

Food Insecurity and Coping Strategies in Rural Areas of Nepal

A Case Study of Dailekh District in Mid Western Development Region

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Abstract

The main purpose of this paper is to analyze the relationship between household's resource endowment and food security status. It also aims to find out the household's coping strategies when they face food deficit condition. The analysis indicates that the distribution of resources is highly favorable to higher caste and has direct impact on household food security condition. It also shows that the depth and the severity of food insecurity vary according to socio-economic characteristics of household. Both depth and severity are higher in occupational caste, small landholders, fewer livestock holders, laborers, and households with less consumption expenses. To become more food secure and in response to food deficit condition, households adopted both *ex ante* and *ex post* coping strategies, such as casual laboring, occupational work, selling of agricultural and livestock products, collection of wild foods, borrowing food or money, use of savings, seasonal migration to the places outside the district, within the country or in foreign countries, small business, use of pension, and so on.

1. Introduction

1.1 Statement of Problem and Objectives of the Study

Nepal has a population of about 23.5 million and occupies 147,181 km² of land. It is distributed into three ecological zones – Mountains, Hills and Tarai, and five development regions: Eastern, Central, Western, Mid Western, and Far Western. Nepal is renowned for its sociocultural diversity of 100 ethnicities, 92 languages, and 9 religions (UNDP, 2004). Agriculture is the mainstay of Nepal's economy, employing about 76.5% of the workforce and contributes 39.2% of GDP (CBS, 2002). Only about 25 percent of the total area is cultivable, another 33 percent is forested and most of the rest is mountainous. The lowland Tarai region produces an agricultural surplus, part of which supplies the food-deficient hill and mountain areas.

More than nine million people, accounting for about 40 percent of the population, are currently esti-

mated to live below the national poverty line, set approximately at 4,400 Nepalese Rupees (NRs) per capita per annum, the sum based on calorie intake, housing and various non-food consumer's goods (ADB, 2002). However, inequalities across ecological zones, development regions, and the rural-urban divide remain wide, as do those across gender, ethnic, and caste lines. Economic growth has been almost exclusively in urban areas, while the rural economy, particularly in the hill and mountainous regions, has been virtually stagnant. The incidence of poverty and food insecurity in the mid and far western development regions and in the mountain districts greatly exceeds the national average. Subsistence, mixed smallholder agriculture is the dominant farming system in all ecological zones of Nepal. About 45 percent of the farmers are smallholders operating less than 0.5 ha of land. There is an uneven distribution of the agricultural land in the country. Small farmers operated only 13 percent of total agricultural land while larger farmers (>2 ha) constituting only 8% are holding 32 percent of the total agriculture land (CBS, 2004). Hence, the development of smallholder's mixed farming is important to enhance the food and livelihood security of the population.

The government statistics on food balance shows even when Nepal's total production of edible cereal-grains exceeded the net requirements, and 45 of the 75 districts in Nepal are incapable of producing food to meet minimum requirements (CBS, 2003). Most of the districts, which are under the food deficit, lie in the hill and mountainous regions. The average amount of food deficit is 47 kg per capita in the mountains and 32 kg in the hills (Pyakuryal, 2004). This is truer for far western and mid western development regions. Even in years of adequate rainfall and good harvest the people in these areas remain in need of food assistance and consume less than the requirement. However, even under such circumstances, we can easily find the households with ample of food surplus from their productions residing as neighbors to food insecure households. These two groups of households share common climatic and weather situation, largely similar soil types and land topography. They also share common socioculture. Yet, one faces food crisis and becomes food insecure, while the other remains food secure. So far, there has been no any research conducted in this area regarding the intensity of food insecurity and coping strategies. Hence, carrying out such in-depth research and quantitative as well as qualitative findings would obviously have both basic (academic) and applied (practical) implications. In this paper the household level food security analysis is done to understand this situation and aims to examine the food security condition among the rural households. The specific objectives of the study are:

- i) To find out the food security condition among the rural households;
- ii) To examine the resource distribution pattern, which are expected to have direct implication for the households' food production and supply;
- iii) To examine the relation between food insecurity and socio-economic characteristics of households
- iv) To identify the problems associated with different aspects of livelihood; and
- v) To identify the coping strategies adopted by household to mitigate food deficit and alleviate food insecurity.

The findings of the study are expected to contribute towards breaching the existing literature gap on understanding the food security of rural households in Nepal. Since food security is one of the main elements of the mission and strategic purpose for the national five-year plans and agriculture development plans in Nepal, the findings in this study are expected to provide useful information for related policy formulation.

1.2 Conceptual Framework of Food Security Analysis

The commonly accepted definition of food security is “access by all people at all times to enough food for an active and healthy life” (World Bank, 1986). Access to food is ensured when all households and all individuals within those households have sufficient resources to obtain adequate foods for a nutritious diet. Every individual requires certain level of nutrition for an active and healthy life based on age, sex and level of physical work. Although access to food is not a sufficient condition for a healthy life, number of other factors such as health and sanitation also come into play. The adequate food availability and access to food remains a necessary condition for household food security.

Two types of household food insecurity – chronic and transitory – are widely discussed. Chronic food insecurity is a persistently inadequate diet caused by the continual inability of households to acquire needed food, either through market purchases or through production. Chronic food insecurity is rooted in poverty. The poor do not have adequate means or “entitlements” (Sen, 1981) to secure their access to food, even when food is available in local market. On the other hand, transitory food insecurity is a temporary decline in a household’s access to needed food, due to factors such as instability in food prices, production or incomes.

The theoretical background of the conceptual framework for this study is derived from the Sen’s concept of entitlement to food. The entitlement approach to hunger discusses the ability of people to command food through the legal means available in the society, including the use of production possibilities, trade opportunities, entitlement *vis-à-vis* the state, and other methods of acquiring food (Sen, 1981). Therefore, hunger could occur even when there is enough food to feed the entire community, and those who suffer from hunger are those who are not able to convert their endowments into food; the individual has suffered an entitlement failure and become vulnerable. This failure appears when people have not access to a category of goods because their endowments are insufficient or have not adopted to produce those goods or to gain them by transaction. Similarly, Ellis (2000) defines all capitals as assets that form a household’s endowment of resources with which to gain a living. In this definition, the conventional meaning of assets is expanded to include, besides material and financial resources, household members’ education and skill (human capital) and their relations within wider communities (social capital). The discussion on conceptual framework (**Figure 1**) starts from the Sen’s entitlement concept discussed above.

