Forest and Food Security of Indigenous People: A Case of Chepangs in Nepal

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Abstract

This study was conducted with the objective of analysing the role of forest plant resources in the food security of Chepangs, a highly marginalized indigenous nationality in Nepal. Shaktikhor Village Development Committee (VDC) in Chitwan district and Handikhola VDC in Makawanpur district were purposively selected as the study sites. A total of 120 households, 60 from each VDC were randomly selected for the purpose of household survey conducted using semi-structured interview structure. Relevant information was also collected through key informants' interview and group discussions. It was found that the average food self-sufficiency of the study community is 7.3 months, while 37.5% of the households are not able to meet the minimum daily calorie requirement of 2,344 cal/AE/day prescribed for the hills. Collection of forest products for consumption and sale forms an important coping strategy to overcome food self-insufficiency for 71.2% of the households. Wild tubers form the staple food of the Chepangs during the period of food shortages, and they play an important role in bridging the hunger gap when the stored food grains are depleted and new harvests are not yet available. Forests play an important role not only in the food security of the Chepang community, but also in the fulfilment of their food diversity and nutritional requirements. There is, thus, a need to exploit the potential of these wild foods so as to complement the staple food crops so that the food security situation of

the Chepang community can be improved.

1. Introduction

The Chepang people, some 0.23 percent of the total population, are one of the twelve highly marginalized indigenous nationalities[1] of Nepal. According to the population census 2001, the total Chepang population is 52,237 (CBS, 2003a). The majority of Chepangs inhabit scattered settlements nearby the forests, in remote, steep terrains, and inaccessible hills in the west of Makawanpur district, northeast of Chitwan district, southeast of Gorkha district, and south of Dhading district. The Chepangs are believed to have lived by hunting and gathering until the last 150 years as Brain Hodgson described them in his 1857 article 'On the Chepang and Kusunda Tribes of Nepal' as "living entirely upon wild fruit and the produce of the chase" (see Hodgson, 1874; p. 45). It is supposed that agriculture is comparatively a newer phenomenon for them, and they practiced *khoriya*[2] cultivation in the hills. Currently, they practice sedentary and subsistence rain-fed agriculture on marginal land and farming forms the mainstay of their livelihood. However, only a small percentage of Chepang households are fully self-sufficient. Food self-insufficiency and food insecurity are identified as the most serious issues in the Chepang livelihoods. They also depend on wage labouring, gathering forest products for self-consumption and for sale, and selling small livestock especially goats, pigs, chicken, selling honey, and agricultural products like blackgram, beans, mustard, ginger, and fresh vegetables for cash income. Most of their cash income is spent on procuring food. They also depend on other communities like Bahuns, Chhetris, and Newars for loans, which they pay back either by wage labouring or by selling the above-mentioned products.

Forest plays an important role in the livelihood of Chepangs to provide staple and supplemental foods, timber, firewood, fodder, litter, farm inputs, medicines, and commercial forest products that generate cash incomes. The contribution of forest in their food security is even more significant as they provide not only the staple foods that help to overcome the food shortages but also a number of dietary elements through supplemental food. Collection of forest products is important for the Chepangs as they are unable to obtain sufficient income from farming alone, and other non-farm income opportunities for earning are absent or very limited in their settlements. Furthermore, agriculture and livestock, which form the mainstay of their livelihood is also largely dependent upon forest resources. However, forest products often fail to receive significant monetary values as most of the products are used for self-consumption (e.g. wild tubers), or for the consumption of livestock (fodder, litter), and their economic valuation is often ignored (Maharjan and Khatri-Chhetri, 2006).

With this background, this paper aims to analyse the role of forest plant resources on the livelihood of Chepang community, particularly focusing on food security. It is composed of eight parts. The next section presents some of the findings from related literatures. The third section explains the conceptual framework of the paper. The fourth section describes the methodology. In the fifth section socio-economic characteristics of the study community is briefly discussed, while the sixth section discusses the situation of food self-sufficiency and food security of the community. The seventh section deals with the role of forest in food security of the Chepangs, and the last section concludes the paper.

2. Literature review

2.1. General aspects of the livelihood of Chepang community

Brian Hodgson was the first scholar to write about Chepangs in 1848 (see Hodgson, 1857). After more than 100 years, Bista mentioned about them in his book 'Peoples of Nepal' in 1967. After Bista, many anthropological studies

have been done in the Chepang community (Rai, 1985; Neis, 1989; Gurung, 1994a, 1994b, 1995; Riboli, 2000). Studies done by Gribnau et al. (1997), FORWARD (2001), and Bhattarai (2004) have contributed to understand the livelihoods of Chepang community from developmental aspects. This section of the paper will briefly discuss about the cultural aspects and livelihood issues of the Chepang community based on the available literatures.

The Chepangs came to be known as the *Prajas* (meaning King's subjects) according to the wishes of late King Birendra who visited Chepang areas in 1977. However, as the name *Praja* symbolizes subservience and dependency, the younger generations of the community have rejected the name *Praja* and prefer the original name Chepang (Bhattarai, 1999; SNV, 2008).

Chepangs have their own language, *Chepang bhasa* (meaning language), which is of Tibeto-Burman origin. They also have their own spiritual beliefs and their religion is called *prakriti dharma* (meaning religion of nature). The Chepangs worship all the elements of nature like trees, river, stones, land, and so on. However, in the past, due to dominant Hindu ethos of the rulers and elites in Nepal, all the indigenous people who had their own tradition beliefs were counted under Hindus. Due to the influence of Hindu culture, they celebrate many Hindu festivals like *Dashain, Tihar, Maghe Sankranti,* and *Sawane Sankranti.* They also have their own typical festivals like *Nwagi* (celebration of new harvest), *Kulayan puja* (celebration of the clan), *Aitabare puja* (celebration performed to prevent natural disasters), and *Bhume puja* (celebration of the mother earth). The religious beliefs and practices of Chepang community has been studied in detail by Gurung (1994b and 1995). After 1981, a significant population of the Chepangs have converted to Christianity, which was first of all introduced by a linguist from New Zealand in 1981 in Maisirang village of Makwanpur district (Bhattarai, 1999, 2004). Spread of Christianity among the Chepangs has two aspects. On the positive side, Christian missionaries have provided various educational opportunities for the Chepang children and health facilities in the community. However, on the slightly negative side, the people are no longer continuing their traditional festivals, practices like Shamanism, and local healing by use of medicinal plants.

As already stated, the Chepangs are believers of Shamanism as well. The Chepang shaman called *Pande* (or *Jhakri*) plays an important role in a number of religious and social activities of the Chepangs, such as name-giving ceremony for a newborn baby, worship of a clan diety, funeral, and *Nwagi*. *Pande* is also a curer of illness. During the process of traditional healing, *Pande* propitiates deities and ancestors while beating a one-sided drum with a crooked stick and chanting *mantras* (magical spells). Riboli (2000) has conducted an in-depth study of Shamanism among the Chepangs.

Chepang settlements are often geographically isolated owing to difficult topography. Furthermore, lack of physical infrastructures aggravates the isolation. Although the Chepang settlements are surrounded by major highways of Nepal, feeder roads joining the Chepang settlements to the highways are very few. Similarly, other facilities like schools, health centers, and irrigation canals are available in almost negligible numbers.

