12.5
Chiraito+Sugandhdhwal	19.0	16.6	-
Chiraito +Nagbeli	19.0	16.6	25.0
Chiraito + Pakhanved	14.4	11.1	12.5

Source: Field Survey, 1999

n = Sample size

f = Frequency of respondents

6.3.1 Attitude Towards NTFP Domestication

Domestication of NTFP depends on farmers' willingness, which is influenced by profit margin, farmers' educational status, land holding size, labor force size, marketing opportunity, government policies and biophysical situations. If these elements are favorable condition there will be the possibility of domestication. In this section firstly respondents' willingness has been examined. This is followed by the analysis of association between willingness and selected socio-economic and perceptual variables.

The discussion held with villagers revealed most of them willing to grow the NTFP in their unused lands such as edges of terraces, and pakho, parti and kharbari lands. In the study area more than three fourths and more than half of uncontrolled collectors are willing to domesticate NTFP (Table 6.4). In regard of non-collectors, only one third of them have positive attitude towards domestication of these species.

Table 6.4: Attitude Towards NTFP Domestication

Attitude	Collectors		Non-collectors (f = 50)
	Controlled (f = 42)	Uncontrolled (f = 18)	
	Percent	Percent	Percent
Willing	83.3	55.6	62.0
Unwilling	16.7	44.4	38.0

Source: Field Survey, 1999

f = Frequency of respondents

Willingness to domestication of NTFP might be influenced by farmer's perception of their profitability. If products are considered profitable then NTFP domestication will take place. The collectors who said NTFP are not profitable, still two fourth of them are willing to domesticate due to the controlled management system of forests. Partly it is because of that NTFP will fetch good price once marketing system is organized by their community. Similarly more than two fifths of the non-collectors, who considered NTFP is non profitable are willing to domesticate such products as some of them have attained training on NTFP domestication organized by the NAF. Besides NAF's extension workers are also making villagers aware of the economic and environmental values of NTFP. It is therefore, some of the motivated non-collectors are willing to domesticate NTFP (Table 6.5).

Table 6.5: The Influence of Farmers' Perception of profitability on Their Willingness to domesticate NTFP.

Description	Collectors				Non-collectors			
	Profitable		Not profitable		Profitable		Not profitable	
	f	%	f	%	f	%	f	%
Willing	25	59.5	9	50.0	11	44.0	6	24.0
Not willing	17	40.5	9	50.0	14	56.0	19	76.0

Source: Field Survey, 1999

f = Frequency of respondents

6.3.2 Collectors' and Non-collectors' Willingness by Education Status

Education is one of the important factors, influencing the farmers' willingness towards NTFP domestication and makes able to reflect their real needs as per their situation. If farmers' education status is high they will be able to decide themselves which species of NTFP is suitable in accordance to their socio-economic as well as biophysical condition and existing and future marketing opportunities of the products. In the study area, three fifths of the literate and more than one third of illiterate collectors are willing to domesticate NTFP. Similarly about one third of literate and two fifths of illiterate non-collectors are willing to domesticate within non-collectors. While about two fifth of literate and two third of illiterate not willing to domesticate within collectors. Where as more than two third of literate and slightly less than three fifth illiterate not willing to domesticate NTFP in non-collectors. It is only because of their educational level (Table 6.6). The chi-square test shows that education level of collectors and non-collectors is significantly different. Therefore, the hypothesis collectors and non-collectors perception based on education status to wards NTFP domestication is justified.

Table 6.6: Collectors' and Non-collectors' Willingness by Education Status

Description	Collectors				Non-collectors			
	Literate		Illiterate		Literate		Illiterate	
	f	%	f	%	f	%	f	%
Willing	30	61.0	4	36.0	10	31.0	7	41.0
Not willing	19	39.0	7	64.0	22	69.0	10	59.0
Total	49	100.0	11	100.0	32	100.0	17	100.0

Chi-square test significant at 0.060 ($p < 0.10$)

f = Frequency

Source: Field Survey, 1999

6.3.3 Collectors and Non-collectors Willingness by Landholding Size

Land holding size is the most crucial factor for the NTFP domestication particularly in a subsistence economy. If farmers have more lands, they can allocate separate parcel of land to NTFP growing. In study area it was revealed that in regards of NTFP domestication majority of farmers have small land holdings they can not allocate land for domestication. It was found that there is positive association between land holding size and willingness to domesticate NTFP. It indicates that increase the land holding size encourages the domestication of NTFP (Table 6.7). The chi – square results show that the land holding size and perception towards NTFP domestication of collectors and non-collectors is significantly associated therefore, the hypothesis that willingness to NTFP domestication is positively associated with land holding size is justified.

Table 6.7: Collectors and Non-collectors Willingness by Landholding Size

Description	Collectors								Non-collectors							
	Small		S. Medium		Medium		Large		Small		S. Medium		Medium		Large	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Willing	8	50	5	36	20	100	7	70	1	6	1	8	6	55	8	100
Not willing	8	50	9	64	0	0	3	30	17	94	12	92	5	45	0	0
Total	16	100	14	100	20	100	10	100	18	100	13	100	11	100	8	100

Chi-square test significant at 0.0 01 level ($p < 0.0.01$)

Small = 0 – 5 ropani, Small medium = 5.1 – 10 ropani, Medium = 10.1= 20 ropani, large = > 20 ropani

f = Frequency of respondents

Source: Field Survey, 1999

6.3.4 Reasons for not Willing to Domesticate NTFP

One third of controlled and two fourths of uncontrolled collectors and more than one fourth of non-collectors were not willing to domesticate NTFP, as they were not aware of the economic value of these products. Similarly slightly more than one tenth of both controlled and uncontrolled within collectors and more than one third of non-collectors were given lack of knowledge about identification of NTFP. Where as more than one fifth and one fourth of controlled and uncontrolled within collectors and one tenth of non-collectors expressed lack of marketing and information system. While slightly more than one tenth and less than one tenth had given problem of seeds and nursery, problem of collection, storage and processing and no guarantee for profit and livelihood including controlled and uncontrolled of collectors and non-collectors respectively (Table 6.8). It clearly shows that farmers are not aware about the importance of NTFP domestication and they are not aware and able to get effective support services from concerned agencies.

Table 6.8: Reasons for not Willing to Domesticate

Reasons	Collectors		Non-collectors (f = 33)
	Controlled (f = 17)	Uncontrolled (f = 8)	
	Percent	Percent	percent
Don't know the economic value of NTFP	35.0	50.0	30.0
Can not identify of NTFP species	12.0	12.5	40.0
Lack of marketing and information systems	23.0	25.0	12.0
Problems of processing, seeds and preparing nursery	12.0	12.5	9.0
Problems of collection and storage	6.0	-	6.0
No guarantee for profit and livelihood	12.0	-	3.0

Source: Field Survey, 1999

n = Sample size

f = Frequency of respondents

6.3.5 Suggestions for NTFP Promotion and Domestication

It was revealed that more than two fourth and two fourth of the controlled and uncontrolled of collectors and slightly more than one third of non-collectors were mentioned nursery, seed production, collection center, storage, processing and marketing are the crucial factors. Where as within collectors slightly less than one fourth and nearly two fifth of controlled and uncontrolled and one third of non-collectors were given the suggestions fixed price, training, support services and marketing are important for the promotion and domestication of NTFP (Table 6.9). It indicates that farmers are deprived to get effective and competent support services from governmental as well as non-governmental organizations in order to promote NTFP domestication in community and private lands.

Table 6.9: Suggestions for NTFP Promotion and Domestication

Type	Collectors (n=60)		Non-collectors (n=50)
	Controlled (f = 42)	Uncontrolled (f=18)	
	Percent	Percent	Percent
Fixed price, training, support service and marketing	23.8	39.0	34.0
Identification, domestication and training	14.2	11.0	30.0
Nursery , seed production, collection center, processing and marketing	62.0	50.0	36.0

n =Sample size

f = Frequency of respondents

Source: Field survey, 1999

6.3.6 Required Support Services for NTFP Domestication

Support service plays a vital role for the development of NTFP. However, it varies from one place to another according to needs of people and the existing social, institutional and biophysical conditions. Majorities of farmers in the study area are living in remote areas where they do not have facilities like school, hospital, road, and electricity, which are considered necessary for the development. However, the biophysical condition is suitable for domestication of NTFP such as chiraita, nagbeli, pakhanved, sugandhwal and majito. Due to inadequate support services like nursery seeds storage, training, marketing and transportation, still farmers are not motivated to domesticate these species. So it is pertinent to provide essential support services for the promotion and domestication of NTFP.

It was found that out of total respondents nearly one third of controlled and more than one fourth of uncontrolled within collectors and slightly more than one third of non-collectors needed training, marketing, seeds and nursery. Likewise more than one fifth and more than two fifth of controlled and uncontrolled of collectors and one fifth of non-collectors required training for the promotion of NTFP (Table 6.10). Nursery and seed production is the most important factors for NTFP domestication, which is, raised by majority of the respondents. So it is necessary to undertake to ensure the farmers, about the availability of seeds, seedlings and nursery before domesticating on their farmlands.