Household’s Entitlement Endowments: In this study the household is recognized as basic unit of analysis which includes more than one individual (although a single individual can also constitute a household), who share economic activities necessary for the survival of the household and for the generation of well-being for its members (Rudie, 1995). Although household members have varying aims and objectives as well as individual goals, they also share a common concern for the well being of each other. Rudie’s definition of household is adopted for this study because of its emphasis on provision for primary needs and joint management of resources. Therefore food security management in the household level is a kind of generation of well being for all members in the household. Sen (1981) defines ownership relations as a kind of ‘entitlement’ relations, which connects one set of ownerships to another through certain rules of legitimacy. Endowments are defined as the stock of different forms of capital (physical, natural, human, financial and social – initial resource bundle) that an agent possesses. Generally head of a household controls the land, livestock, physical assets and financial capital. Human and social capitals may differ according to the household members. Natural capitals are provided by nature itself and its efficient use depends on availability and capacity of the household members.

Therefore, in the household level entitlement endowment is the summation of all capitals – initial resource bundle – possessed by all household members¹.

Transforming Structures and Processes: Through policies and planning approach (processes), governmental and non-governmental organizations, market institutions, community organizations and private sectors, all transforming structures, acts in the community to facilitate the entitlement changers (households) to change their initial resource bundle to food and income through resource allocation. Household's decision to allocate initial resource bundle is influenced by the policies and plans of transforming structures acting in that community. Institutions may focus on development of policies and regulations, service provision or research, and may represent civil society, the public and private sectors.

Livelihood Strategies: The interaction between household's entitlement endowment, transforming structures and processes determine the livelihood strategies or activities set by the particular household. Broadly, household members in rural area engage in two kinds of activities, natural resource based (farming and forest resource use) and non-natural resource based (wage laboring in off-farm sectors and engaging in professional jobs). Household's resource endowment and its allocation in different activities jointly support their level of well being of the household in general and food security in particular.

Production, Income and Consumption: Food security management is a subset of the livelihood, which is most important for every rural household. Both natural resource based and non-natural resource based strategies adopted by the household determines the availability of and access to food. Availability generally refers to production and physical availability of food in a given area. Access refers to economic access to food, i.e. the purchasing power of the people concerned. Physical availability in the community depends on the development of local markets. Thus, the household consumption depends on availability of food and access to it. At the household level, the gap between consumption and demand of food, based on requirements of all the household members, indicates the food insecurity condition of the household. This research assumes household as a rationally behaving unit (like rational individual) so that all the food available for the household is distributed rationally based on requirements of the different members.

Vulnerability to Food Insecurity: Vulnerability always begins with a notion of risk. Risk is characterized by a known or unknown probability distribution of events. The risk of shortfall can be expressed as a probability statement regarding the failure to attain a certain well-being threshold in the future (Christiaensen and Boisvert, 2000 and Alwang *et al.*, 2001). Therefore, vulnerability to food insecurity indicates probability of failure to attain a certain threshold level of nutritional requirement for healthy life in the future. In the household level, less land ownership, high wage labor dependency, drought/water scarcity, land degradation, loss of off-farm jobs, poor technology, indebtedness, social insecurity, product price fluctuation etc. are the main risk factors. One important aspect of being food insecure is a high level of exposure to risk of adverse events and lack of the means to cope with them. Food deficit risk coping measures are household's reactive response to a stressful situation. These are also *ex ante* and *ex post* responses to manage household food deficit. The *ex ante* measures help to improve food availability and access to food through own production and income diversification. On the other hand, when households are faced with the decline of food availability, they can adjust food deficit

¹ Entitlement endowment of household members are not assessed separately in this study and hence, the food insecurity of individual household members along with other intra household issues, whose importance is well recognized, are not discussed in this paper.

through *ex post* responses like borrowing food, collection of wild foods, sale of agriculture and livestock products etc.

The aim of an effective food security policy is to ensure that all households have an adequate dietary intake and can acquire it without being subjected to excessive risks. Vulnerability to food insecurity exists mainly due to the ineffective policies and planning approach of transforming structures. It can be alleviated through supporting vulnerable people to build up their entitlement endowments and minimize the risks associated in different sectors.

This discussion of conceptual framework indicates that food insecurity is fundamentally afflicted with poor household’s resource endowment and weak policies of transforming structures. In this paper we focus our discussion to the major resources among rural households and problems they face in different aspects of livelihood due to ineffective role and weak policies of transforming structure in study area. With analysis of field level data, we present the empirical evidence of prevalence, depth, and severity of food insecurity among the rural households in the study area. No study of this nature has been done in the area so far. Hence, it is hoped that this study will contribute in understanding the food security condition of the study area in detail and add another dimension in grasping the issues.

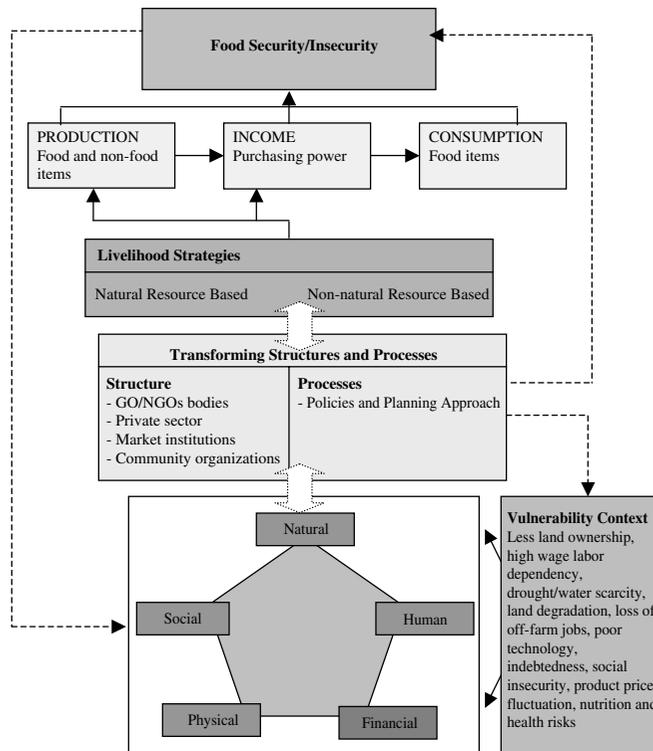


Figure 1: Conceptual framework of food security analysis
 Source: Adopted from Ellis, 2000 and WFP, 2001.