Food self-insufficiency and food insecurity is the most prominent issue in the livelihoods of Chepang community. Only a small percentage of Chepang households are fully self-sufficient. Thus they adopt multi-pronged livelihood strategies like wage labor, collection of forest products, rearing small livestocks, selling bamboo handicrafts, and selling agricultural and forest products (Gurung, 1995; Gribnau et al., 1997; Bhattarai, 1999; FORWARD, 2001). Insecure land tenure and lack of possession of citizenship certificates is important issue for most of the Chepangs (Aryal and Kerkhoff, 2008). Furthermore, unfavorable forest policies that restrict their access to forest resources have further threatened their livelihoods (Limbu, 2005; Uprety and Adhikari, 2006). Related findings from previous studies regarding socio-economic status, food self-sufficiency, and livelihood strategies will be stated in the discussion part where the findings of this study will be compared with the findings from previous studies. Review of some relevant forest policies in Nepal that have restricted the access of indigenous peoples to forests have been done in the following section.

2.2. A brief history of state policies and Acts restricting indigenous peoples' access to forests

The indigenous communities are forest-dependent peoples, who have been not only been utilizing the forest resources for their livelihood, but also managing these resources in their own ways. However a highly controlled regime adopted by the state during the late 50s to early 70s has put a set back in this long practiced tradition. The Private Forest Nationalization Act 1957 included under the government ownership all the forests that had been used from the past under the traditional rights as well as wastelands and uncultivated lands lying within its boundary (MLJ, 1999a). This Act had many adverse impacts on the indigenous people as well as the forests (Joshi, 1993; Tamang and Singh, 2004). The Chepangs did not have land titles and farmed *khoriya* in the midst of the forests. The nationalization took away all these resources, and converted them as state property whose use was restricted. As the people now lost ownership of the forest, the resources were used unsustainably and over-exploited. Furthermore, Forest Act of 1961, Forest Protection Special Act of 1968, and the Forest Products (Sale and Distribution) Rules of 1971 all aimed at preventing the common man from entering the forests (MFSC, 1988). These Acts did not recognize the age-old rights of the people over forests, pastures and other common property resources (Bhattarai, Regmi, and Adhikari, 2002).

From the late 70s, emphasis has been given on participatory approach in the management of the forest resources. The enactment of Community forestry legislation 1978 empowered the communities to manage the adjoining forest resources to meet their needs. However, some legal and policy flaws still exist (Bhattarai, Regmi, and Adhikari, 2002). Though community forestry concept has helped the community by the process of handover of the forests to existing users, it gives no concerns on the exclusive rights of the indigenous peoples using the forest. Stavenhagen (2007) reports that despite international praise for its conservation efforts, Nepal's community forests have forced many indigenous communities from their traditional lands. Two distinct types of exclusion due to community management of forests are clearly visible among the Chepangs. Firstly, they are not included in the forest user groups. Even if they are included in the groups, they are excluded from the decision-making, and from equitable sharing of benefits accruing from community forest management. Secondly, these landless forest-dependent people suffer the most under community forestry as their traditional use rights are not recognized. They rely on naturally occurring edible non-timber forest products in the forests. Community forests however do not address such need of these groups (Poudel et al., 2003). In addition, several studies show that the land and houses of Chepang communities have been encroached by community forestry thereby leaving them landless and homeless (see Mulyankan, 2003; Limbu, 2005; Aryal and Kerkhoff, 2008).

Forest Act 1993 included waste or uncultivated lands or unregistered lands surrounded by the forest or situated near the adjoining forests as well as paths, and all water bodies inside the forest under 'National Forests' (MFSC, 1995). As this Act had no category of property rights that recognized customary use, Chepangs lost the ownership of the land used for shifting cultivation (*khoriya*) thus negatively affecting their livelihoods (Upreti and Adhikari, 2006). There are many other provisions in the Act that goes against the livelihood of indigenous communities. In the name of protection of forests or its boundaries, section 4 of this Act permits the incorporation of any public or private land or any house built on that land within or adjoining the national forest. Any activity such as herding of animals or collection of fodder etc in such common property resources by the local people becomes illegal activity and hence may invite punishment (See section 49 of Forest Act 1993).

Leasehold forestry in Nepal was started in 1993 with the aim of helping the poorer sections of the society. Even though, leasehold forest program states that it gives priority to very poor households and disadvantaged ethnic groups, it is seen in practice that they have not treated indigenous peoples in special way. Furthermore, the government has converted the *khoriyas* cultivated by Chepangs into leasehold forestry (Bhattachan, 2000). This system does not allow cultivation of food crops in the forest area. As a result, the Chepangs are reluctant to join leasehold forestry programs because they do not have other alternative land for growing crops (Regmi, Albano and Kumar, 2008). This has not only

negatively affected the livelihood of majority of Chepangs but also an infringement of the traditional rights as the forest now is transferred to the government ownership.

Finally, establishment of protected areas like national parks and wildlife conservation has also restricted the access of indigenous peoples to forests. The national parks and other protected areas have been mainly established in the territories of the indigenous populations as a result of which these people were evicted from the park and resettled somewhere else. Padampur Resettlement Project is one of such project in Chitwan district, where people living nearby Royal Chitwan National Parks were resettled in Padampur. Several Chepang households were also relocated during the process (Tamang and Singh, 2004). This has caused the loss of traditional knowledge and thereby ethnic identity of indigenous peoples of Nepal. Section 4 of the National Parks and Wildlife Conservation Act 1973 prohibits entry inside the national parks and reserves without prior approval of entry in written form from the concerned authority. The Act does not provide opportunity for the people living near the national parks to collect and utilize NTFPs (MLJ, 1999b). This also goes against the favor of indigenous people. Samdup and Claeys (2007) reports that Chepangs of Handikhola in Makawanpur district used to collect brooms, asparagus, and other NTFPs from the forest to sell them at the local markets for their livelihoods. However, after the establishment of Parsa Wildlife Reserve, the activities were banned which made their livelihood very insecure in the absence of alternative livelihood sources. Thus state policies have failed to address the livelihood needs of the indigenous people.

2.3. Wild plants and the food security of indigenous people

While more than 3000 edible plant species are known to mankind, less than 30 species of crop plants contribute to more than 90% of the world calorie intake (Reddy et al., 2007), out of which many wild plants are utilized by rural populations around the world and they contribute substantially to household food security (Cooper et al., 1996). Such food forms an integral part of the daily diets of many poor rural households. It was found that in South Africa, the wild leafy vegetables were collected in abundance when the food crops were scarce (August to October). Thus, uncultivated plants are important sources of vegetables to fulfill the food shortages (Modi et al., 2006). Wild food plants played an important role in the household food security of the indigenous people living in various states of India (Reddy et al., 2007; Misra et al., 2008; Tiwari et al., 2010).

The contributions of the wild species to household food supply vary according to region and groups. In study done in rural Bangladesh village, Mazhar et al. (2007) reports that wild plants contribute 65% of food weight of very poor landless households and 34% of better-off households. Similarly, Sinha and Lakra (2005) studied the wild food plants consumed by five tribal groups in Orissa, India. The study reports that 80% of forest dwellers in Bihar, Orissa, Madhya Pradesh, West Bengal and Himachal Pradesh depend on forest for 25 to 50% of their annual food requirements. Jain (1963) reports that the tribals of Bastar in Madhya Pradesh of India draw half of their total food supplies from the edible products of forest. In another study by Foppes and Ketphanh (2004) in Lao PDR, it was reported that the forest plants contribute 50% of the food procured by the rural populations.