Table 6.10: Required Support Services for NTFP Domestication

Services	Collectors (n=60)		Non-collectors (n=50)
	Controlled (f = 42)	Uncontrolled (f = 18)	
	Percent	Percent	Percent
Training	23.8	44.4	20.0
Training, marketing, seeds and nursery	31.0	27.8	35.0
Training, marketing, storage	9.5	5.6	-
Training, demonstration and observation tour	7.1	-	5.0
Collection, marketing and storage	19.0	11.0	25.0
Identification and marketing	9.5	11.0	15.0

n = Sample size

f = Frequency of respondents

Source: Field Survey, 1999

6.4 SWOT Analysis of the Promotion of NTFP in the Study Area

SWOT analysis is based on field survey, group discussion and interview with concerned stakeholders. The NTFP domestication, production, collection, processing and marketing are the main components of the analysis. Here, SWOT analysis is carried out to identify the key elements of existing internal and external environment regarding problems and prospects of NTFPs. It is found that SWOT analysis is necessary to formulate the future strategies to build strength, overcome the problems, explore the opportunities and minimize the threats in the study area. Thus entirely it gives the pragmatic view of the existing situations and helps to formulate strategies for further development of NTFP in the study area (Table 6.11).

Table 6.11: SWOT Analysis of the Promotion of NTFP in the Study Area

Strength	Opportunity
1. Suitable bio-physical conditions and comparative advantage	1. Increased employment opportunities
2. Terrace risers, edges of cultivated lands, <u>kharbari</u> available for NTFP plantation	2. Increased household income
3. Indigenous knowledge for NTFP collection	3. Increased NTFP domestication and collection
4. Agroforestry based farming system	4. Establishment of NTFP processing plants
5. Availability of labor force	5. Promotion of bio-diversity
6. Collectors are aware of the economic value of NTFP	6. Availability of middlemen
7. Some NTFP species <u>chiraito</u> , <u>sugandhwal</u> , domesticated	7. Reduced indebtedness
8. FUGs are fully authorized for collection and management of the NTFP	9. Utilization of unproductive private lands
8. Emergence of village level institutions such as agroforestry groups, saving and credit groups promoted by NAF's	10. Technical support from concerned agencies (NAF)
	11. Road-head not far from the village

Weaknesses	Threats
<ol style="list-style-type: none"> 1. Inadequate technical know how due to poor extension services 2. Small land holdings for NTFP domestication 3. Low investment costs for establishment of NTFP processing plants 4. Low level of education status and skilled labor force 5. Unavailability of seeds and seedlings 6. Unorganized and inefficient marketing system 7. Insufficient infrastructure facilities for NTFP promotion 8. Low price of NTFPs at collectors level 9. Weak entrepreneurship for NTFP enterprises domestication, processing and marketing 10. Farmers are not aware of government rule and regulations towards NTFP 11. Ownership of national forests is still with government 12. Government is not much concerned about NTFP promotion rather than timber 13. Lack of management of NTFP species in national forest 	<ol style="list-style-type: none"> 1. Increased competition for NTFP collection <ul style="list-style-type: none"> • Reduced bio-diversity • Degraded environment • Over exploitation of resources 2. Over supply may lead to drastic drop in market price of the products 3. Conflict between collectors vs. non-collectors over benefit sharing in case of community forestry (controlled system) 4. Govt. may not hand over open access forests to the local community

Source; Field Survey, 1999

CHAPTER VII

SUMMARY OF FINDINGS, CONCLUSIONS AND STRATEGIES

This study analyzed NTFP collection and marketing practices in the Hills of Nepal using qualitative as well as quantitative information. Data were collected from controlled and uncontrolled management system within NTFP collectors and non-collectors to explore the idea, perception and attitude towards NTFP domestication, collection, processing, marketing, and promotion in the study area.

7.1 Summary of Findings

Being an area with mountainous rugged topography, with people living in poverty condition. Normally crops are cultivated under rain-fed condition, and the crop productivity is quite low. The main crops are maize, wheat, millet, potato and kidneybean. Vegetables are grown in very limited quantity due to the lack of irrigation facilities. Lands are left fallow for about 3-4 months.

Majority of households have no enough food for six months of a year. About 46 percent of collectors and non-collectors could not fulfill their food requirements more than six months. A very small number of households have surplus food grain. Farmers have to meet their food deficit through collection of NTFP and wage labor.

Buffalo, goat and poultry are raised for milk, meat, eggs and draught power. Livestock helps to transfer nutrient from forest to farmlands. Livestock products are also considered as a source of household cash earnings.

The annual average per household cash earnings of collectors and non-collectors is estimated to be Rs 8,408 and 3,692, respectively. On average household cash earnings of collectors is higher than non-collectors. The annual cash earnings from NTFP account for 17 percent of the collector's annual income. The study shows that nonagricultural activities contribute a major proportion to the household income of collectors and non-collectors.

The collectors' income from NTFP has substantially contributed to strengthen their household economy. But still NTFP have not been domesticated in private farmlands. So there is not much production and collection of NTFP in order to meet market demand and fulfill the household requirements.

NTFPs are collected from community and government owned forests. Normally children and women are engaged in this activity. The collection of NTFP is their secondary work. The involvement of children in NTFP collection has deprived them of their basic education. Which ultimately leads to illiteracy and poverty.

Of the fifteen NTFP species identified, chiraito, majito, nagbeli and sugandhwal are collected for marketing purpose. There is a wide price variation from primary collectors to the final export agents due to unorganized marketing system and inefficient market channels.

There is the great potential for NTFP domestication in view of the biophysical condition. Majority of the households of collectors and non-collectors has positive perception to domesticate NTFP on their marginal private lands. Due to the inadequate facilities of effective extension and support services like infrastructure, credit, seed and seedlings, processing, storage and marketing villagers' are not motivated to domesticate in large extent.

Domestication, harvesting, processing and local value addition, marketing, research and development, training and awareness raising activities are considered most crucial factors for the promotion of NTFP in the study area.

Community forest user groups and local farmers need to be supported to introduce NTFP in their community forests and private farmlands, by strengthening FUGs, provision of seeds, seedlings and effective extension services.

7.2 Conclusions

It is apparent that from the overall analysis of the study that the existing on-farm activities are not sufficient to meet subsistence requirements of the farmers. Therefore, they are collecting NTFP to supplement their basic necessities. Most of the villagers collect NTFP from national forests. National forests are freely accessible to all, and villagers are not concerned about their management. In view of this, most of the national forests are degraded and NTFP are over harvested. If this practice continues valuable NTFP species like chiraito, majito and sugandhwal are vulnerable to extinction. While community forests are well managed by villagers and there is the system of managing NTFP in a sustainable way by prohibiting villagers to have free access to forests and promoting regeneration by thinning, pruning, coppicing and planting NTFP species.

Though, villagers have positive attitude towards NTFP domestication, due to, inadequate infrastructure facilities and support services and, small land holdings it has not been much practiced. There is no institution to providing credit for NTFP promotion activities like cultivation, processing, storage and marketing. So far, the government programs have not reached to the local level. They are focussing cereal crop promotion program irrespective of locational comparative advantages. So there is need to develop locally suitable alternatives in order to tap the comparative advantages.

The study area is suitable for locally available NTFP species like chiraito, majito, nagbeli, pakhanved, and sugandhwal and these species are naturally grown in forests as well as farmers' field.

Efforts should be made to promote the domestication, collection, processing, storage and marketing of NTFP will substantially contribute to generate income and employment opportunities for the rural people. It does not mean to replace the existing agricultural systems. Therefore, it is necessary to explore and promote indigenous knowledge for integration of NTFP in agroforestry system to utilize terrace risers, edges of cultivated lands, kharbari and gullies for productive purpose.

STRATEGIES FOR THE PROMOTION OF NTFP

In regards of NTFP promotion there are some crucial issues related to the community and private management systems. These issues are closely interrelated with each other and considered as a requisite for sustainable NTFP management from social, economic and environmental point of view.

The existing practice of NTFP utilization involves only collection or harvesting during certain period of time according to collectors' convenience. The sustainable management system for increasing production and collection is not being practiced so far. Therefore, it is necessary to explore other possible alternatives for promotion and production of NTFP, which basically depend upon institutional systems. The key benefit of the sustainable production and harvesting of NTFP is the harmonizing of biological sustainability with economic sustainability in order to increase the NTFP production in sustainable way through improving methods of production, domestication and harvesting.

7.3 Improving the Production of the Wild NTFP on a Sustainable Basis

This involves the management of NTFP species, which allows their sustainable natural regeneration. Sustainable production of NTFP is only possible only when there is enough resource stock in forests. So far attention has not been paid towards this. In the study area, there is good scope for sustainable regeneration of NTFP particularly at high elevational zone. However, it depends upon the size of human population, demand of the products and their abundance. For this purpose a range of options can be considered for the NTFP management, which are as follows:

7.3.1 Hand Over of National Forests to Local Communities

It was observed that national forests are freely access to all and there is no management system for conservation from community level. In view of this, these forests are degrading day by day and NTFPs are rapidly depleting due to over harvest. For the better management of national forests, it is suggested that there is need to be involved local community in managing the forests. Therefore, it may be necessary to hand over of national forests to local community as a suitable strategy for better management of forests and NTFPs.

7.3.2 Controlled Harvesting

Collection of NTFP while retaining enough stock for natural regeneration is a suitable strategy for sustainable production and harvesting of the products. The controlled harvesting technique, simple, easy and inexpensive management strategy to be

implemented by the forest user groups (FUGs) at local level. This ensures the natural regeneration, checks the over exploitation of NTFP, and helps to enhance the natural regeneration rate in the forests.

Controlled harvesting system can be enforced by following measures:

Rotational Harvesting

This system should be adopted by the FUGs in order to retain the stock of NTFP. Forest users can manage to allocate rotational cycle for the particular species in a specific time for sustainable harvesting. This technique is particularly important because it ensures the natural regeneration rate and stock of the NTFPs in the forests. This method can be based on indigenous knowledge, which can be easily carried out by the forest users.