1.3 Study Area, Data Collection and Analytical Methods

The data used to analyze household food insecurity and coping strategies were collected in two

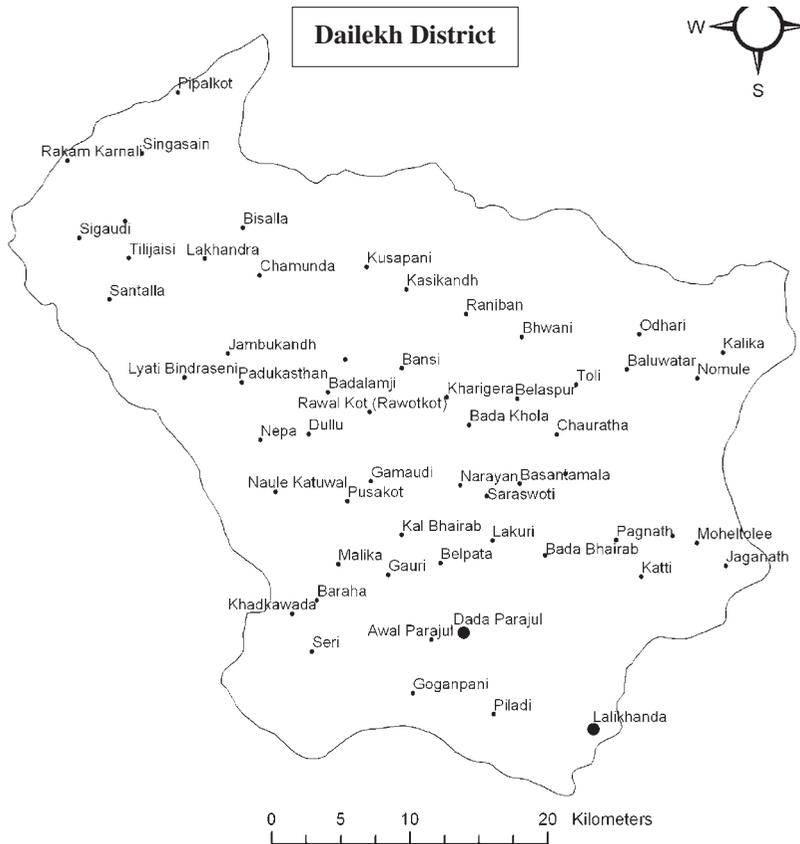
Village Development Committee & (VDCs) in Dailekh district in the mid-western hills of Nepal (**Map 1 and 2**). Two villages were randomly selected to take account of the different socio-economic characteristics of households with large sample size. Dailekh is located in mid western development region between 28° 35'-29° 88' northern latitude and 81° 25'-81°-55' eastern longitudes. It shares its border with Jajarkot and Surkhet in east, Achham in west, Kalikot in north and Surkhet and Achham in south. This district is divided into 1 Municipality, 55 VDCs, and 2 parliamentary constituencies. The district comprises of small mountain valleys and mid and high mountains covering 1502 sq. km area. It has gentle to very steep mountains with altitude varying from 544 to 4168 meter above sea level (masl). This region has sub-tropical, mild-temperate and cool-temperate climate.



Map 1: Map of Nepal showing geographical location of the country as well as research district

Major land use of the district is agriculture, forest, pastureland and settlement development. About 23.5 percent of the total land is under cultivation. The forest and pasture occupy 52.07 and 11.76 percent of the total land respectively. The most common local system of land classification is based on land use and water supply situation, which categorizes all land into four major groups, namely, *khet* (wetland), *pakho* (dryland), *charan* (pasture and grazing land) and *parti* (fallow land). The rain-fed agriculture terraces of varying shapes, sizes, and slope gradients are the principle land-use and economic feature of the areas. Wet terraces are rather limited in proportion and mainly concentrate in lower hills. Although Dailekh district is rich in water resources, a negligible amount of water from the natural sources is used for irrigation.

Before sample survey, general census survey of all households within the two VDCs was carried out.



Map 2: Map of Dailekh district indicating study villages

This helped to find the general socioeconomic characteristics of households in two VDCs (Lalikhanda and Dadaparajul). This also helped to find out “Food Security Status” of households that rural people consider, i.e. the access to adequate food to live 12 months based on local food habit of eating two meals a day (see Appendix A). During the sampling process, other socio-economic characteristics were considered to create variability within sample households. Approximately 10% of households from each VDC were selected for sample survey, which includes all socio-economic characteristics found in general census survey. Total of 128 households were selected based on stratified random sampling technique. The villages included in the study area lie mostly in the slope of hills. All study households owned some land, but land is mostly non-irrigated and rainfed. Villages are largely isolated from the market areas and far from the district headquarter.

Primary data were collected by means of survey questionnaires through interviewing the sample respondents. Household and individual data including information on caste status, age, sex, education, job of all household members were collected mainly from the head of the household during the general census survey. This information was also used with sample survey data. In the sample survey, in depth information on economic status indicators including ownership of land, livestock, and equipments

regarded as household's human, natural and physical capital, production data of all cereals, pulses, spices and other minor crops, livestock and livestock products and problems related to crop and livestock farming, market, infrastructures and so on were collected. All these information were considered during the analysis to assess the food security status of the household.