Wild foods are a source of important vitamins, mineral and other nutrients which complements the staple crops eaten by many rural communities. According to Foppes and Ketphanh (2004), forest foods are important source of micronutrients to the rural households in Lao PDR. They form the source of 40% calcium, 25% iron, and 40% of vitamin A and C. Modi et al. (2006) reports that wild vegetables like amaranthus, black jack, and water navel consumed by the indigenous people in South Africa contains more vitamins, iron and zinc compared to cultivated vegetables like cabbage and swiss chard. Sundriyal and Sundriyal (2003) reports that the underutilized edible plants in the Sikkim Himalayas of India are even more nutritious than some of the commercial fruits, and thus can play a major role in meeting the dietary requirements of the tribal populations living in the area.

Wild and uncultivated plants also form an important source of food for the rural populations in Nepal. Manandhar

(2002) in his book 'Plants and People of Nepal' has compiled the information gathered over 30 years of field visits, and documents 651 food plants utilized by 14 different ethnic groups of Nepal including the Chepangs. Pant et al. (2005) identified 83 species of wild edible plants utilized by the indigenous communities in Darchula district of Nepal. These communities rely largely on wild edible plants during food scarcity or famine. Bhattarai et al. (2009) reports that wild plants play an important role in both daily nutrition, and survival during times of famine for the indigenous people living in the mountainous Manang district of Nepal.

There are several studies that document the use of wild plants by the Chepang community in Nepal (Khan, 1997; Karki, 2001; Pandey, 2001; Manandhar, 2000; Dhakal, 2003) However, these studies are limited to documentation and inventory of the plants utilized by the community for various purposes. Rijal (2008a and 2008b) has done an analytical quantitative study about the use of wild plants by the Chepang community for medicinal purposes. The study identified 115 medicinal plant species used by the Chepangs. Furthermore, it was found that older generation possessed more indigenous knowledge than the younger generation, and the knowledge among the community was greater in homogenous Chepang community compared to heterogenous community. Aryal et al. (2007, 2009) explored the role of uncultivated plants in the livelihood of Chepang community in Dhusa of Dhading district. The studies report that the all the Chepang households used wild plants as food, although the quantity and forms of use varied among the households based on the differences in socio-economic status. It was found that 58% of the households used wild foods for more than 3.5 months per year. According to Gribnau et al. (2007), Chepangs derive 17% of annual household food availability and 15% of annual cash income from forest. Similary, according to FORWARD (2001) all Chepang households use forest products for their livelihood, however the contribution of forest products goes down from the poor households (42%) through medium (32%) to the rich households (20%). This shows that poorer Chepang households have higher degree of dependency on forest resources.

3. Conceptual framework

The process of procuring food among the rural households in general and Chepang households in particular have been conceptualized in figure 1. The nature of farming practiced by the Chepangs can be characterized as an integrated farming system composed of three components, viz. crops, livestock, and forestry. All these three components are interrelated and interdependent with one another, each using the products and by-products of the other. Crops provide fodder for the livestock in the form of bran, husks, straws, stems, leaves, and whole plants. Livestock provides labor and manure in the form of dung and other excreta to the crops and forests. Forests provide fodder and litter for the livestock and manure, mulch, and other material inputs needed for crop production. It is also important for ecosystem maintenance and prevention of soil erosion, thereby improving the crop production. All these three components provide food, fuel, medicine, shelter, labor, and cash income for the Chepang community. Thus procured goods are consumed directly or indirectly by exchanging them with various other goods and/or cash, for meeting their welfare needs, i.e., food.

Maize and finger millet are the two most important crops for the Chepang community. Besides these, Chepangs also cultivate paddy, buckwheat, rapeseed, soybean, blackgram, beans, ginger, and fresh vegetables. The cereals are used as staple food, whereas the legumes, ginger, and fresh vegetables form an important source of cash income to buy staple foods (i.e. cereals) when their own harvest is depleted and new harvest is not yet available. Livestock forms another important component for the Chepangs. They mostly raise cattle, goats, pigs, and poultry. Live animals, especially goats and poultry are important source of cash income for them. Forest is another important component of the farming system, which is the source of fodder and litter for the livestock. Forest also form the source of mulches, stakes, and other material inputs for the crop production. Besides, forest is an important source of wild tubers, green vegetables, fruits, spices, and medicines for this community. Chepangs also collect commercial forest products for cash income generation.

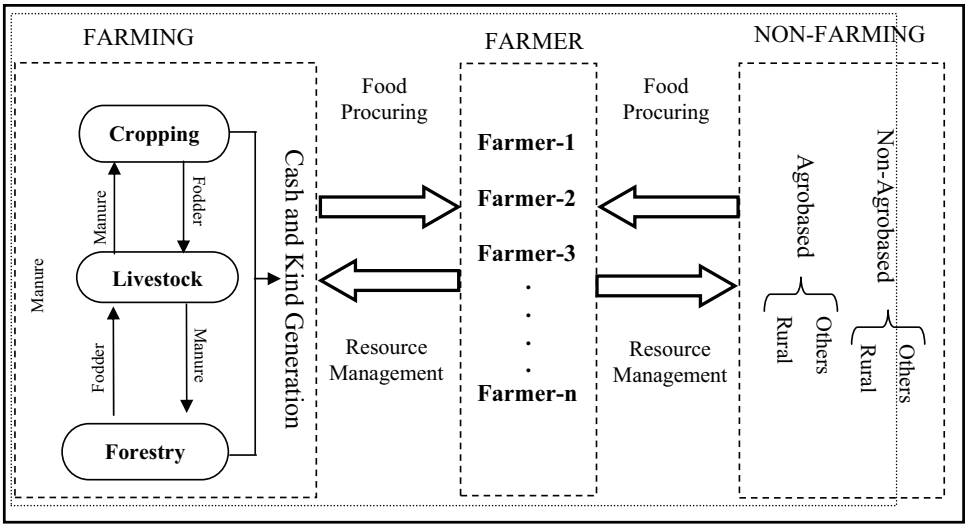

Figure 1: The process of securing food in rural households
Source: (Maharjan, 2003)

Moreover, farming alone is not sufficient to meet the food demand of the Chepang households. As a result, they also depend on non-farm activities, agrobased or non-agrobased in nature, within the villages and beyond. Some of the agrobased non-farm activities include agro-processing activities like milling of ginger, turmeric, edible oil, and their marketing. Other non-farm activities in the villages include houses, schools, and road construction, tailoring, carpentry, jobs related to teaching, health services, post office, government and NGO works, and other day laboring. Common non-farm activities beyond the rural region include police, army, teacher, cooks, working in carpet factories, and other day laboring in and outside the country.