Selective NTFP Harvesting

This technique is applicable for the NTFP that have specific harvesting requirements. Some NTFP species have a certain time or condition which is better for harvesting. For instance, chiraito the difference between actual and optimum harvest time is two months-September instead of November. In this period individual plants double in size and also value (from NRs 30 to a maximum of NRs 40 at collectors' level) because the whole plant is traded. If collection took place in November the total volume of production for the region could also doubled and seed production would be ensured and waste could be minimized. So this method can be applicable in controlled management system in order to make sustainable harvest of NTFP.

7.3.3 Intensive Management of NTFP

Attention should be paid not only on harvesting but also other aspects of production such as cleaning the site, thinning, pruning, and coppicing. These methods ensure the regeneration rate of stock and high yields. Although it is time consuming and need to have knowledge about the techniques, there is a scope to gradually apply these techniques to manage the high value products in the community and private farmlands.

7.3.4 Domestication of NTFP in Community and Private Lands

Growing of promising, NTFP species on private farmlands, community lands including forests can substantially contribute to improve the local household economy. The existing forest laws of Nepal also allow NTFP production on community forestland, provided this does not deteriorate the condition of forest. It is more appropriate on

marginal private lands where either the cultivation of cereal crops is not possible or yields are very low and in degraded community forestlands.

In the study area some NTFP like chiraito, majito, pakhanved, sugandhwal and nagbeli are only collected from forests. There is prospect to grow these plants on marginal private lands. In this regard, there is need to provide motivation training at village level to make aware the rural people about NTFP and its importance in household economy. And there is also need to arrange training on NTFP domestication, including seed collection, propagation and plant care for the local people. There is also need to develop institutional capability of NAF for conducting the technical research and further strengthen and extend the NTFP development program in the study area.

7.3.5 Improving the Harvesting System and Reducing Post Harvest Losses

Some of the NTFP are harvested before they are biologically matured which makes these species vulnerable to extinction. For example, *Swerita chirayita* is propagated only from seeds which gets matured during October- November. But due to the high competition for collection and cash needs during Dashain, villagers usually harvest this species during July-September. This leads to diminishing regeneration of this product.

It is suggested that a good plan for harvest regarding quality, timing and methods is important to ensure the sustainable harvest of NTFP. Use of indigenous knowledge and further research can be useful to improve the storage system, including maintaining temperature, airflow, moisture, and improve harvesting method.

7.3.6 NTFP Conservation Education and Training

NTFP resources are degraded due to lack of awareness, on the parts of forest users, of the consequences of their activities. Moreover, most extension workers and forest users are unaware of appropriate conservation methods. Providing conservation education in conjunction with technical assistance should be a means of coping with these constraints. Users group should be responsible for the conservation of the resources. Training should be organized by GO and NGOs on domestication procedures, propagation techniques, processing methods and proper storage and marketing system of NTFP in order to make aware to the local people and motivate them for domestication and promotion of the NTFP in private and community lands. For example, NAF is providing training and support services and establishing NTFP demonstration nurseries. It provides seeds and seedlings in order to motivate the local people for to domesticate and promote NTFP.

7.4 Local Value Addition

The collected NTFP from forest can be sold in different forms – crude raw materials, semi - processed raw materials and processed raw materials-through different market channels. The experience shows that the number of processing and manufacturing industries are very few in the country, with bulk of NTFPs still trading in raw form to India.

The value of NTFP is high, but the potential of value-adding opportunities at local level is still underutilized. Community controlled NTFP provide equitable return to the collectors. The processed and semi-processed NTFP generally fetch higher price than unprocessed NTFP. Likewise an improved marketing system would bring more benefit than the on going system.

The collection and transportation of NTFP alone is not going to provide desirable return unless attempts are directed to increase value added through proper cleaning, sorting, packaging and distillation at the village level. Value addition intends to make the same products more valuable, so, as it would play a greater role in the local economy. This also contribute to creates employment for local people and uplift their living standard.

Value addition can be made in a number of ways by increasing the efficiency at each stage of the processing. An improvement in the quality of raw materials through processing is one way of value addition that can be handled by local communities easily.

7.4.1 Improvements in Raw Materials

Under the current NTFP trading system particularly with Indian traders in which traders do not distinguish the quality of materials and pay by weight, regardless of quality. Collectors have little incentive for improving the quality of NTFP. But there are markets that do have quality requirements. Now the traders have started to offer different prices for different grade of NTFP. The maintenance of quality is also important from a point of view of sustainable trade with some foreign traders.

Even simple operation such as cleaning and sorting can add a significant value by reducing transportation costs and improving the quality standard. In cleaning, alien materials are separated from NTFP, but in grading, the product is divided into grades based on quality as determined by buyers in the market. So, it is necessary to adopt simple methods, like cleaning, sorting and grading in order to enhance the value of NTFP.

7.4.2 Processing

NTFP processing industries are in their infant stage in Nepal. In regards to processing of NTFP can be summarized as follows:

- lack of NTFP processing industries in local and regional market centers
- lack of effective organization of collectors for improved access to knowledge about resource stock, processing technologies and markets with which they could enhance their bargaining power;
- problem of quality control and lack of certification for NTFP at the primary collectors level;
- problem of investment capital, short term financial support and other incentives; and

Local processing is an important step to redirect the return from NTFP to the local people. The processed raw material is reduced in volume and quantity and hence it helps to reduce the cost of transportation. At the same time it enhances the value of products. The same quantity of products after processing can fetch higher price than sold in crude form.

Villagers' are willing and ready to establish community owned small-scale processing plant in the study area, as there is the facility of electricity and road transportation. But due to the shortage of funds and technical know how they have not been able to establish the plant. If they get financial assistance from out side in community basis it will be good opportunity for them to capture more value from their products.

There are examples of community based NTFP processing industries in Nepal. In Humla district, for example, Humla Oil Pvt. Ltd. (HOPL) there is a community owned processing plant which was established in 1994 with the technical and financial support provided by Biodiversity conservation Network (BCN), Asia Network for Small Scale Agricultural Bioresources (ANSAB) and Appropriate Technology International (ATI) through Humla based NGO, Humla Conservation and Development Association (HCDA). HOPL is processing selected NTFP to extract essential oil using simple distillation method and has been successful in to provide additional employment and income opportunities to local communities.

It is suggested that financial institutions like Agriculture Development Bank need to provide credit for establishing community - based NTFP enterprises. Credit made available to individual or groups in order to start value-added activities related to NTFPs would support local processing industries and provide incentives for resource conservation. This is especially suitable in study area where middlemen are putting

pressure on the community members by providing monetary advances to over harvest the particular species like chiraito, majito and nagbeli.

It was observed that NAF supported agroforestry groups had initiated saving and credit program and able to save considerable amount of funds. Such funds could be mobilized to some areas having locational potential such as NTFP promotion activities. This may arise the problem of channeling the funds therefore, number of groups need to be work together in the form of cooperative to mobilize the savings. NAF as a networking organization can provide necessary support to have such program initiated by the FUGs.

7.5 Marketing and Trade

A good marketing system provides incentives for NTFP conservation by providing higher benefits to local people. This requires knowledge of markets and the means to reach them. In Nepal, NTFP are sold in local, regional, national, and international markets. There is market for NTFP, but this does not assure the access to the market. It is often very difficult to transport NTFP to the market centers where collectors can get higher prices for products.

At present, the market and trade channels of most of the NTFPs follows the general pattern of forest/ meadow to village to road head or trade center, and ultimately to the large trade centers in India. The NTFP collected in remote areas are sold through a long marketing channel, which is inefficient and costly from the perspective of the collectors. The present trade channel is not providing the fair share of profits to the primary collectors. It is operating for decades, with limited numbers of wholesalers.

Dissemination of information on markets prices and other matter of concern can help to increase income of collectors. Lack of information and wrong information seem to be the major reasons why collectors are not getting fair price for NTFP that they collect.

So far, NTFP collections have been working individually in collection and marketing of NTFP. They are not aware of the important of organization in securing their interest of maximizing the income. It is, therefore, collectors should be encouraged to form cooperative types of organization. It will make them easy to seek technical assistance from the concerned agencies. Their voice will be effective. Besides, the organization will enable them to tackle the various problems, including processing and, marketing.

Improving infrastructure and strengthening institution is required to improve marketing activities. Cooperation and exchange of information among existing institutions at local, national and international level is needed. Local research organizations have to develop standards, grading systems and testing methods and provide related services to back up marketing.

Strengthen and set up marketing information systems to provide necessary and relevant information on market and supplies. Information systems need to be established and strengthened, covering resource inventories, resource distribution, processing, marketing, utilization and trade and consumption.

Collectors need to know what to do with marketing information. In this respect, training and capability- building is important. Extension services are critical elements in developing marketing capabilities. Villagers need to be advised and trained. NGOs can provide vital support to the small-scale collectors. Government officials should also be familiar with the market forces affecting NTFP production and prices.

7.6 Benefit Sharing

Visualizing the possible conflict on benefit sharing among the forest users (collectors and non-collectors), amicable alternative needs to be developed by the users committee. Unlike to the present practice, FUGs may directly involve in NTFP harvesting and marketing in future. In this regard in addition to the users benefit those who are directly involving in NTFP collection will receive their wage labor while non-collectors will get only their share of the benefits. Thus, this mechanism will ensure the equitable share of the benefit among all forest users.