In the field of nutrition, food security is measured in two ways, based on consumption per equivalent male adult and consumption based on age and sex without converting equivalent male adult. Under nutrition can be viewed as a specific type of poverty, namely food energy poverty. For the purpose of food security analysis in this study, food balance sheet and aggregate household calorie consumption have been constructed and food security condition was calculated based on calorie requirement, according to sex and age of household members recommended by Food and Agriculture Organization (FAO). Consumption below the minimum level of calorie requirement indicates food insecurity condition. The food insecurity measures discussed in this paper are Head Count Method, Food Insecurity Gap, and Squared Food Insecurity Gap² to capture successively more detailed aspects of the food insecurity at the household. Hence,

$$IFI = \frac{FIH}{TH} \times 100 \dots\dots\dots i$$

Where, *IFI* = Incidence of Food Insecurity
FIH = No of Food Insecure Households
TH = Total Households under study

$$FIG_i = \frac{TCR_i - TCC_i}{TCR_i} \dots\dots\dots ii$$

Where, *FIG_i* = Food Insecurity Gap of *i*th food insecure household
TCR_i = Total Calorie Requirement for *i*th food insecure household
TCC_i = Total Calorie Consumption by *i*th food insecure household

Therefore, total food insecurity gap is:

$$TFIG = \sum_{i \in n} \frac{TCR_i - TCC_i}{TCR_i} / FIH \dots\dots\dots iii$$

Where, *TFIG* = Total Food Insecurity Gap, which indicate the depth of food insecurity among the food insecure households
n = No. of food insecure households

² Food Insecurity Gap and Squared Food Insecurity Gap are not analogous to the poverty gap (PG) and the squared poverty gap (SPG) indicators. In this analysis FIG and SFIG were calculated among the food insecure groups excluding food secure households. PG and SPG include both poor and non-poor.

$$SFIG = \sum_{i \in n} (FIG_i)^2 / FIH \dots\dots\dots iv$$

Where, SFIG = Squared Food Insecurity Gap, which indicates severity of food insecurity among the food insecure households

Households can be divided into three groups based on food security status i.e. chronically food insecure, potentially food insecure and food secure (Lovendal, 2004). This study also used Lovendal criterion to distinguish the households into three different types of food security status based on calorie deficit situation. Chronically food insecure group is less than 6 months food secure (i.e. more than 50% of the time in a year, households are calorie deficit). Potentially food insecure group falls under 6 to less than 12-month food secure (i.e. less than 50% of the time in a year, households are calorie deficit). Food secure are 12 and more month calorie sufficient for their consumption.

2. Results and Discussion

2.1 Household's Socio-Economic Characteristics and Resource Distribution

The dominant social group in the study village is *chhetri* (53.9%). About 12.5% households are occupational castes like *damai* (tailor), *kami* (iron smith), *sarki* (shoe maker) and *sunar* (jewelry makers). *Bahun* and *magar* are 12.5% and 21.1%, respectively (**Table 1**). The education level of the household head is very poor and majority of them are illiterate (59.1%). Very few household heads have education above higher secondary level.

Agriculture is a dominant job in the study area. Casual laboring, particularly in agriculture sector, is an important income source for land-poor households. Due to the lower educational level few household heads and members are engaging in service sectors. Few households belonging to occupational caste are continuing their professional works as the main job. In the passage of time these people faced hardship to sustain their livelihood only with occupational works. Therefore, they had shifted their original job to farming, wage laboring and other activities. Apart from farming people also have some non-farm jobs. Some of the adult members in the households are engaged in one or several types of non-farm jobs within or outside the country. Temporary migration in search of income opportunities to the places outside the village within and outside the country is general phenomenon for adult members in the village.

The crucial assets for farming households are land, labor and livestock. The average family size in the village is 7.5, which is higher than national average (5.4) and majority of the households (67.2%) have 5-10 individual in their family (**Table 2**). The dependency ratio i.e. number of members <15 aged is about 0.40. This means 40% of household members are dependent on other adult family members for their livelihood. The farming in the village, which is subsistence in nature, is operated on an average farm size of less than a hectare. The average landholding size is 0.71 hectare, 35.9% households are small holders (<0.5 ha), and 60.9% are medium holders (0.5 to 2 ha). Only 60% of the households own the irrigated land. Farmers are raising different types of livestock like cow, buffalo, bullock, goat and poultry. The average livestock ownership is calculated by LSU³ (Livestock Standard Unit), which help

³ 1 Buffalo and Cattle = 1 LSU, 1 Sheep and Goat = 0.2 LSU, 1 Poultry = 0.01 LSU according to central bureau of statistics of Nepal.

Table 1. Distribution of households based on socioeconomic characteristics

Attributes	No of household	Percentage
Caste/ethnicity		
Bahun	16	12.5
Chhetri	69	53.9
Magar	27	21.1
Occupational caste	16	12.5
Main job of HH*		
Agriculture	116	90.6
Business	4	3.1
Labor	4	3.1
Service	4	3.1
Landholding		
Small (<0.5 ha)	46	35.9
Medium (0.5 to 2 ha)	78	60.9
Large (>2 ha)	4	3.1
Livestock holding		
1-5 LSU	78	59.4
6-10 LSU	42	32.8
Above 10 LSU	10	7.8
No livestock	5	3.9
Family size		
<5 members	16	12.5
5-10 members	86	67.2
Above 10 members	26	20.3
Household expenses**		
Below 50 thousand	48	37.5
50-100 thousand	61	47.7
Above 100 thousand	19	14.8

Source: Household Survey, 2002. *Household Head, **Proxy for household income.

Table 2. Descriptive statistics of household's socio-economic characteristics

Attributes	Minimum	Maximum	Mean	Std. deviation
Family size	1.00	26.00	7.54	3.4318
Education of family members	0.00	3.67	1.53	0.6706
Education of household head	0.00	6.00	1.03	1.4577
Irrigated landholding	0.05	3.00	0.28	0.3676
Non-irrigated landholding	0.05	1.25	0.53	0.2652
Landholding	0.05	3.50	0.71	0.4598
Livestock holding	0.00	23.10	5.58	4.1223

Source: Household Survey, 2002.

to aggregate the number of different types of livestock owned by a family. The average livestock holding size is 5.48 LSU and 59.4% households own 1-5 LSU.

The crucial assets for farming households are the productive ones such as land, labor and livestock. The distribution of resources according to caste/ethnicity⁴ is highly unequal, particularly in the case of landholding (type and area), livestock holding and educational level of family members (**Table 3**). In land size and quality of land *bahun* and *chhetri* are better endowed than *magar* and occupational caste⁵. Table 3 shows that *bahun*, *chhetri* and *magar* have better labor endowment in terms of family size compared to occupational caste. Of course, larger family size increases at the same time the number of consuming units. In all caste/ethnic groups dependency ratio is more than 40% and educational level is very low. Among the caste/ethnic group educational level is quite low in occupational caste.