This framework captures all the important aspects and dynamism of rural Nepalese livelihoods. As a result, this conceptual framework has been adopted in several other livelihood studies carried out in Nepal. Joshi and Maharjan (2007) and Maharjan and Khatri-Chhetri (2006) have used this framework to assess the food security in rural areas of Nepal. Besides food security related studies, this framework has been used by Maharjan (2005) to study the community participation in forest resource management in Nepal; and by Singh (2007) to study the contribution of dairy farming in the rural livelihood in Nepal.

4. Study site and data collection

Chitwan and Makawanpur districts in Central Nepal were chosen as the study districts, as more than 75% of total Chepang population live in these two districts (see figure 2). Shaktikhor Village Development Committee (VDC[3]) in Chitwan district and Handikhola VDC in Makawanpur district were purposively selected as the specific study sites (figures 3 and 4). To qualify as a study site, some strategic conditions were identified in order to generate representative information. There are some basic differences between the two VDCs that facilitated comparative study among the Chepangs in these locations. Elevation of Shaktikhor varies from approximately 250 – 1200 meters above sea level (masl) (Gribnau et al., 1997); whereas elevation of Handikhola VDC varies from 300 – 700 masl (Pradhan, 2008). Shaktikhor VDC is linked to the East-West Highway by an all-season-gravelled road, but only up to the foothills of

the VDC. Most of the Chepangs live at higher elevations, and are thus far away from the road head. Other Chepang VDCs surrounding Shaktikhor (i.e. Siddhi, Korak, Kaule and Lothar VDCs) are not connected by roads (see figure 3). Thus Shaktikhor is the main market centre for the inhabitants of the adjoining hilly VDCs. Handikhola VDC, on the other hand is separated from the East-West Highway by the Rapti River. Because of the absence of bridge over Rapti, transportation facilities to Handikhola VDC are available only during winter. Even during winter, transportation touches only a small portion of Handikhola VDC, thus a larger part of the VDC is untouched by transportation all the year round. Furthermore, Handikhola VDC is traversed by many rivulets, which are very difficult to cross during the rainy season. The forests in the vicinity of Shaktikhor VDC are mostly government forests whereas Handikhola VDC is surrounded by protected forests, i.e. Parsa Wildlife Resort to the west and Chitwan National Park to the south. Thus, the access to forest resources is more restricted in Handikhola (see figure 4).

Data for this study was gathered from both primary and secondary sources. Chepang households form the basic units of study. A total of 120 households, 60 households from each VDC were selected as the sampling units. It accounts for 15 percent of total Chepang households in Shaktikhor VDC of Chitwan district, while it is 26.1 percent of total Chepang households in Handikhola VDC of Makawanpur district. The households were selected randomly taking into considerations factors like accessibility, security, and within the walking distances from the place of home-stay. Household survey was conducted with the help of semi-structured questionnaires. The households covered by this study were untouched by roads and electricity. Face to face interviews were conducted with the members of the selected households in their own household premises. University students majoring in agriculture, NGO staffs having experience of working in the Chepang areas, and some local Chepangs were hired as enumerators to assist the researchers in household survey. All the research works were done under the leadership and close supervision of the researchers. Information was also collected through key informants' interview, group discussions, and researchers' observations. Primary data collection was done in two phases. The first field visit was done in August - September 2008. A follow-up field visit was done in February - March 2009. To supplement the data from primary sources, various published and unpublished secondary sources were also considered.

Figure 2: Map of Nepal showing Chitwan and Makawanpur districts

Figure 3: Map of Chitwan district showing Shaktikhor VDC

Figure 4: Map of Makawanpur distric showing Handikhola VDC

This is basically a qualitative study. However, the qualitative analyses are complemented with simple statistical tools like frequencies, means, and percentages used for describing demographic and socio-economic parameters. T-tests and chi-square tests are done for testing differences among the households and between the two study VDCs. Data entry and analysis were done using Excel and Statistical Package for Social Sciences (SPSS) spreadsheets.

5. Socio-economic descriptions of the study community

The socio-economic characteristics of the sample households (HHs) have been presented in Table 1.

Table 1: Socio-economic characteristics of the sample households

Socio-economic parameters	Shaktikhor (n=60)	Handikhola (n=60)	Overall (n=120)
Average family size per HH	6.6	6.2	6.4
Average Dependency ratio per HH	1.18	1.06	1.12
Sex of the HHH			
Male	56 (93.3)	56 (93.3)	112 (93.3)
Female	4 (6.7)	4 (6.7)	8 (6.7)
Education of the HHH			
Illiterate	35 (58.3)	41 (68.3)	76 (63.3)
Primary	22 (36.7)	13 (21.7)	35 (29.2)
Lower secondary	1 (1.7)	5 (8.3)	6 (5.0)
Secondary	2 (3.3)	1 (1.7)	3 (2.5)
Primary occupation of the HHH			
Farming	59 (98.3)	56 (93.3)	115 (95.8)
Skilled non-farm jobs / salaried jobs	1 (1.7)	1 (1.7)	2 (1.7)
Working abroad	0 (0.0)	3 (5.0)	3 (2.5)
Possession of citizenship certificate by HHH	44 (73.3)	44 (73.3)	88 (73.3)
Average livestock holding per HH (LSU)	7.9***	4.3***	6.1
Livestock holding by category***			
Small (<5 LSU)	20 (33.3)	41 (68.3)	61 (50.8)
Medium (5 - 10 LSU)	26 (43.3)	17 (28.3)	43 (35.8)
Large (>10 LSU)	14 (23.3)	2 (3.3)	16 (13.3)

Source: Field Survey, 2008
Note: Figures in parenthesis indicate percentage
*** Significant at 1% level of significance

Average family size of the sample households is 6.4, which is slightly higher than the national average of 5.45 (CBS, 2006). Overall, dependency ratio[4] of the community is 1.12, which shows a high level of burden for the economically active population to support the dependents. In both the districts, 93.3% of the households are headed by male. Females headed the households only if the husband is dead, if the husband lives separately with another wife, or if the husband is away from home for earning most of the time.

Majority of the household heads (HHHs) (63.3%) are illiterate[5]. Of those who are literate, nearly 29% HHHs have acquired primary level[6] education. Those who have acquired lower secondary[7] and secondary level[8] of education are less than 8%, and none of the HHHs have acquired education above the secondary level. Comparison between Shaktikhor and Handikhola shows that literacy rate is slightly higher in Shaktikhor. The relatively better educational status of Chepang community in Shaktikhor VDC is because there is a provision of hostel for Chepang students in a secondary school located in the foothills of Shaktikhor VDC while there is no such provision in Handikhola VDC. Students living far away from the secondary school cannot commute daily to the school, and cannot afford to stay nearby the school due to the low economic status of the household.

Farming is the primary occupation for nearly 96% of the HHHs. Only 1.7% of the HHHs are engaged in skilled non-farm jobs or salaried jobs, which includes peons in schools, postmen, teachers, cooks, and carpet weaving. Few HHHs (2.5%) are working abroad as labours, mostly in India.

Only around 73% of the HHHs possess citizenship certificate. Lack of citizenship certificates means they are prevented from many receiving many facilities like claiming allowances for senior citizens, securing voting rights and qualifying themselves as candidates for elections; registering for birth, marriage, and death certificates; getting passports; buying and selling lands; opening bank accounts; and obtaining any subsidized public goods and services. It was found from the field survey that more than 43% of the study population do not possess citizenship certificate basically due to administrative and procedural difficulties in the official process of acquiring the certificate. The process is often lengthy and difficult for the illiterate community. Further, citizenship certificate is issued from the district headquarters, often far away from their settlements.