7.7 Research on NTFP

On farm trials for domestication of NTFP need to be conducted to test the adoption of different NTFP species on farmers' fields. Farmers' participation on such trials provides opportunity to learning and skills of propagation techniques and subsequently motivates towards their wider adoption. On farm research enable farmers and researchers to come out with locally suitable species and methods for domestication in real field situation.

REFERENCES

- Ashton, P.M.S. and Ashton P.S., (1993). *Plant Resources for Agroforestry Systems in the Asian Tropics*, In Bentley, W.R., Khosla, P.K. and Seckler, K., (eds.); *Agroforestry in South Asia: Problems and Applied Research Perspectives*. Winrock International USA and Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, PP.125-146.
- Baskota, Kamal and Sharma, Bikash,(1996). *Poverty situation Analysis* UNKP Kathmandu, Nepal,.
- Branny, Peter and Dev Om Prakash, (1994). *Biodiversity Implication of Community management of forest in nepal*. In Wood et al. (eds.); *Community Development And Conservation Of Forest Biodiversity Through Community Forestry: Proceeding of a seminar RECOFTC Report 12*. Bangkok Thailand October 26-28, 1994.PP 136-149.
- Bajracharya, D. (1991). *Fuel, Food or Forest? Dilemmas in Nepali village, Reading in social forestry and natural resource management for Nepal* HMG Ministry of Agriculture-Winrock International PP 147-169.
- Central Bureau of Statistics (CBS, 1996). *National Accounts of Nepal* CBS, Kathmandu
- Central Bureau of Statistics (CBS, 1996). *National Live standard Survey of Nepal* CBS, Kathmandu.
- Central Bureau of Statistics (CBS, 1998). *A Compendium for Environment Statistics* (1998), Nepal.
- Carson, Brian (1992). *The Land, the Farmers, and the Future: A soil fertility management strategy for Nepal*. ICIMOD occasional paper no.21.Nepal.
- Charls, M. Peters, (1994). *Sustainable Harvest of Non-timber Plant Resources inTropical Moist Forest: An Ecological Primer*. Institute of Economic Botany, The New York Botanical Garden Bronx, New York 10458.The Biodiversity Support Program is a USAID-funded consortium of World Wildlife Fund, The Nature Conservancy and World Resource Institute.
- Chandrasekharan D, (1998).*NTFPs, Institutions, and Income generation in Nepal*. Lessons for Community Forestry. Discussion Paper Series No. MNR 98/1. International Center for Integrated Mountain Development (ICIMOD) Katmandu, Nepal

Campbell J Y., Chattopadhyay R..N. and Das C, (1995). *Income Generation Through Joint Forest Management in India: A Case Study of the Participatory Forest Management Project in Nayagram, West Bengal*. In Victor M. (eds.) 1997. *Income Generation Through Community Forestry* Proceeding of an International Seminar RECOFTC Bangkok, Thailand 18-20 October 1995 PP 93-118. Recoftc Report 13. Bangkok, Thailand: Regional Community Forestry Training Center, Kasesart University.

Durst P. B. Ulrich W. and Kashio M, (eds.) 1994. *Non-wood Forest Products in Asia*. Regional Office for Asia and Pacific (RAPA) Food and Agriculture Organization of the United Nations Rome 1995.

Edwards, D.M., (1994). *Non-timber Forest Products and Community Forestry*. Project Report G/NUKCFP/12

Edwards, D. M, (1996). *Non- timber forest products from Nepal. Aspects of the trade in Medicinal and aromatic plants*. FORSEC Monograph 1/96, Forest research Service Centre Ministry of Forests and Soil conservation Babarmahal Kathmandu.

Friedman, John, (1993). *Empowerment The Politics of Alternative Development*, Blackwell, Oxford.

FAO, (1978). Cited by Bhargava S. K., (1993). *Policy legislation and community forestry*. In Warner Kathrine and Wood Henry (eds.); Proceeding of a workshop, RECOFTC Report 11 Bangkok Jan 27-29, 1993 PP 17-26.

FAO, (1991). Report of the eleventh session of the FAO Regional Commission on Farm Management for Asia and East Asia 3-6 December, Kathmandu.

FAO, (1996). *Asia- Pacific Agroforestry Profiles*: Second Edition. Kappleman. R. Chun

Hammet, A.L, (1993). *Non- timber forest products: Profit and Panacea*. In Edwards M. David et al (eds.) Focus on Jaributi Proceeding of the non-timber forest products seminar Kathmandu on 12 May 1993. FRCS occasional paper 2/93.

Hertog W.D, (1995). *Trees and People in Balance: Forest Utilization in Salyan District* SNV Nepal.

IFAD, (1999). *Securing Livelihoods of Indigenous and Marginal Upland People Through Sustainable Management of Farm and Forest Resources*. IFAD Proposed Special Programme For Asia. Working Paper Presented at the Workshop Organized in AIT, Bangkok, April 1999.

- Jackson, W.J., Nurse M.C. and Chhetri R.B. (1993). *High altitude forest of the middle hills: can they be managed as community forest?* Banko Jankari Vol.4, No 1 PP20-23 March 1993. Kathmandu Nepal.
- K. Lai; Durst, P.B. and Naewboonnien J.(eds.); Asian Pacific Agroforestry Network. Jackson W. J. and Ingles A. W. (1994). *Developing Rural Communities And Conserving The Biodiversity of Nepal's Forest Through Community Forestry*. In Wood et al. (eds.); Community Development And Conservation Of Forest Biodiversity Through Community Forestry: Proceeding of a seminar RECOFTC Report 12. Bangkok Thailand October 26-28, 1994.PP 115-135.
- Karki S, (1996). *Investigating Non-timber Forest Products (NTFPs) Opportunity in Nepal*. Nepal Australia Community Forestry Project -PP 16.
- Lundgren, Bjorn, (1982). Cited by Peter A.Huxley (1984), Education for Agroforestry. In Jackson J.K. (eds) *Social, Economic, and Institutional Aspects of Agroforestry*: The United Nations University, 1984.
- Lal J. B, (1989). *India's Forests Myth and Reality*, Natraj Publisher's Deharadun India.
- Michon G. and Foresta H. D, (1996). *Agroforests as an alternative to pure plantations for the domestication and commercialization of NTFPs*. In R.R.B. Leakely, A.B. Temu. M. Melynk and Vantommm P (eds.) 1996. Non-wood Forest Products 9. Domestication and Commercialization of non-timber forest products in agroforestry system, Proceeding of an International Conference held in Nairobi Kenya 19-23 February 1996. The Food and Agriculture Organization of the United Nations Rome.
- Messerschmidt, D. A. and Hammett A. L, (1993). *Indigenous knowledge of alternative forest resources extracting and marketing: significance for community planning and management*, Banko Jankari Vol. 4, PP 32-36 March 1993, Kathmandu Nepal.
- Mahat, T.B.S., Griffen D.M. and Shepherd, K.R.(1987). Human impact of some forest of the Middle Hills Nepal; *Forest in the subsistence economy of Sindhupalchok and Kabhre planchok*. Mountain Research and Development vol.7No1, 1987 pp53-70.
- Metz, J.J, (1994). *Forest product use at an Upper Elevation Village in Nepal*. Environmentak Management, Vol.18. No 3, pp 371-390.
- Maharjan M.R, (1994). *Chariot Cultivation in Community Forest*. Project Report B/NUKCFP/13.

- Maharjan M.R, (1995). *Income generation through NTFPs in community forestry case study from the Koshi Hills*. Paper presented at RECOFTC Regional Seminar, Income Generation through Community Forestry, 18-20 October 1995, Bangkok, Thailand. 10p.
- Malla,S.B. et al. (1995). *Minor Forest Products (NTFPs) of Nepal: General Status and Trade*. FRIs Project Paper No.4 HMG/FINNIDA 27PP
- NRA, (1994). *Nepal District Profile*. Kalikasthan, Kathmandu Nepal.
- Neupane.R.P. (1995). A study on the Development of Agroforestry System in the Hills of Ramechhap, Nepal: A sustainable resource Perspective, AE-95-46 C.2 *Masters Thesis*. Thailand
- NSAC, (1998). *Nepal Human Development Report*, South Asia Center (SAC). Kathmandu Nepal.
- O.P.Behari, (1994). *Marketing of Minor Forest Produce-An overview*. Agricultural Marketing. A national Level Quarterly Journal on Agricultural marketing Vol. XXXVII, No.1 PP 12-23 April- June. Directorate of Marketing and Inspection Ministry of Rural Development Government of India.
- Oslen C.S.,(1997). Ph.D. dissertation, *Commercial Non- timber forestry in Central Nepal: Emerging Themes and Priorities*. Royal Veterinary and Agricultural University Denmark.
- Pierce,J.T, (1990). *The food Resource: Themes in Resource management*, Longman Group U.K., John Wiley and Sons, New York, P-199.
- Poffenberger Mark, (1994). *The importance of sustainability, effectiveness and equity in Community Management*. In Wood Henry and Mellink H. H.Willem (eds.); Sustainable And Effectiveness Management systems For Community Forestry Proceeding A Workshop RECOFTC Report: 9 Bangkok, Thailand January 1992, PP13-21.
- Palit.S.(1997).*Comparative Analysis of Policy and Institutional Dimensions of Community Forestry in India and Nepal*. International Center for Integrated Mountain Development Kathmandu Nepal.
- Raintree, J. B. (1991). *Socio-economic attributes of tree and tree planting practices*, FAO, Rome, 1991. PP 7-9.
- Singh,R. V.(1994).*Participatory Management of Non-Degraded Forests for Sustainable Production of Non-Timber Forest Products*. International Conference on Participatory Forest Management Enabling Environment Calcutta, December 1994. Organized jointly by IBRD and RDC, IIT Kharagpur India.