Table 3. Distribution of resources according to caste/ethnicity

Attributes	Caste/ethnicity			
	Bahun	Chhetri	Magar	Occupational caste
Total landholding (ha)	0.59	0.64	0.58	0.31
% Of irrigated land	22	20	12	11
% Of unirrigated land	78	80	88	89
Livestock holding size	5.42	5.95	6.75	4.09
Family size	6.20	6.29	6.46	5.79
Dependency	0.42	0.40	0.40	0.41
Education level*	1.28	0.96	0.67	0.62

Source: Household Survey, 2002. *Average number of schooling year.

2.2 Food Security Status among Rural Households

The head count method of food insecurity analysis indicates that majority of households (74%) are food insecure and are not capable to manage food demand even through the combination of different coping strategies. **Table 4** shows that 22.7% households are chronically food insecure, 51.5% households are potentially food insecure and 25.8% households are food secure.

Table 4. The food security condition in the research area

Food security condition	No. of households	Percent
Chronic food insecure	29	22.7
Potentially food insecure	66	51.5
Year round food secure	33	25.8
Total	128	100

Source: Household Survey, 2002.

⁴ One integral aspect of Nepalese society is the existence of the Hindu caste system, modeled after the ancient and orthodox Brahmanism of the Indian plains. Its establishment became the basis of the emergence of the feudalistic economic structure of Nepal: the high-caste Hindus began to appropriate lands— particularly lowlands that were more easily accessible, more cultivatable, and more productive. They also enjoy more seen and unseen benefits in the society.

⁵ Occupational caste – also known as Dalits, is a group of people outside of the four castes (*bahun*, *chhetri*, *baisya*, *sudra*), and socially discriminated as polluters, though illegal by law.

The incidence, depth and severity of food insecurity according to socio-economic characteristics are shown in **Table 5**. In total sample households, the incidence of food insecurity, average food insecurity gap and square of food insecurity gap are 74%, 0.33 and 0.14, respectively. The average depth of food insecurity is lower in *bahun* than in other caste. This depth is 1.5 times higher in occupational caste than *bahun* but severity is 2.5 times higher. The incidence of food insecurity is highest in *magar* but depth and severity of food insecurity is lower than *chhetri* and occupational caste. The reason is that most of the *magar* households fall in potential food insecure group with less than 50% calorie deficit, where as in the cases of *chhetri* and occupational castes, more numbers of households fall under chronic food insecure group with more than 50% calorie deficit. Similarly, both depth and severity of food insecurity is higher in small landholders and livestock holders, laborers, and households having less expenses. It was found that same and higher level of incidence of food insecurity is not directly related to higher depth and severity of food insecurity. This analysis also indicates that distribution of resources have influence to the household's food security status. Large land and livestock holders, business and service jobholders, and households with high-income level (proxy of household's expenses) are more food secure.

Table 5. Incidence, depth and severity of food insecurity according to socio-economic characteristics of households

Attributes	Incidence of food insecurity	Depth of food insecurity	Severity of food insecurity
Caste			
Bahun	68%	0.26	0.08
Chhetri	71%	0.33	0.15
Magar	85%	0.30	0.12
Occupational caste	75%	0.41	0.20
Farm size			
Small (<0.5 ha)	76%	0.47	0.24
Medium (0.5 to 2 ha)	75%	0.29	0.11
Large (>2 ha)	50%	0.14	0.04
Livestock			
<6 LSU	82%	0.34	0.17
6-10 LSU	64%	0.31	0.13
Above 10 LSU	60%	0.30	0.11
Main Job of HH			
Agriculture	74%	0.32	0.14
Labor	75%	0.47	0.30
Business	75%	0.28	0.08
Service	75%	0.27	0.10
Expenses			
<50 thousands	77%	0.32	0.14
50-100 thousands	77%	0.34	0.16
>100 thousands	57%	0.28	0.09
Aggregate	74%	0.33	0.14

Source: Household Survey, 2002.

2.3 Food Security – Temporal Dimension

The most difficult months to manage food requirement according to household's food security status is shown in **Table 6**. Table presents the response of households they feel difficulty to manage the food requirement due to deficit in own production. In chronic food insecure group, the food deficit situation exists in the month of May to September and February to April. This is relatively more than the deficit months faced by potentially food insecure and food secure groups. In these two groups, the food deficit situation exists in the month of late June to early August and late February to early April. This problem exists just before the harvest of main crops. In the study area, wheat, maize and rice are harvested in April, August and November, respectively. After the harvest of rice in November, the entire households have enough to eat. But the food stock gets dried in March, and in chronic food deficit group, the food deficit condition starts to prevail as early as late January because of their less rice production. This situation is somewhat improved in April-June with the harvest of wheat, providing short relief. The severity of food deficit is found in late June to early August as the self-food stock dries completely and the food prices in the local market shoot high. This problem is further aggravated by start of monsoon rain that disrupts transportation of food from the plains. This problem is particularly acute for the chronic food insecure households, who can't stock any food as they even have to sell portion of their produced food soon after the harvest, comparatively at cheaper price, in order to maintain households cash demand for other purposes. These households are compelled to take food loan from the local merchants and landlords during this time, to be paid later in cash, kind or labor. Potentially food insecure group manages this crisis slightly better. Whereas, the food secure group overcomes it with different coping strategies. The food deficit conditions improve in August after the harvest of maize, the other major food crop. Most of them don't face food deficit till the harvesting time of rice the following November.