The average livestock holding of the sample households is calculated in livestock standard units (LSU)[9]. The average livestock holding is significantly higher in Shaktikhor (7.9) than in Handikhola (4.3). Based of the size of livestock holding, most of the households in Shaktikhor (43.3%) fall under medium holding, while in Handikhola, most of the households are small holders (68.3%). Also, households under large holding are significantly higher in Shaktikhor (23.3%) than in Handikhola (3.3%). This is because goats are very important source of cash income for Chepangs in Shaktikhor, and income from goats are used to procure food during the lean period or to repay their loans. Market for goat in Shaktikhor is very well developed and buyers from many adjoining districts and major market centres like Narayanghat, Hetauda, and Mugling come to the village themselves to buy goats.

Table 2 shows the landholding of the sample household by different land types. Among the four land categories identified, unirrigated upland and *khoriya*[10] are less productive lands compared to lowland and irrigated upland. Most of the Chepang households owned only unirrigated upland and *khoriya*. Area per household is significantly higher in Shaktikhor than in Handikhola for all categories of land. In total, the average landholding is significantly higher in Shaktikhor (1.15 ha) compared to Handikhola (0.33 ha). It was found that landholding for all the land categories were significantly different from each other in the two study VDCs, basically due to differences in topography.

Overall, 43.3% of the sample households have registered their land, which means that the remaining 56.7% do not possess land registration certificates. Furthermore, it can be observed from table 2 that very less *khoriya* have been registered (only 3.3% in Shaktikhor and 5% in Handikhola). This is because land policy in Nepal failed to recognize

khoriya as suitable land for legal registration. For land to be legally registered, villagers had to prove that the land was under permanent cultivation. However, under the *khoriya* system, most of the patches remained fallow. Thus, many of the *khoriya* patches were included under the government forests, thus many Chepangs lost the land, under which they practiced *khoriya*. Number of households with registered land is higher in Handikhola (48.3%) compared to Shaktikhor (38.3%). The major difference between the two study VDCs come from unirrigated upland. This is because, when cadastral survey was done in the Chepang areas during the early 1970s (see Aryal and Kerkhoff, 2008), much upland in Shaktikhor was cultivated as *khoriya*, which could not be officially registered. Later Chepangs started to cultivate them permanently as uplands so that the ownership can be legally recognized. However, legal ownership of land still remains a major issue in the Chepang community, and it has adverse impacts on resource management and ultimately food production.

Table 2: Average landholding of the sample households by land category (in ha)

Land category		Shaktikhor		Handikhola		Overall	
		No. of HHs	Area/HH	No. of HHs	Area/HH	No. of HHs	Area/HH
Own land	Lowland	29 (48.3)	0.32**	15 (25.0)	0.19**	44 (36.7)	0.28
	Irrigated upland	7 (11.7)	0.78	3 (5.0)	0.09	10 (8.3)	0.58
	Unirrigated upland	48 (80.0)	0.69***	56 (93.3)	0.25***	104 (86.7)	0.45
	Khoriya	35 (58.3)	0.62***	17 (28.3)	0.15***	52 (43.3)	0.46
	Total	60 (100.0)	1.15***	59 (98.3)	0.33***	119 (99.2)	0.74
Registered land	Lowland	19 (31.7)	0.34	11 (18.3)	0.23	30 (25.0)	0.30
	Irrigated upland	5 (8.3)	1.02	1 (1.7)	0.20	6 (5.0)	0.88
	Unirrigated upland	10 (16.7)	0.61	25 (41.7)	0.24	35 (29.2)	0.34
	Khoriya	2 (3.3)	0.12	3 (5.0)	0.10	5 (4.2)	0.10
	Total	23 (38.3)	0.77	29 (48.3)	0.31	52 (43.3)	0.51

Source: Field survey, 2008
Note: Figures in parenthesis indicate percentage
** Significant at 5% level of significance, *** Significant at 1% level of significance

Six different sources of income were identified in the Chepang community viz., farming, wage labor, forest, handicrafts, skilled non-farm jobs, and remittance. Farming includes income from crops grown for own-consumption or for sale and livestock. Income from crops was calculated by measuring the value of different crop products over one year period for each household. Income from livestock consists of two components: sale of live animals and livestock products either consumed or sold. Market prices or own reported values were used to estimate the income from farming. Wage labor includes both agricultural and non-agricultural activities for which the households are paid on an hourly or daily basis. For non-agricultural labor, the adult male members of the family migrate temporarily outside the village during the dry season due to lack of employment opportunities at the local level. Another important source of income for the Chepang community is the forest. In this study, forest products collected either for human consumption or for sale were valued using market prices or own reported values. Next source of income for the Chepangs is the income by selling bamboo handicrafts like baskets used for daily household purposes. Skilled non-farm jobs include non-farm activities requiring some particular skill and monthly paid jobs. These activities were usually pursued outside the village and include jobs like cooking in hotels, carpet weaving, and salaried jobs like teachers, peons, and post-men. Another source of livelihood is remittance from abroad, usually earnings through laboring in India.

Table 3: Gross annual income per HH (NRs.[11]) from different sources

Sources of income	Gross annual income/HH (NRs.)					
	Shaktikhor		Handikhola		Overall	
	n	Mean	n	Mean	N	Mean
Farming	60 (100)	45,604***	60 (100)	29,716***	120 (100)	37,660
Wage labour	51 (85)	15,483	55 (92)	20,431	106 (88)	18,050
Forest	55 (92)	11,582***	47 (78)	4,520***	102 (85)	8,328
Handicrafts	3 (5)	1,156	8 (13)	3,032	11 (9)	2,520
Skilled non-farm and salaried jobs	10 (17)	24,000	13 (22)	31,716	23 (19)	28,361
Remittance	1 (2)	15,000	4 (7)	62,000	5 (4)	52,600
Aggregate	60 (100)	73,689	60 (100)	63,396	120 (100)	68,543

Source: Field survey, 2008
Note: Figures in parenthesis indicate percentage, n = number of households

Table 3 shows the gross annual income that households derive from each of these sources. Farming forms the most important source of livelihood for all the households. Besides farming, wage laboring and forest also forms an important source of livelihoods for a majority of the households. Other three sources, i.e. handicrafts, skilled jobs, and remittance are pursued by fewer households. Overall, average annual income per household is the highest from remittance followed by skilled non-farm jobs, however, very few households are pursuing these livelihood sources. This is because of higher investment and vocational education required for these sources, which most of the Chepang households cannot afford.

In Shaktikhor income from farming is significantly higher than in Handikhola. This is because average landholding in Shaktikhor is 1.15 ha, which is significantly higher (at 1% level of significance) compared to 0.33 ha in Handikhola. At the same time, irrigation facilities are better developed in Shaktikhor. Nearly 60% of households in Shaktikhor owned plots having perennial sources of irrigation compared to only 30% households in Handikhola. As a result, Chepang community in Shaktikhor has better prospects to produce high value products that can be marketed. Furthermore, Shaktikhor forms a major market center for all the surrounding Chepang VDCs. Praja (Chepang) Cooperative established at the foothills of Shaktikhor VDC acts as a collection center and marketing outlets for agro-products like black-gram, four-season beans, and ginger produced by the Chepangs. Whereas in Handikhola, low landholding, lack of irrigation, and market has lead to low income from farming.