Shrestha, Bijaya, (1996). *Poverty in Small Farms*, APROSC Kathmandu Nepal.

Sharma, P. D. and Minhas, (1993). *Land use and Bio-physical Environment of Kinnaur District*, Himanchal Pradesh India, Mountain Research and Development, Vol. 13 No. 1 UNUIMS, California, USA, P-41.

Sharma, P, (1996). *Non-wood Forest Products an Integrated Mountain Development Observation from Nepal*. Business Seminar on Medicinal Herbs, Essential Oils and other Non-timber Forest Products, Held in Kathmandu ; December 1996 DEG/NGCCI 11PP.

South Asian Association for Regional Cooperation (SAARC, 1991). Report of the Independent South Asia Commission on Poverty Alleviation, Kathmandu Nepal.

Saxena, N.C. and Gulati Mineesh, (1993). *Forest management and recent policichanges in India*. In Warner Katherine and Wood Henry (eds.); Policy and legislation in community forestry, proceeding of a workshop Bangkok jan. 27-29 1993. PP 121-128.

S.P.Sah and I.C.Dutta (1996). *Inventory and future management strategies of multi purpose tree and herb species for non-timber forest products Nepal*. In R.R.B. Leakely, A.B. Temu. M. Melynk and Vantommm (eds.); Domestication and Commercialization of non-timber forest products in agroforestry system, FAO Rome 1996.

Thapa, G.B. and K.E. Weber, (1990). *Managing Mountain Watersheds, Upper Pokhara Valley, Nepal*. Development of Human Settlement Development, AIT, Bangkok, Thailand. PP 22-39.

Thapa, G. B. and K. E. Weber, (1993). *Private Forestry around Urban Center: A Study in The Upper Pokhara Valley, Nepal*. Human Settlement Program, AIT Bangkok, Thailand. PP22-39.

Frank Taylor, Staley M. Mateke and Karen J. Butterworth, (1996). *A holistic approach to the domestication and commercialization of non-timber forest products* In R.R.B. Leakely, A.B. Temu. M. Melynk and Vantommm (eds.); Domestication and Commercialization of non-timber forest products in agroforestry system, FAO Rome 1996.

World Bank, (1991). *Nepal Poverty and Incomes*, A joint by World Bank and UNDP. The World Bank Washington D. C.

World Bank, (1990). *World Development Report (WDR, 1990)*. The World Bank Washington D. C.

Appendix A: Supplementary Tables

Table A.1: Land Holding Size of Collectors

Farm size category (In ropani)	Average land (Ropani) / collectors			
	Management Systems			
	Uncontrolled		Controlled	
	f	Percent	f	percent
< 5 Marginal	3	16.7	13	31.0
6- 11 Small	6	33.3	9	21.4
10- 19 Medium	4	22.2	14	33.3
>20 Large	5	27.8	6	14.3
Total	18	100.0	42	100.0

Source: Field Survey, 1999

f = Frequency of respondents

20 ropani = 1 hectare; 1 ropani = 0.05 hectare

Table A.2: Engaged Labor Force on NTFP Collection

Collectors	Mean	Standard deviation
Controlled	6.3810	3.8947
Uncontrolled	4.2778	2.1900

Source: Field Survey, 1999

Table A.3: Level of availability of NTFP

Level of availability of NTFP	5 Years Ago		Now	
	No of HH	Percent	No. of HH	Percent
Low	18	30.0	5	8.33
Medium	29	48.33	40	66.66
Plenty	13	21.66	15	25.0
Total	60	100.0	60	100.0

HH = Households

Source: household Survey, 1999

Appendix: B

Coordination Schema

Promoting Non-Timber Forest Products in the Hills of Nepal

Parameters	Complex Variables	Simple Variables	Values	Source of Information
Bio-physical aspect	Topography	Hill slopes	Name	Observation
	Climate	Valley	Value	
	Soil	Temperature Precipitation Land capability	Amount Types	Topographic map Land capability map
	Natural resources	Soil	Type	Soil map
		Rivers and streams Vegetation	Number, type, condition	Observation Documents.
Social aspect	Ideographic information	Gender Age Education Occupation	M/F Years Level (s) Types	Household Survey " " "
	Household Composition	HH size Gender Age structure Education Occupation Employment	Number " " "	" " "
Land holding	Type	<u>Gharbari</u> <u>Bari</u> <u>Khet</u> <u>Kharbari</u> Marginal (<u>Parti</u>)	Area	Household Survey
		Land fragmentation	No. of plots	"
	Land Tenure	Types of Ownership	Area	
	Land Use	Field crops Fruits Khar <u>Bari</u> terraces <u>Khet</u> terraces	Area	" "
		Marginal Bari land (abandoned terraces) <u>Parti</u> , Terrace edges	"	"

Parameters	Complex Variables	Simple Variables	Values	Source of Information
Crop Production	Cereal Crops	Rice, maize, millet, wheat, legumes, other Sales	Area and yield Quantity sold	HH Survey " "
	Cash Crops	Vegetables, Potato, Ginger, Pulses, other Sales	Area, Production Quantity sold	"
	Fruits	Type	Production	"
Livestock	Types	Cattle, Buffalo, Goats, Pig, Poultry	Number	HH Survey
	Production	Dairy products Livestock heads	Amount	" "
	Sale	Animal, meat, eggs,	Amount	"
Nonfarming activities	Activities	Business Service Pension Remittances Others	Amount	"

Parameters	Complex variable	Simple variable	Values	Information source
NTFP Practices: Private Land	Awareness	commercial value of NTFP	Yes/No Listing	HH Survey
	Trees	Species Products	No. of Trees Area Amount	"
	Shrubs and Grasses production	Species, Products Area	Amount	"/RRA
	NTFP Sale	Products sold Amount sold Earnings	Yes/No Real value Real value	HH Survey
	HHconsumpt.	Products	Yes/No,	"
	Input used	Manure, Mulching, Equipment Labor	Amount	HH Survey
	NTFP management and Production	Labor used for: collection, production, harvesting Seedling pdn Land preparatn. Planting	Amount	HH Survey
	Perception of domestication of additional NTFP species	Willingness to domesticate	Yes/No	"
	Problems encountered in domestication of NTF species	Technical, marketing of products, Other	Yes/No	"

Parameters	Complex variable	Simple variable	Values	Information source
NTFP Practices: Community/Common Land	Community Forest	Found, Collected	Species Amount	HH Survey
	VDC/National Forest	Found, Collected	Species Amount	"
	Scrub Land	Found, Collected	Species Amount	"
	Collection /harvesting system	Open, controlled-rules and regulations	Yes/ No	"
	Management problems	Rights of harvest Community conflict Cost sharing	Yes/No " "	" RRA
NTFPs Marketing	Marketing Channel	Traders at market center Middlemen Itinerant traders Direct to market center	Yes/No	RRA
	Location of the markets where products are sold	Market	Name, time taken to transport products	HH Survey/RRA
	Possible marketable products	Fruits, Fiber, Seeds, Bark, Roots, Leaves and, Medicinal herbs and Others	Yes/No	HH Survey/RRA
	Transportation	Transportation, Costs	Mode, Cost of transportation	HH Survey/RRA
	Problems in marketing the NTFPs	Storage Low price Transportation Other	Yes/No	"

Parameters	Complex Variables	Simple Variables	Values	Source of Information
Institutional role in NTFP promotion	Extension program	Extension worker (EW) Visits by EW Observation tour Demonstration Sites, Extension materials	Yes/No Places, species, types and numbers	Household Survey Observation
	Training	Types: NTFP, Forest	Number by men and women trained	Household Survey
	Method of communication	Received by: Mass, Group Individual	Yes/No	RRA session
	Type of Institutions	NGO/ FUG local group	Name and number,	RRA, HH Survey
	Role in NTFP promotion	Memberships in organization Awareness NGO support Training and marketing	Number, Male and Female Yes/No	Group Discussion, HH Survey

APPENDIX - C

Questionnaire for Household Survey

Name of village development committee:

Date :

Village:

Ward no:.....

Household sample no:

Interviewer:

Respondents' Ideographic data

Name of the respondent:

Age:

Occupation:

Education:

A. Demographic Information

Q. No. A. 1. Household size, sex composition and age structure

Age group	Male	Female
Below 5		
5 - 10		
10 - 59		
60 and above		
Total		

Q.No. A. 2. Educational status of household members above 5 years (number)

Just literate	Primary school	Secondary School	Higher Education	Illiterate

Q.No.A.3. Occupation of household members above 10 years (Number of persons).

Occupation	Female	Male
Agriculture		
Agriculture and Service		
Agriculture and business		
Business/ Tea shops		
Public services/Teaching		
Private Services/ Construction work		
Cottage industry		
Study		
Wage Labor		
Without any occupation		
Other(Specify)		

Q.No.A. 4. Non farm earnings during last agricultural year

Sources	Earnings Amount

Sources: 1. Business/Trade 2. Industry 3. Service 4. Teaching
5. Military/police services 6. Study 7. Construction 8. Wage labor 9. Pension 10. Remittances.

B. Land Holding Size and Tenure Status

Q.No.B.1 Land owned or used by the household.