Table 6. Food deficit months perceived by households according to household's food security status

Months	Total No of Responses	Chronic food insecure	Potentially food insecure	Food secure
Baisak (April-May)	17 (13.28)	5 (17.24)	9 (13.63)	3 (9.09)
Jestha (May-June)	22 (17.18)	7 (24.13)	11 (16.67)	4 (12.12)
Ashad (June-July)	36 (28.12)	10 (34.48)	18 (27.28)	8 (24.25)
Shrawan (July-August)	79 (61.71)	21 (72.41)	40 (60.61)	18 (54.55)
Bhadra (August-September)	30 (23.43)	11 (37.93)	12 (18.19)	7 (21.22)
Ashoj (September-October)	3 (2.34)	2 (6.89)	1 (1.51)	0
Kartik (October-November)	1 (0.78)	1 (3.44)	0	0
Mansir (November-December)	0	0	0	0
Push (December-January)	2 (1.56)	1 (3.44)	1 (1.51)	0
Magh (January-February)	5 (3.90)	3 (10.34)	1 (1.51)	1 (3.03)
Falgun (February-March)	37 (28.90)	6 (20.68)	22 (33.34)	9 (27.27)
Chaitra (March-April)	61 (47.65)	10 (34.48)	37 (56.06)	14 (42.43)

Source: Household Survey, 2002. Value in parentheses is %.

2.4 Problems influencing Household Food Security

Table 7 presents the problems perceived by the survey households in the study area. All problems are

not equally important but they influence directly or indirectly the food security condition of the households. In crop production, diseases and pests, lack of improved technology and inputs and dependency on rainfall are major problems for low food production. Less productive local breeds and severity of animal diseases are major problems in livestock raising. Rural markets are not well developed for agriculture and livestock products. Hence, farmers couldn't get reasonable price for their produce. On the other hand, due to higher transportation cost, food price in the market is quite high as compared to urban areas. The provision of social services and agriculture extension are weak and concentrated in the district headquarters.

Table 7. Risk factors associated with different aspects of livelihood

Livelihood aspects	Risk factors
Crop production	-Diseases and insects -Lack of knowledge and training -Lack of improved seeds -Less available land for cultivation -Lack of manure and fertilizers -Rainfed agriculture and lack of irrigation -Traditional method of cultivation
Livestock raising	-Diseases -Lack of improved breed -Lack of forest for grazing and year round collection ban of livestock need forest products from community forest
Market	-Less access to market -No reliable means of transportation -High transportation cost -Low market price for home products -Lack of bargaining power -High food price in the market during food deficit season
Irrigation development	-Lack of water sources in the village -Lack of irrigation canal (to bring water from distance sources) -Geographical difficulty to develop irrigation facility
Development of cottage industry	-Lack of knowledge and training -Lack of equipments and raw materials
School	-Lack of awareness about importance of education -Lack of schools
Health care	-Lack of health posts -Lack of health related programs -Lack of health awareness
Extension services	-JT/JTA seldom visit villages -Large farmers have approach to extension services -Weak distribution of technology and inputs

Source: Household Survey, 2002.

2.5. Household Food Deficit Coping Strategies

More than 75% of households under this study produce not enough food to fulfill their household's food demand. Households that are vulnerable to food security adopt different strategies to reduce, mitigate and cope with risk and shocks that affect them, based on the options offered by their internal resource endowment and their access to external assistance. Households are found to depend on different strategies to cope with food deficit situation. Households with more month of food self-sufficiency (>8 months) may able to manage overall calorie requirements by adopting combination of coping strategies. However these strategies are helpful for less food self insufficient households to sustain their life rather than to make them food secure. These food deficit coping strategies might be *ex ante* and *ex post*. **Table 8** shows the different coping strategies to fulfill household food demand. Among the coping strategies, casual laboring, occupational work, paper and handicraft making, service and business are *ex ante* coping strategies. Sale of agriculture and livestock products and temporary migration may be both *ex ante* and *ex post* coping strategies. Collection of wild foods, loan for food, use of saving and use of pensions are *ex post* coping strategies. But in the study area collection of forest products like fuel wood, fodder, grass, leaf litter etc. are common practices for agriculture and livestock farming. Therefore, collection of forest products other than food items for agriculture and livestock farming is an *ex ante* coping strategies.

Table 8. Household food insecurity coping strategies

Coping strategies	No of households	Percent
Collection of wild food	70	54.7
Loan for food	37	23.9
Casual labor	25	19.5
Sale of agriculture produce	19	14.8
Use of saving	15	11.7
Service within country	13	10.2
Sale of livestock	13	10.2
Temporary migration to India	12	9.4
Occupational work	9	7.2
Paper making	4	3.1
Business	4	2.3
Pension	3	2.3

Source: Household Survey, 2002.

2.5.1 Working as a Casual Laborer

Working as a casual laborer is widely adopted in the study villages, particularly resource poor households are engaged in casual labor for their livelihood. Working as casual laborer includes agricultural laborer during the agriculture season and non-agricultural laborer such as portering, carpentry, and work in government constructing infrastructures. Working as an agricultural laborer is widely prevalent because agriculture is the main job of rural people. On the other hand, mutual exchange of labor is common practices in rural agriculture. This arrangement helps small holders to mitigate their own labor shortages during peak season without incurring cash wage. Portering is done mainly for transporting goods of local merchants and baggage of peoples who are coming to districts from outside (tourist &

visitors, job holders and the villagers working out side the district and country). Despite work in local areas, large number of people go to places outside the district and other countries (mostly India) to work as a casual laborer. Men and boys from the marginal farm households in the study area often migrate to the Tarai and India in search of paid agricultural and off-farm work. In the study villages, about 20 percent of households reported that casual labor is one of the coping strategies to maintain food demand. Like wise about 10 percent of households reported temporary migration to India for casual laboring is another coping strategy. This coping strategy when undertaken as *ex ante* can be understood as a measure against income shock. But when undertaken as *ex post* it is a measure to mitigate the income shock.

2.5.2 Occupational Work

Occupational caste groups are tied in a social relationship with households of the upper caste, who customarily pay them a fixed amount of grain after harvest. This traditional patron-client relationship known as Bista system still exists in the rural areas particularly with tailors and ironsmith. For lower caste households, i.e., *kami*, *damai* and *sarki* their occupational work is no longer enough to support their year round food demand. Some of them are doing this occupational work just to cope with the food crisis. Among them *damais* are more dependent on their occupational work. They lend their services throughout the year to their Bistas and collect seasonal agricultural products from them during each harvesting time. This traditional system of Bista is also a measure to mitigate income shock for the occupational caste. However, many of the rural occupational people have changed their main livelihood to agriculture or wage laboring to cope with the reduced demand for their services. Out of 16 households belonging to occupational caste under this study, 9 households (56.25%) are engaged in their respective occupational works to cope with the risk of household's food deficit condition.