Forest income was also found to be significantly higher in Shaktikhor VDC. This difference can be explained by various factors, the first one being access to forest resources by the community. Handikhola VDC is surrounded by Parsa Wildlife Reserve in the West, and Chitwan National Park in the South. It is illegal to collect forest products from protected forests, which means that the access to surrounding forest resources is restricted in Handikhola. In addition, forest in and around Shaktikhor is itself denser and richer in species diversity. Thus, differences in agro-ecology, resource holding, access to resources, and market availability in the two VDCs play an important role for the differences in income from different livelihood sources.

As shown in table 3, forest forms a source of income for 85% of the households. On-farm activities (comprising of agriculture and livestock), which form the major source of household gross income, are also highly dependent on forest resources. However, income from forest products appears to account for a small share of a household's total income because most of the forest products are either self-consumed (e.g. wild tubers like *gittha* (*Dioscorea bulbifera*), *bhyakur* (*Dioscorea pentaphylla*), green vegetables like *sisnoo*(*Urtica dioica*)) or consumed by livestock (fodder, litter, etc), which often fail to obtain significant monetary value, and the economic valuation of which is difficult and often ignored.

6. Status of food self-sufficiency and food-security in the study community

The overall average food self-sufficiency for the Chepang community is 7.3 months (table 4). Only 7.5% of the total Chepang households covered by the study are reported to be food self-sufficient. Similar findings were also reported by Bhattarai (1999) and Aryal (2007). Gurung (2006) and FORWARD (2001) report even lower average food self-sufficiency of 5 months and that only 1% of total Chepang households is food self-sufficient. Gribnau et al. (1997) reported that only 4% Chepang households are self-sufficient. The food deficit in the community was reported to be from F*algun* to *Asar*, the most chronic deficit being *Chaitra* to *Baisakh* (For conversion of Nepali months to English calendar, see Annex 1). The reason for food deficit during this period is because this is the dry season, and due to lack

of irrigation facilities the communities depend on rain-fed agriculture. The land remains fallow during the dry season. Due to infertile and stony nature of the land, crop productivity is low. Whatever little is harvested earlier gets depleted by this time of the year, while the new crops are still in the field.

Average food self-sufficiency is slightly higher for the Chepang community in Shaktikhor (7.6) than those in Handikhola (7.0), but the difference is not statistically significant. Furthermore, in Shaktikhor, 40% of the Chepang households have food self-sufficiency of more than 9 months, while it is only 28.3% in Handikhola (see table 4). The relatively higher self-sufficiency in Chepang households of Shaktikhor can be related to relatively higher landholding.

On the basis of calorie requirement per Adult Equivalent (AE)[12] per day, 37.5% of the Chepang households covered in the study are food insecure. That means they are not able to cover the minimum daily calorie requirement of 2,344 cal/AE/day prescribed for the hills (CBS, 2003c). This value is not significantly different between Shaktikhor and Handikhola. For the food secure households, overall average calorie consumption is nearly 4,200 cal/AE/day, which is significantly higher that the average calorie consumption of 1,700 cal/AE/day for food insecure households. Three major sources of calorie contribution were categorized as forest plant resources, on-farm sources (crops and livestock) and market. On an average, forest plants resources contributed nearly 7% of the total calorie procurement. Gribnau et al. (1997) classifies sources of food for the Chepang community on the basis of quantity and reports that 67% of food was supplied from farming, 17% from forest, and 12% from wage labor.

Table 4: Food self-sufficiency and food security scenarios of the sample households

Parameters	Shaktikhor (n=60)	Handikhola (n=60)	Overall (n=120)
Average food self-sufficiency per HH (months)	7.6	7.0	7.3
Food self-sufficiency by category (no. of HH)*			
<3 months	1 (1.7)	1 (1.7)	2 (1.7)
3 to <6 months	1 (1.7)	10 (16.7)	11 (9.2)
6 to <9 months	34 (56.7)	32 (53.3)	66 (55.0)
9 to <12 months	20 (33.3)	12 (20.0)	32 (26.7)
12 months and more	4 (6.7)	5 (8.3)	9 (7.5)
No. of HHs meeting minimum daily calorie requirement#			
Food secure HHs	38 (63.3)	37 (61.7)	75 (62.5)
Food insecure HHs	22 (36.7)	23 (38.3)	45 (37.5)
Average cal/AE/day			
Food secure HHs	4,363.2	4,056.7	4,207.9
Food insecure HHs	1,618.7	1,802.3	1,708.5
Calorie contribution per HH (cal/AE/day)			
Forest plant resources	221.7 (6.7)	249.7 (7.7)	235.7 (7.2)
Agriculture and livestock	2,586 (78.1)	2,079.8 (64.4)	2,333.3 (71.3)
Market	502.7 (15.2) ***	900.7 (27.9) ***	701.7 (21.5)
Total	3,311.1 (100.0)	3,230.1 (100.0)	3,270.6 (100.0)

Source: Field survey, 2008
Note: Figures in parenthesis indicate percentage
* Significant at 10% level of significance, *** Significant at 1% level of significance

Table 5 shows different coping strategies adopted by the food self-insufficient household. Overall, 82.9% of the

food self-insufficient households depend on wage labor, followed by 71.2% households depending on forest products in order to meet the food deficit during the lean period. Usually the males go away from home to earn during the dry season. Women work for the merchants and lender from where they acquire grains and cash loans. Selling of goat is another important livelihood strategy that is adopted by the community to overcome food deficit. Income from the sale of goat is used to buy food directly, and this is also a major strategy adopted to pay back the grain loans and cash loans, which they borrow during the food deficit period. Most of the less preferred food refers to wild tubers, which are consumed very frequently during the chronic food deficit months. Cutting meal is less frequent, and in most cases, adults are the one to cut meal if necessary. Grain loans are usually taken from local lender and shopkeepers. The interest rate varies from 12% and 36% annually. Grain loans are paid back in cash by selling goat, chicken, wage laboring, selling commercial forest products, and selling handicrafts. All the cash loans are taken from informal sources and the interest rate varies from 12% to 60% annually. The strategies adopted for paying back the cash loans are the same as those adopted for paying grain loans.

Table 5: Households adopting different coping strategies to overcome food self-insufficiency

Coping strategies	Shaktikhor (n=56)	Handikhola (n=55)	Overall (n=111)
Collect forest products	40 (71.4)	39 (70.9)	79 (71.2)
Sell goat	45 (80.4) **	34 (61.8) **	79 (71.2)
Wage labouring	41 (73.2) ***	51 (92.7) ***	92 (82.9)
Eat less preferred food	34 (60.7)	33 (60.0)	67 (60.4)
Cut meal	13 (23.2)	14 (25.5)	27 (24.3)
Cash loan	25 (44.6) ***	46 (83.6) ***	71 (64.0)
Grain loan	21 (37.5)	19 (34.5)	40 (36.0)
Sell land	1 (1.8)	0 (0.0)	1 (0.9)
Sell other properties	0 (0.0)	1 (1.8)	1 (0.9)

Source: Field survey, 2008
Note: Figures in parenthesis indicate percentage
** Significant at 5% level of significance, *** Significant at 1% level of significance

7. Forest as a source of food for the Chepang community

As shown in table 3, forest forms a source of livelihood for 85 percent of the Chepang households. The importance of forest in the food procurement of the Chepangs is also shown in table 5, where more than 70 percent of the households depend on collection of forest products as a strategy to overcome food self-insufficiency.