Record the response in the table below (Area in ropani)

Land Uses	LowLand (<u>khet</u>)		Upland (Bari)	<u>Kharbari</u>	Forest	<u>Parti</u>
	Irrigated	Rain-fed				
1 Owner operated						
2 Rented in						
3 Rented out						
4 Others.....(Specify)						
Total						

Q. No.B.2 Do you have some land, which is not in use and could be used for planting NTFP species? Yes [] (continue Q.No. B.3No) [] (Go to Q. No. C.1)

Q. No. B.3 If yes, how many more NTF species can be planted on such land (terrace risers, non-cultivated inclusions) without decreasing your present level of crop yield Please, mention in number of plants and # of Kanlas as appropriate.

Types	Number/Area	Place of planting
Fruit trees/ shrubs		
Fodder trees / shrubs		
Medicinal shrubs		
Grasses (# of Kanlas left without)		
Others.....(Specify)		

C. Farm activities

Crop production:

Q.No.C.1 What Crops did you cultivate last agriculture year?(Baisakh 2055 - Chaitra 2055)

Q.No. C.2 How much area did each crop cover?

Q.No. C.3 How much quantity was produced?

Read out the listed item and record the response as appropriate

Q. N. C.1 Crops	Q. C.2 Area Covered	Q. N. C.3 qty. produced
Paddy		
Maize		
Wheat		
Millet		
Potato		
Kidneybean		
Horsebean		
Soybean		
Vegetables		
Others.....(Specify)		

Note: Area = in ropani Production = in muri

Please, record the selling and buying prices of the major crops separately.

Iv. No.....

Q. No. C.4 How long the field crop production can meet your household food demand?

3 months	6 months	9 months	whole year

Q.No.C.5 What fruits did you produce and sell last year (Baisakh 2054-Chaitra 2054)

Fruits	Produced	Sold (Amount)

D. Livestock

.Q. No. D.1 Livestock raised and milk production

Livestock	No.	Annual milk prodn. (<u>Pathi</u>) (Buffalo and cattle only)
Cattle		
Buffalo		
Goat		
Pig		
Sheep		
Poultry		
Others.....(Specify)		

Iv. No.....

Q.No. D. 2. What livestock and livestock products did you sell last year and how much did you earn from this?

Record the response

Q. D.3 Livestock / Livestock products	Earnings (Rs.)
1. Sale of animals (cow, buffalo, goats, sheep, pigs)	
1. Fresh milk	
2. Milk products	
3. Bullock rented out	
4. Manure	
5. Eggs and Chickens	
6. Meat selling	
7. Others(Specify)	
Total:	

E. Non-timber forest species and products: Private Land

Q. No.E.1 please provide names, types, quantity of NTFP species which are collected from the private land.

[illegible]

Q.No.E.2 Did you plant some of the NTFP species?

Yes []

Continue Q. No. E. 3

No [] Go to Q. No. E. 8

Q. No.E. 3 Where did you get seeds and seedlings from?

.....

.....

Q.No. E.4 Why did you plant NTFP species?

1.....

2.....

3.....

Q. No.E 5 Who planted NTFP?

Male []

Female []

Q. No.E.6 Are you willing to plant additional NTFP species in plots of land that you consider relatively unsuitable for field crops?

Yes []

Continue Q. No.E.7

No [] Go to Q. No. E. 10

Q. No. E.7 What are the species that you want to plant?

.....

.....

Q. No. E.8 Why did not you domesticate those species so far?

.....

.....

Q. No.E.9. If no why ? Give reasons:

1.....

2.....

3.....

4.....

5.....

Q. No.E.10 Could you please mention the name and reasons of species which can not be domesticated?

Species	Reasons

Q. No.E.11 Did you believe that NTFP are more profitable than field crops?

Yes [] No [] Go to Q. No. E.16
Continue Q. No. E.12

Q. No. E.12 Is it possible to shift from crop to NTFP cultivation?

Yes [] Continue Q. No.13 No [] Go to Q. No. E. 14

Q. No. E. 13 If yes, why so far you have not done so?

.....
.....
.....

Q. No. E. 14 If no, why?

.....
.....
.....

Q. No. E. 15 What policy changes of the government will motivate farmers to plant more NTFP?
(Please suggests the desired policies to promote planting)

Community/Common land:

Q. No.E. 16 Please mention NTFP species and products found in the community forest?

[illegible]

Note: Products: 1= roots, 2= Stems, 3= leaves; 4=bark; 5= Gum; 6=Resin
7.Seeds 8. Fruits

Q. No. E.17 Did you collect some of the NTFP last year? (Baisakh 2054 -Chaitra 2054)

Yes [] Continue Q. No.16

No [] Go to Q. No 20

Q. No.E.18 What were the specific products that you collected?

Q. No. E.19 How much did you collect?

Q. No.E. 20 Please mention the NTFP species and products found in National/VDC forest?

[illegible]

Note: Products: 1= roots, 2= Stems, 3= leaves; 4=bark; 5= Gum; 6=Resin 7.Seeds

8. Fruits

Iv. No.....

Q. No. E.21 Did you collect some of the NTFP last year? (Baisakh 2054 –Chaitra 2054)

Yes [] Continue Q. No. E.20

No [] Go to Q. No.E. 24

Q. No.E.22 What were the specific products that you collected?

Q. No. E.23 How much did you collect?

Q. No.E. 24 Please mention the NTFP species and products found in scrub land?

[illegible]

Note: Products: 1= roots, 2= Stems, 3= leaves; 4=bark; 5= Gum; 6=Resin 7.Seeds
8. Fruits

Iv. No.....

Q. No. E.25 Did you collect some of the NTFP last year? (Baisakh 2054 – Chaitra 2054)

Yes [] Continue Q. No.24 No [] Go to Q. No. E.31

Q. No.E.26 What were the specific products that you collected?

Q. No. E.27 How much did you collect?

Q. No. E.28 How much distance you have to walk for the NTFP collection?

Days [] Hours [] Minute []

Q. No. E. 29 Who collects NTFP mostly?

Adult male [] Adult female [] Children []

Q. No E. 30 Approximately how much time did you spent on NTFP collection last year?

Hours [] Days []

Q. No. E.31 Where and whom did you sale your NTFP?

Items	Amount	Place	Middlemen	Traders	Income

Q. No. E.32 How long you need to store NTFP before taking to the market?

Products

Days

1.....

2.....

3.....

Q. No E. 33 Do you have to process them before marketing?

Yes [] Continue Q. No. E.34

No [] Go to Q. No. E.35

Q. No E. 34 If yes what do you do?

Product	Processing

Q. No. E 35 Did you consume some of the NTFP collected from forest and scrub-land ?

Yes [] Continue Q. No. E. 36

No [] Go to Q. No. E.37

Q. No. E.36 If yes, how much did you consume/use?

Product	Amount consumed/used kg/ <u>Bhari</u>

Q.No E37 What is the differences in availability of NTFPs five years before and now a days?

Today

Availability- Plenty [] Medium []
Low []

Travel Distance- Hour [] Minute []
Day []

Before 5years

Plenty [], Medium [], Low []

Hour [], Minute [], Day []

Iv. No.

No of species- Plenty[] Medium[] Plenty [], Medium [], Low []
Low []

Q.No.E.38 Do you feel or experienced that some of NTFP available in the forest before 10-15 years have been disappeared now?

Yes [] Continue Q. No. E.39

No [] Go to the Q. No F1.1

Q. E. 39 If yes can you give the name (s)

1.

2.

3.

Q.No.E 40 Can you mention the names of some NTFP in the forest/scrub land which are about to disappear, in your opinion?

1.

2.

3.

4.

5.

Q. No E.41 Do you pay tax for collection NTFP? If yes how much?

Products	Tax paid (Cash/Kind)

F. Institutional

Q. No. I.1 Are you or your household members affiliated with any organization ?

Yes [] Continue Q. No. I.2;

No. []

Q. No. I.2 If yes, what type?

NGO [] Farmer's group []

FUG []

CDC []

Saving and Credit group []

Women's group []

(CDC= Community Development Committee; FUG= Forest Users Group)

Q.No I 1.3 Whether Extension worker visit your village?

Yes [] Continue Q. No.I 1.4

No [] Go to Q. No.I 1.8

Q. No. I. 1.4 What kind of support services you got from extension worker?

1.
2.
3.

Q. No. I. 1.5 Have you ever been to district forestry extension office for their service?

.....

Q. No. I 1.6 Whether they informed about the NTFP ?

.....

Q. No.I 1.7 What type extension service do you need to promote NTFP?

.....

.....

Q. No I 1.8 Have you are any one of your HH member obtained training on forestry, agroforstry and NTFP ?

Yes [] Continue Q. No. I 1.9

No [] Go to Q. No I. 1.10

Q. No I 1.9 If yes, please mention the details of training.

Type	Duration(Days)	Organization.	Participated by	
			male	female

Q. No. I.1.10 Do you need any such training ?

Yes []

No []

If yes, please mention the type.

Iv. No.....

1.....

2.....

3.....

Q. No. I. 1.11 Please suggest what should be done to promote NTFP ?

1.....

2.....

3.....

4.....

5.....

Appendix D: Identification and Use of NTFPs

1. Chiraito

Botanical Name: *Swerita chirata*

Distribution: 1200-3000 m. subtropical to sub alpine

Habitat: Cold, Moist and Open ground

Harvested part: Whole plant

Harvest season: October to November

Use: Medicine

This is one of the most collected plants on the sub-alpine region of Nepal. The plant is very bitter, a febrifuse used for stomach complaint anthelmintic and as a tonic.