2.5.3 Sale of Agricultural and Livestock Products

Income generation through the sale of agriculture produces particularly cash crops and live animals like goat, poultry and sometimes cow and buffalo are some of the common in house coping strategies for food deficit households. Sale of agriculture produce and livestock is found more in higher food

Table 9. Coping strategies through the sale of agricultural and livestock products to food security status and caste/ethnicity

Food security status and caste/ethnicity	Sale of agriculture produce		Sale of livestock		Total
	No sale	Sale	No sale	Sale	
Food security status					
Chronic food insecure	23 (78.31)	6 (20.68)	27 (93.10)	2 (6.89)	29
Potentially food insecure	49 (87.5)	7 (12.5)	50 (89.28)	6 (10.71)	56
Food secure	39 (90.69)	4 (9.30)	38 (88.37)	5 (11.62)	43
Caste/ethnicity					
Bahun	12 (75.00)	4 (25.00)	14 (87.50)	2 (12.50)	16
Chhetri	61 (88.40)	8 (11.59)	60 (86.96)	9 (13.04)	69
Magar	25 (92.59)	2 (7.40)	26 (96.29)	1 (3.07)	27
Occupational caste	11 (68.75)	5 (31.25)	15 (93.75)	1 (6.25)	16
Total	109	19	115	13	128

Source: Household Survey, 2002. *Value in parenthesis is percentage.

secure households (**Table 9**). Such coping strategy is *ex ante* and a measure against the anticipated income shock, in general. It is due the fact that these households have more land and LSU and can produce more cash crop and livestock products for marketing purposes. In relation to caste/ethnicity, coping strategy through livestock sale is found higher in *bahun* and *chhetri* households than *magar* and occupational castes. But sale of agriculture produce is found higher in *bahun* and occupational castes. The latter one is indeed a distress sale.

2.5.4 Collection of Forest Products

Collection and selling of forest products is common practices in the study area. Almost all households have access to either community or government forest resources. Forest access has both direct and indirect impact on the household's food security. Households can collect directly consumable food items for home consumption. They can also collect forest products like herbs, firewood, wild fruits, barks and leaves that can be used to prepare medicine and spices and sell these products for extra cash income. Access to forest resources in the study area is also important to sustain livestock based agriculture system. Collection of fodder, grass, leaf litter and animal grazing are common practices. In this study almost all households collect some kinds of forest products and about 55% of the households collect wild foods for home consumption. Chronic food insecure households and occupational caste are depending more on collection of wild foods to fulfill household's food demand (**Table 10**).

Table 10. Coping strategies through the collection of wild foods according to food security status and caste/ethnicity

Food security status and caste/ethnicity	Collection of wild foods		Total
	No collection	Collection	
Food security status			
Chronic food insecure	12 (41.37)	17 (58.62)	29
Potentially food insecure	24 (42.85)	32 (57.14)	56
Food secure	22 (51.16)	21 (48.83)	43
Caste/ethnicity			
Bahun	11 (68.75)	5 (31.25)	16
Chhetri	25 (36.23)	44 (63.76)	69
Magar	17 (62.96)	10 (37.03)	27
Occupational caste	5 (31.25)	11 (68.75)	16
Total	58 (45.31)	70 (54.68)	128

Source: Household Survey, 2002. *Value in parenthesis is percentage.

2.5.5 Borrowing Food or Money

Many food insecure households borrow grain as a loan or directly money to cope with food deficit periods. In the beginning, the poor and disadvantaged people knock the door of neighbors, friends and relatives for food grains and money. In extreme cases they go to local landlord and merchants. Generally poor wage laborers borrow from their landlords in advance and pay later. But when there are not many people in the community with the surplus of food then the food insecure households have to visit local food traders to ask for food grains as a loan or visit local landlords and moneylenders and ask for loan.

Due to lack of assets that can be used as collateral (that is required by formal credit institutions), poor and marginal households rely on informal credit sources with high interest rate. Although interests can be paid through casual labor in different seasons, it could well tax the food insecurity condition and degrade it further. The interest on loan of cash and food received from different informal sources ranges from 20 to 60 percent. In the study area, local saving and credit groups are providing loans for its members during the time of hardship. They charge low interest rate for the members. But this practice is only common among relatively resource rich households than the poor ones. **Table 11** presents distribution of loan taking households to procure food according to food security status and caste/ethnicity. In this study, chronic food insecure household, *chhetri* and occupational castes are depending more on loan for food. This measure is virtually *ex post* measure to overcome the economic shock that can lead a household to a vicious circle if not managed properly.

Table 11. Coping strategies through the use of loan to food procure according to food security status and caste/ethnicity

Food security status and caste/ethnicity	Use of loan to food procure		Total
	Use no loan	Use loan	
Food security status			
Chronic food insecure	17 (48.27)	12 (41.37)	29
Potentially food insecure	44 (78.57)	12 (21.42)	56
Food secure	30 (69.76)	13 (30.23)	43
Caste/ethnicity			
Bahun	15 (93.75)	1 (6.25)	16
Chhetri	43 (62.31)	26 (37.68)	69
Magar	22 (81.48)	5 (18.51)	27
Occupational caste	11 (68.75)	5 (31.25)	16
Total	91 (71.09)	37 (28.90)	128

Source: Household Survey, 2002. *Value in parenthesis is percentage.

2.5.6 Other Coping Strategies

Temporary migration to outside the district (within country) and other countries, occupational work, paper making, pension and use of savings are other food deficit coping strategies. Petty trading is another kind of coping strategy in rural areas. Some people do this business when income is not sufficient to meet household demand for food. For example, some people buy livestock and agriculture products in village and sell them in district headquarters. But these options are not common for most of the food insecure households. Income generation by selling household made products like bamboo products (*doko*, *dalo*, mats, etc.), ropes prepared from the fiber of plants and woodcrafts (container for curd preparation, ghee storage, etc.) are *ex ante* and *ex post* measures also found in the study area. These measures help to overcome the economic shocks, as well. Beside these food deficit coping strategies, household members also practice other coping strategies like reduction of amount of diet by all members, reduction of diet by elder members of household, and so on. But this study did not consider intra-household food distribution and dietary practices among household members.