Forest products are either self-consumed or sold in the market, income from which is utilized to buy foods. Table 6 shows the benefits extracted from the forest by the households belonging to different categories of food self-sufficiency. Monetary valuations were given to the food items collected from the forest based on market value or their own reported values. As already discussed, economic valuations of forest products often tend to be ignored or undervalued. Consequently, forest products used for consumption of livestock (fodder and litter) were not given a monetary value in this study because these products are not marketed among the Chepangs, nor are they bartered with other goods. Thus, cash income from forest primarily constitutes commercial forest products of industrial value and edible products that are sold in the market. As shown in table 6, the value of wild and uncultivated food collected was higher for food self-insufficient households. Cash income (most of which is utilized for procuring food from the market) from forest is also higher in the food self-insufficient households. This clearly indicates that higher the degree of food

self-insufficiency, the more those households are dependent on forest products. Thus, forest products are important to bridge the periods of hunger gaps, especially during the months of food shortage when the stored grains from earlier harvest get depleted.

Table 6: Benefits extracted from forest by households belonging to different categories of food self-sufficiency

Food Self-sufficiency	Value of edible products collected from forest (NRs.)	Cash income from forest (NRs.)
<6 months	6,113	3,368
6 - <12 months	5,176	2,891
>12 months	1,505	0

Source: Field survey, 2008

Surprisingly, the food self-sufficient households collect forest products only for self-consumption, and do not collect commercial products that can be sold in the market. This is because the collection of commercial forest products is often a risky job. National forest policies fail to recognize such activities and consider it illegal to collect forest products without taking permission from the district forestry offices. However, most Chepangs are reluctant to obtain permission, as they are not easily granted such permissions by the government authorities. Furthermore, illiterate Chepangs are ignorant of the paper works and formal official procedures. In addition, collection of the commercially important forest products is also a tedious job. It takes considerable amount of time to collect those forest products. Also, the Chepangs have to carry those products themselves from their settlements down to the market centres. However, their family labour utilized for the collection and transportation of these products is not valued. Due to the above-mentioned reasons, collection and sale of commercial forest products among the Chepangs is done not by choice, but rather due to limitation of other opportunities. Thus, only the food self-insufficient households are involved in the collection and sale of commercial forest products. The major forest products collected and sold by the Chepangs in Shaktikhor and Handikhola are listed in Annex 2.

Table 7 also shows that Chepang communities depend on forest resources for the fulfilment of their food needs, especially during the most critical periods. The period during which most of the edible forest products were collected coincides with the period of food deficit. As already discussed, this period varies from *Falgun* to *Asar*. Wild tubers like *gittha* (*Dioscorea bulbifera*), *bhyakur* (*Dioscorea pentaphylla*), and *tarul* (*Dioscorea alata*) form the staple diet of Chepangs especially during the lean periods – the period after their agricultural harvest is depleted, and before the new harvest is ready. These tubers not only form the staple diet for these people, but it also provides supplementary nutrition. Studies have shown that *gittha* and *bhyakur*, which are the major wild tubers eaten by Chepangs in largest quantity, contain five times more protein and fibre than potato and sweet potato (Regmi, Aryal, and Tamang, 2008; Bhandari, 1995). The studies further show that these tubers are source of important elements like iron, calcium, phosphorous, and amino acids.

Wild edibles are also the source of food diversity all the year round. Forest is the main source of green vegetables for this community. Green vegetables commonly consumed include young shoots of *tanki* (*Bauhinia purpurea*)*, sisnoo* (*Urtica dioica*)*, niuro* (*Drypoteris cochleata / Tectaria macrodonta*)*, jaluko (Remusatia vivipora), bethe* (*Chenopodium album*)*, latte* (*Amaranthus spp*) and *kholesaag* (*Veronica baccabunga*). Young shoots of *tanki* and *sisnoo* regenerate very easily and can be harvested for 8-9 months. Young bamboo shoots are also commonly used as vegetables, and Chepangs store the bamboo shoots by pickling to be used during the dry season as well. Wild varieties of *timur* (*Xanthoxylum spp*) and *tejpaat* (*Cinnamomum tamala*) are used as spices. The aerial yam of *gitta* and *tarul* is powdered and used as pickle. In addition, Chepangs consume fruits of many types of wild figs like *dumri* (*Ficus racemosa*)*,*

badahar (*Artocarpus lakoocha*), and *pipal* (*Ficus religiosa*).

Table 7: Ten most commonly collected edible plants from forest in the study area

Common Name	Scientific Name	Parts Collected	Purpose	Month of collection
Gittha	*Dioscorea bulbifera*	Tuber	Staple diet	Falgun – Jestha
Bhyakur	*Dioscorea pentaphylla*	Tuber	Staple diet	Falgun – Jestha
Tarul	*Dioscorea alata*	Tuber	Staple diet, vegetable	Magh – Jestha
Chiuri	*Bassia butyracea*	Fruit Seed	Eaten raw Ghee	Jestha – Bhadra
Sisnoo	*Urtica dioica*	Young shoot, flower	Green vegetable	Bhadra – Baisakh
Niuro	*Drypoteris cochleata / Tectaria macrodonta*	Young shoot	Green vegetable	Falgun – Shrawan
Tanki	*Bauhinia purpurea*	Young shoot Seed Flower	Green vegetable Roasted Pickle	Falgun – Asoj
Jaluko	*Remusatia vivipora*	Young shoot	Green vegetable	Falgun – Baisakh
Bamboo shoot	*Bambusa spp*	Young shoot	Vegetable	Asadh – Bhadra
Mushrooms		Whole plant	Vegetable	Asadh – Bhadra

Source: Field survey, 2008/09

Bassia butyracea is another important source of food for the Chepangs in Shaktikhor. The edible fruit pulp often forms the major diet for the Chepangs during *Asadh-Shrawan*. They also collect its seeds for extraction of butter, which they use as cooking oil. Many wild foods consumed by Chepangs also perform dual role of food as well as medicine. For instance, butter extracted from the seeds of *Bassia butyracea* is the cooking oil for the majority of Chepang households in Shaktikhor. It also has medicinal value and is used for treating rheumatism, wound, and dry skin.

8. Conclusion and recommendations

Chepangs are often characterized by illiteracy, poverty, food insecurity, food self-insufficiency, and lack of resource ownerships. Many Chepangs are restricted of their basic rights of nationality, as they do not possess citizenship certificate basically due to administrative and procedural difficulties in issuing the certificate. A majority of the Chepang population do not legally own the land that they cultivate. This is because for legal registration, land should be permanently cultivated. But because Chepangs traditionally practiced *khoriya*, their lands were not identified as suitable for registration. Furthermore, the procedures of land registration are too complicated for the Chepangs to comprehend. Lack of land ownership adversely affects the management of land resources, which in turn has negative impacts on the overall food security of the community. Thus, access to education, flexible administrative procedures to issue citizenship certificates and land registration certificates, and favourable policies to secure land tenancy are some of the important issues that need to be addressed by the government policies to raise the living standard of the Chepang community.