2. Majito

Botanical Name: *Rubia manjith*

Distribution: 2100- 3000m. temprate to subalpine

Habitat: Cold and Moist place

Harvested part: Rhizome

Use: Medicine and Red dye

3. Nagbeli

Botanical Name: *Lycopodium calvatum*

Distribution: 1800-3600m. subtropical to subalpine

Habitat: Open ground

Harvested part: Spores

Harvest season: August to September

Use: Medicine

It is very common in pine forest. The spores to cover medicine in pill form to stop them sticking together.

4.Sugandhawal

Botanical Name: *Valeriana wallichii*

Distribution: 1500-2500m.sub tropical to temperate

Habitat: Cold, Moist and Shady place

Harvested part: Rhizome

Harvest season: October to November

Use: Medicine

Common in humid forest the rhizomes used in medicinal purpose. It contains alkaloids and steroids. It is used to treat nervous illness.

Pakhanved

Botanical Name: *Bergenia ligulata*

Distribution: 2100-3000m. temperate to sub alpine

Habitat: Cold and Moist place

Harvested part: Rhizome

Harvest season: October to December

Use: Medicine

Rhizomes are useful for fever, diarrhoea and pulmonary problem.

Source:MOFSC,(1977).

Appendix E: Photographic Essay

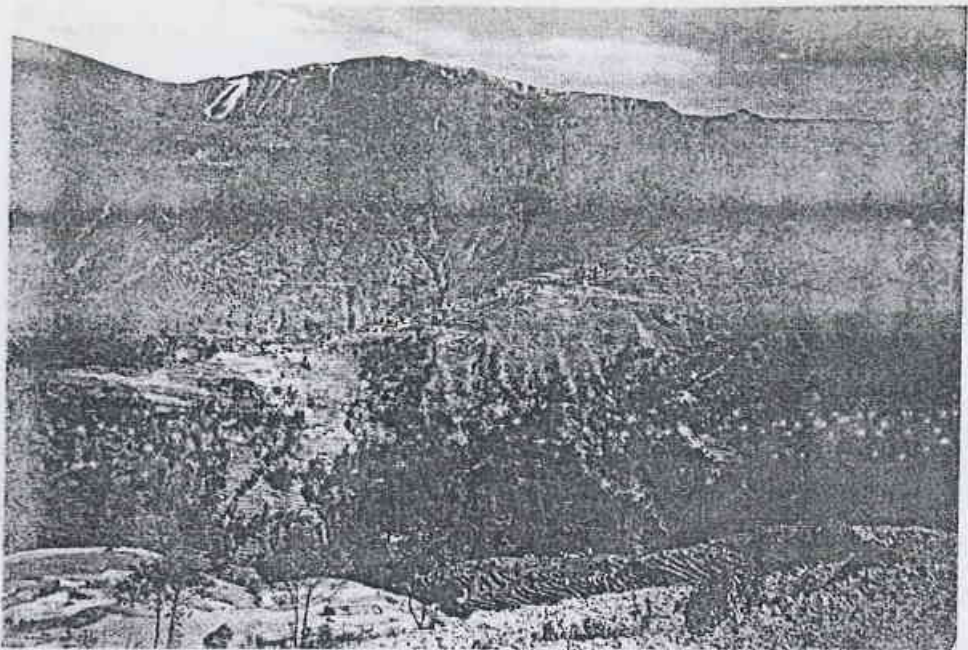


Plate 1
Study Area: Degraded National Forest

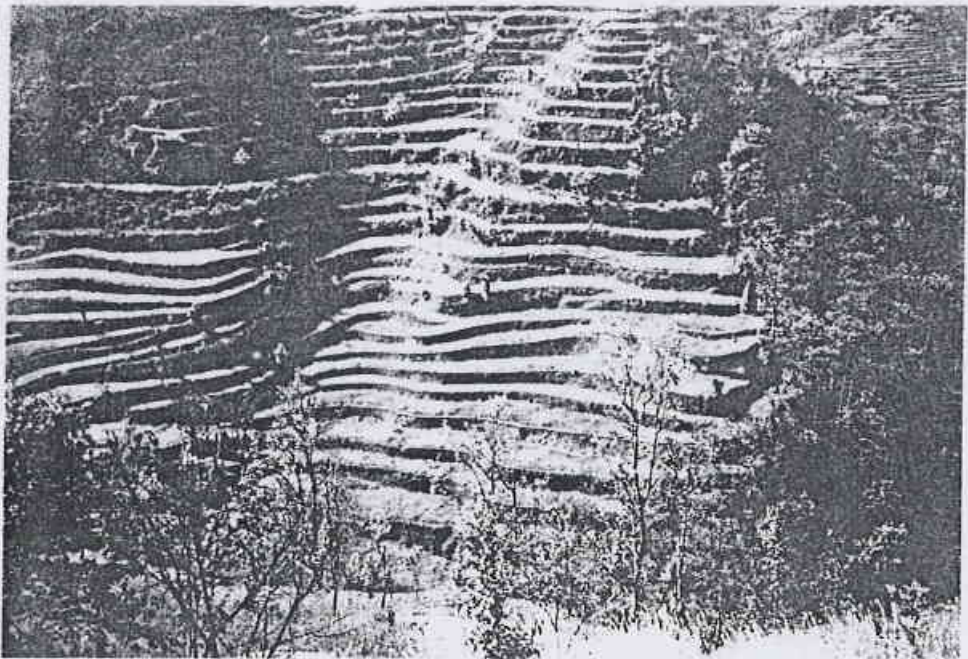


Plate 2
Typical Mid Hill Terraces

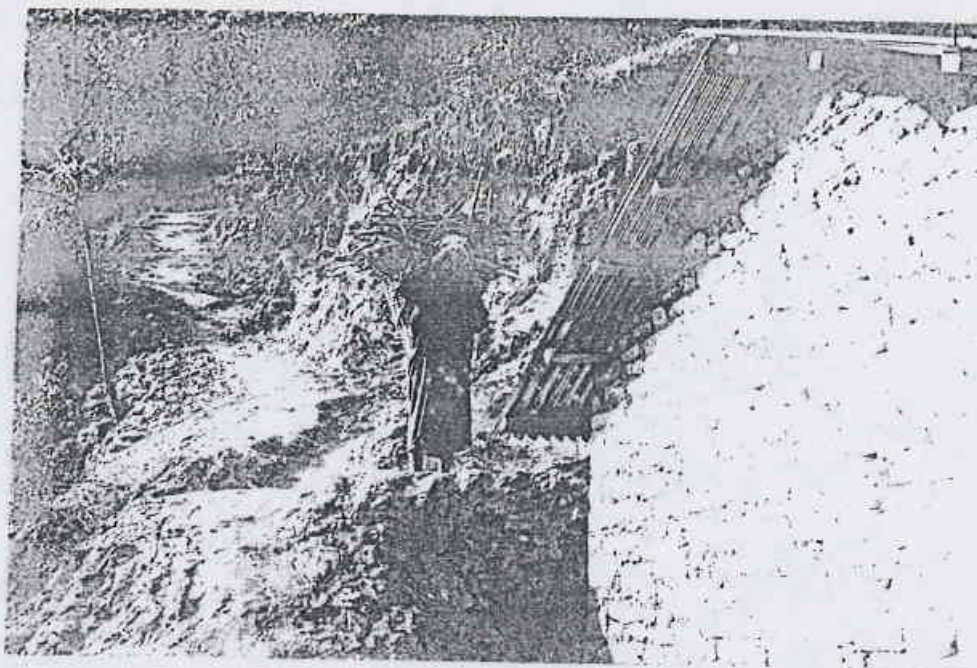


Plate 3

Fuelwood Collection From C.F. a Women's Domain

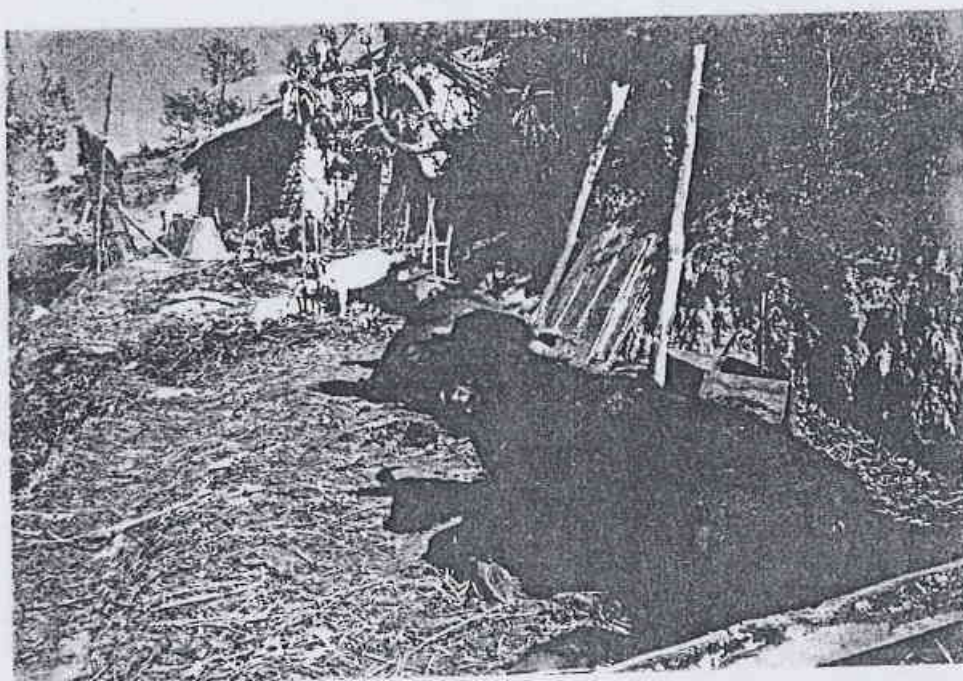


Plate 4

Livestock an Integral Part of the Hill farming System

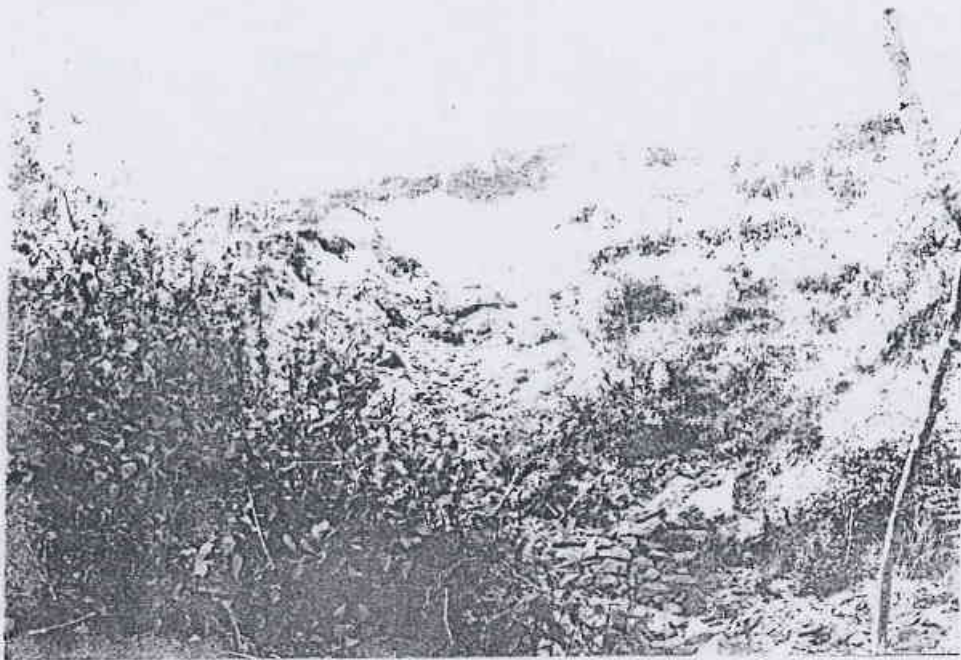


Plate 5

Eroded Gullies: NTFP can Reconcile Conservation and Devt.



Plate 6

Community Managed Forest



Plate 7
Users Involvement in Thinning and Pruning



Plate 8
Chiraito Growing in Community Forest



Plate 9
Nagbeli growing in Community Forest

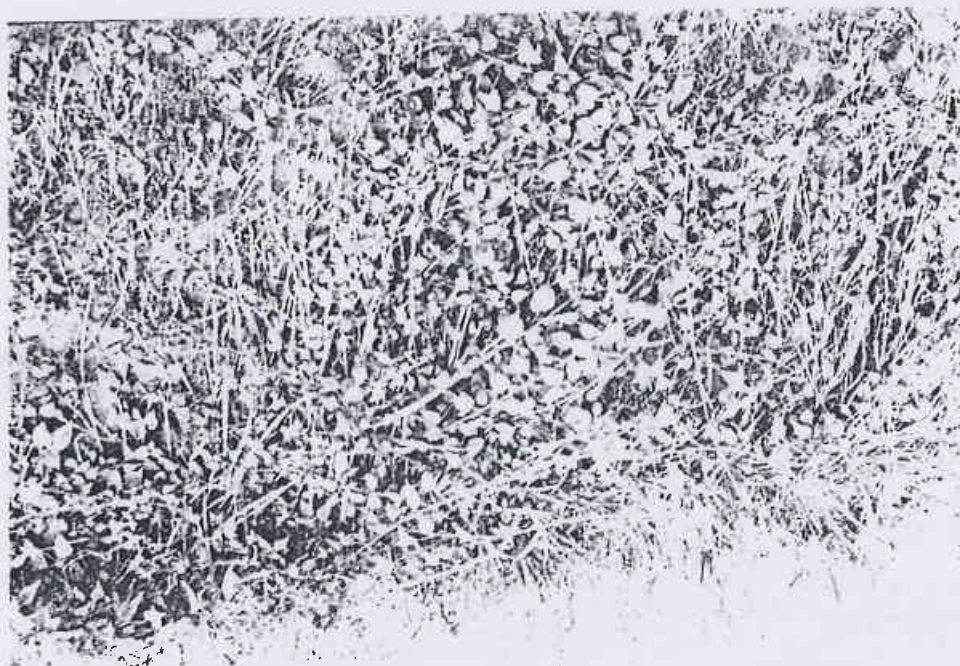


Plate 10
Majito Growing in Community Forest



Plate 11
NAF's Demonstration Nursery for NTEP Domestication



Plate 12
Poor Storage Facilities

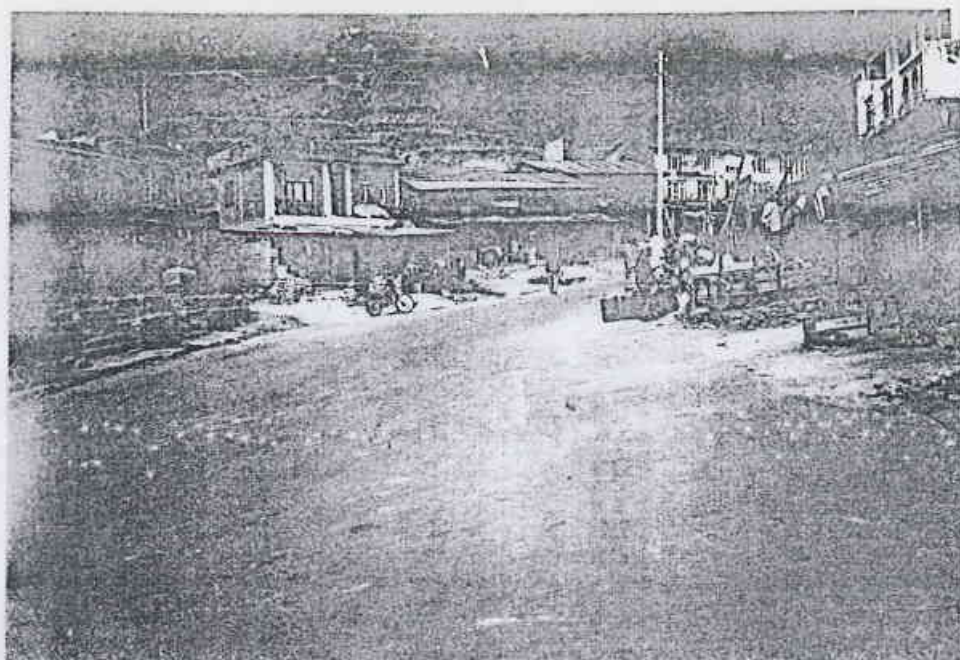


Plate 13
Local Market Center at Mudhe



Plate 14
NTFP selling in Street of Kathmandu

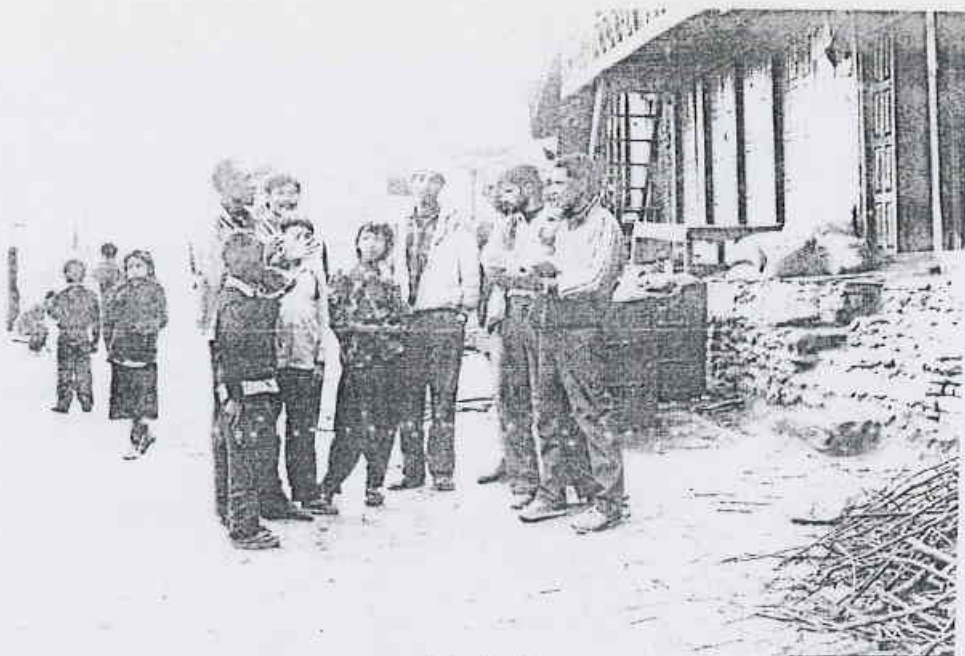


Plate 15
Researcher with NTFP Collectors



Plate 16
Researcher with Local Leaders