3. Conclusions

This analysis has shown that for Nepal, commonly used indicators of food security at the regional and national level are often poor predictors of household food security. In this study of food security analysis based on calorie consumption at household level, it is found that majority of the households (74%) are food insecure. Among them 22.7% households are chronic food insecure (consume less than 50% of total calorie requirement). The uneven distribution of resources aggravated the food insecurity status in the study area. All the socio-economic indicators are better for higher caste people. The comparison among the households based on socio-economic characteristics indicates that the depth of food insecurity and the severity of food insecurity are different according to socio-economic characteristics of the households. Both depth and severity of food insecurity are higher in occupational caste, small farms and less LSU holders, laborers, and households having minimum expenses.

Another result from this study is that households adopt combination of different coping strategies like working as a casual laborer, collection of wild foods, seasonal migration to the places outside the district or country, sale of agriculture and livestock products, use of savings, loan for food, and so on. These coping strategies also differ according to level of resource endowment, caste/ethnicity and food security status of the households. Those households who are relatively rich in resource endowment can adopt many *ex ante* measures, such as, increase in agriculture and livestock products through use of improved technology and income diversification through engaging in professional jobs and business. But the poorer ones are more dependent on *ext post* measures such as casual laboring, collection of wild foods and migration to outside the district or out side the country to fulfill the household's food demand. They also face more income shocks than resource rich households. The nature of these coping strategies also indicates both their severity of food insecurity and opportunities available for them to manage the food crisis. Policy institutions (governmental and non-governmental) can response to the food insecure households based on their *ext ante* and *ex post* coping strategies with targeted policy and programs.

Rural households face many problems that are associated with different aspects of livelihood, such as, food production, livestock farming, irrigation, marketing, delivery of social services and infrastructure development. Some of the problems are manageable for rural people but some need more capitals, which rural people cannot manage without external assistance. This indicates that there is a space for policy intervention by government and non-governmental organizations to overcome the problems and alleviate their food insecurity.

Some of the options to manage food insecurity would be to increase food production through the provision of improved cultivation methods and inputs and to develop infrastructures for easy movement of food items from surplus area of plains (Tarai) to deficit area (Hills and Mountain). On the other hand, provision of off-farm income opportunities for resource poor households is necessary and this needs rapid development of non-agriculture sector in coordination with agriculture sector. Finally consideration of household's socio-economic characteristics in food security management programs will be at the core of successful food security policies in the rural areas of Nepal.

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References

- ADB (2002), *Poverty Reduction in Nepal: Issues, Findings and Approaches*. Asian Development Bank, Manila.
- Awang, J., B.S. Paul and L.J. Steen (2001), *Vulnerability: A View From Different Disciplines*, Social Protection Discussion Paper Series, Social Protection Unit, Human Development Network, World Bank.
- CBS (2002), *Statistical Year Book of Nepal*, HMG, Kathmandu, Nepal.
- CBS (2003), *Population Monograph of Nepal (Vol. II)*, HMG, Kathmandu, Nepal.
- CBS (2004), *National Sample Census of Agriculture Nepal*, HMG, Kathmandu, Nepal.
- Christiaensen, L. and R.N. Boisvert (2000), *On Measuring Household Food Vulnerability: Case Evidence from Northern Mali*, Working Paper WP 2000-05, Department of Agricultural, Resource and Managerial Economics, Cornell University, Ithaca, NY.
- Ellis, F. (2000), *Peasant Economics, Farm Household and Agrarian Development*, Newcastle: Cambridge University Press.
- Loveldal, C.R. (2004), *Food Insecurity and Vulnerability in Nepal: Profiles of Seven Vulnerable Groups*, ESA Working Paper No. 04-10. ADED/FAO, Italy.
- Pyakuryal, B. (2004), Food Security: Need to Devise a Better Supply System. *The Himalayan Times*, November 22, Kathmandu Nepal.
- Rudie, I. (1995), The Significance of Eating: Co-operation, Support and Reputation in Kelantan Malay Household. In: Karim, W.J. (Ed.). *Male and Female in Developing Southeast Asia*, Oxford: Berg Publishers.
- Sen, A.K. (1981), *Poverty and Famines: An essay on Entitlement and Deprivation*, Oxford: Clarendon Press.
- UNDP (2004), *Nepal Human Development Report 2004: Empowerment and Poverty Reduction*, United Nations Development Program. Kathmandu, Nepal.
- WFP (2001), *NEPAL: Food Security and Vulnerability Profile 2000*, VAM Unit, World Food Program Nepal.
- World Bank (1986), *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*. World Bank, Washington DC.

Appendix A.

Household's socioeconomic characteristics at village level

Attribute	Frequency	Percent	Cumulative percent
Caste			
Bahun	136	9.9	9.9
Chhetri	978	71.3	81.2
Gurung Magar	70	5.1	86.3
Occupational	188	13.7	100.0
Education of HH*			
Illiterate	811	59.1	59.1
Can read	277	20.2	79.3
Primary	92	6.7	86.0
Lower secondary	23	1.7	87.7
Secondary	147	10.7	98.4
Higher secondary	13	0.9	99.3
Above HS	9	0.7	100.0
Main job of HH			
Agriculture	1179	85.9	85.9
Business	29	2.1	88.0
Labor	69	5.0	93.1
Service	64	4.7	97.7
Occupational work	31	2.3	100.0
Farm size			
Small	624	45.5	45.5
Medium	722	52.6	98.1
Large	11	0.8	98.9
Landless	15	1.1	100.0
Family size			
<5 members	484	35.3	35.3
5-10 members	779	56.8	92.1
>10 members	109	7.9	100.0
Livestock holding size			
1-5 livestock	706	51.5	51.5
6-9 livestock	429	31.3	82.7
>10 livestock	184	13.4	96.1
No livestock	53	3.9	100.0
Food sufficiency months			
<3 months	59	4.3	4.3
4-6 months	291	21.2	25.5
7-9 months	422	30.8	56.3
>10 months	557	40.6	96.9
Not specified	43	3.1	100.0
Total household	1377	100	

*Indicate household head