Farming is the mainstay of Chepang livelihood. However farming alone is not sufficient to provide food for the whole year. Forests play an important role in sustaining their livelihoods. Chepangs collect many wild foods, fruits, vegetables, medicinal plants for own consumption, and commercial forest products for sale. Wild tubers form the source

of staple foods for the Chepangs during the lean periods. Most of the wild foods are collected from the forest during the period of food shortage. Forests thus play an important role in fulfilling the food requirements of the households when the stored food supply is dwindling and the next crop is still standing in the field. Wild and uncultivated foods are important not only from the aspect of food security, but also from the aspects of food diversity. Forest plants sources provide green vegetables, spices, pickles, edible oil, and fruits to the community. They also contribute to the nutritional requirements of the Chepang community by providing supplemental foods beside staple foods. The agriculture and livestock sectors, which form the mainstay of Chepang livelihoods, are also highly dependent on forest resources.

Forest is also an important source of cash income. However, control over and access to forest resources has been severely restricted due to unfavourable state policies, which in turn threaten their traditional livelihoods. As a result, only the food self-insufficient households resort to collection of commercial forest products for cash income generation. Income thus generated is utilized to procure food from the market. Promotion of commercial forest products seems to be promising alternative to improve food security situation of the Chepangs. For this, the unfavourable national forest policies need to be revised in favour of the livelihoods of indigenous people like Chepangs.

The collection and consumption of forest products is more common in food self-insufficient households. For these people, who adopt multipronged livelihood strategies like subsistence agriculture, wage labour, and collection of wild foods among others, losing one of the key components of their food i.e. wild edible plants would mean a threat to their food security. It is important to understand how staple food crops and wild uncultivated food crops complement each other so as to maximize the food security of the Chepang community.

Endnotes

[1] According to National Foundation for Development of Indigenous Nationalities Act 2002, indigenous nationalities means tribes or communities having its own mother language and traditional rites and customs, distinct cultural identity, distinct social structure and written or unwritten history. Based on the same Act, Nepal Government has identified 59 Indigenous Nationalities, which are further categorized as endangered, highly marginalized, marginalized, disadvantaged, and advanced based on the socio-economic indicators and population (NIRS, 2006).

[2] *Khoriya* cultivation is also known as shifting cultivation or slash-and-burn cultivation. In ancient times, Chepangs practiced *khoriya* cultivation by clearing and burning small patches of forests, which was then planted with food crops usually maize, millet, and legumes like blackgram and soybean. The land was usually cultivated for a year or two at the most, and then abandoned for the next ten to fifteen years. By that time, it would have regenerated into forest and soil would gain fertility. In the meantime, they would clear other pieces of land and continue this practice. These days, the practice of *khoriya* cultivation is slowly vanishing, mainly due to restrictions put forth by the national forest policies.

[3] Lowest tier of administrative division in Nepal composed of 9 wards.

[4] Dependency ratio is the ratio of economically non-active members (by age, less than 10 years of age and above 64 years of age) to economically active members (by age, 10 – 64 years of age).

[5] Illiterate: Cannot read or write at all

[6] Primary level: Attained informal education or formal education up to 5th grade

[7] Lower secondary level: Attained formal education from 6th to 8th grade

[8] Secondary level: Attained formal education of 9th and 10th grade

[9] LSU is aggregates of different types of livestock kept at kept at household in standard unit calculated using the following equivalents; 1 adult buffalo = 1 LSU, 1 immature buffalo = 0.5 LSU, 1 Cow = 0.8 LSU, 1 calf = 0.4 LSU, 1 pig = 0.3 LSU , 1 sheep or goat = 0.2 LSU and 1 poultry = 0.1 LSU (CBS, 2003b and Baral, 2005).

[10] The Chepangs in the study area no longer practiced the conventional system of slash-and-burn (*khoriya*) cultivation. Here, *khoriya*, as a category of land refers to sloppy patches of land in the forests having no terraces.

[11] NRs. = Nepali Rupees; 70 NRs. = 1 US$

[12] AE is aggregate measure of family size that standardize consumption unit within the household taking into account the age and sex of the household members.

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Annex 1. Conversion table for Nepali months to English months

Nepali months	English months	Nepali months	English months
1. Baisakh	Mid April to Mid May	7. Kartik	Mid October to Mid November
2. Jestha	Mid May to Mid June	8. Mangsir	Mid November to Mid December
3. Asadh	Mid June to Mid July	9. Poush	Mid December to Mid January
4. Shrawan	Mid July to Mid August	10. Magh	Mid January to Mid February
5. Bhadra	Mid August to Mid September	11. Falgun	Mid February to Mid March
6. Ashwin	Mid September to Mid October	12. Chaitra	Mid March to Mid April

Annex 2. Major forest products traded by the Chepangs in the study area

Nepali name	Scientific name	Plant type	Parts traded	Location
Allo	*Girardinia diversifolia*	Shrub	Bark	Shaktikhor
Amala	*Phyllanthus emblica*	Tree	Fruit	Shaktikhor
Amriso	*Thysanolaena maxima*	Shrub	Spike	Both
Bajuri	*Thalictrum foliolosum*	Shrub	Bark	Shaktikhor
Bans	*Bambusa nepalensis*	Bamboo	Young shoot	Both
Barro	*Terminalia bellirica*	Tree	Fruit	Shaktikhor
Boke timur	*Zanthoxylum spp*	Shrub	Fruit	Shaktikhor
Chameli phool	*Jasminum gracile*	Herb	Flower	Shaktikhor
Chiuri	*Bassia butyracea*	Tree	Butter	Shaktikhor
Daar	*Boehmeria rugulosa*	Tree	Bark	Shaktikhor
Dalchini / Tejpat	*Cinnamomum tamala*	Tree	Bark, Leaf	Shaktikhor
Gaikhur		Herb	Root	Shaktikhor
Gurjo	*Tinospora sinensis*	Vine	Vine	Shaktikhor
Harchul	*Viscum articulatum*	Tree	Bark	Shaktikhor
Harro	*Terminalia chebula*	Tree	Fruit	Shaktikhor
Honey				Shaktikhor
Kaafal	*Myrica esculenta*	Tree	Bark	Shaktikhor
Kali niuro	*Tectaria macrodonta*	Fern	Young shoot	Both
Kaulo	*Persea bombycina*	Tree	Bark	Shaktikhor
Kauso	*Mucuna prurita*	Vine	Seed	Shaktikhor
Kurilo	*Asparagus racemosus*	Herb	Root	Both
Majito	*Rubia manjith*	Vine	Vine	Shaktikhor
Niuro	*Drypoteris cochleata*	Fern	Young shoot	Both
Orchid				Shaktikhor
Pipla	*Piper longum*	Shrub	Fruit	Shaktikhor
Rani sinka		Fern	Plant	Shaktikhor
Ritta	*Sapindus mukorossi*	Tree	Fruit	Shaktikhor
Saldhup	*Shorea robusta*	Tree	Exudate	Shaktikhor

Source: Field survey, 2008/09