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**Household Food Security in Rural Areas of Nepal: Relationship between Socio-economic Characteristics and Food Security Status**

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# **Household Food Security in Rural Areas of Nepal: Relationship between Socio-economic Characteristics and Food Security Status**

## Abstract

One of the main development goals of Nepal is to reduce the number of chronically undernourished people all over the country by half by the year 2015. In consonance to this, this study examines food security and its relationship with socio-economic characteristics among rural households in the remote western mountains of Nepal. Accordingly, the relationship between household's resource endowment and food security status was analyzed based on the calorie requirement for all household members according to their sex and age. The food security measures applied in this paper are Head Count Method, Food Insecurity Gap, and Squared Food Insecurity Gap to capture successively more detailed aspects of the food insecurity status of the household. It was found that majority of the households in the region are food insecure and depth and severity of food insecurity varies according to socio-economic characteristics of the households. Resources are disproportionately distributed in favor of higher castes and these groups are more food secure as compared to lower caste people. As compared to food insecure households food secure households have small family size, lower dependency ratio, higher percentage of irrigated land, and more total land and livestock holdings. Hence, it is concluded that food security strategies should consider socio-economic characteristics of households in order to achieve more than a marginal reduction in the number of chronically undernourished people.

*Key words:* Food security, calorie, socio-economic characteristics, rural households, Nepal.

## **1. Introduction**

Over time, definitions of food security have moved from a focus on supply to questions of distribution and access. Initially, food security meant avoiding transitory shortfalls in the aggregate supply of food and simple understanding was that supply indicators are highly correlated with the true but unmeasured indicators of household or individual access to food. Despite a growing world abundance of food, famines and other food-related crises continue to occur. Disparities in food security within countries are common even if the country has sufficient food in aggregate during the normal times. With increased observation of disparities in the sufficiency of food intake by certain groups, despite overall adequacy of supply, the term food security has been applied more recently mostly at community, household or individual levels (Foster, 1992) and has been broadened beyond notions of food supply to include elements of access to food (Sen, 1981). Thus, the conceptual understanding of food insecurity has gradually evolved over the past twenty-five years to include not only transitory problems of inadequate supply at national level but also chronic problems of inadequate access and unequal distribution at the household level.

Nowadays, food security is widely defined as ‘access by all people at all times to enough food for an active healthy life’. Food insecurity is, therefore, the inability of a household or individual to meet required consumption levels in the face of fluctuating production, prices and incomes. Sen (1981) states that the production and income level determines the ability of household or individual’s access to food. He uses the notion of entitlements to explain the complexity of an individual’s access to food. Entitlements encompass two dimensions: endowment and exchange. Endowment includes all forms of capitals (natural, physical, human, financial and social) and that has an exchange value. On the other hand, household’s socio-economic characteristics

indicate level of resource endowment and capacity of exchange to food in the community. Inequality in assets ownership (particularly size and type of land ownership, livestock holding), human capital (e.g. number of adult members and educational level) as well as other forms of capital can affect the food production and access to off-farm income, which can enhance the ability of households to acquire food other than production.

In Nepal, food insecurity remains a fundamental challenge and the issue of food insecurity has high importance in development policies. At the world food summit in 1996, Nepal along with 184 other countries made a commitment to reduce the number of chronically undernourished people by half by the year 2015 (FAO, 2002). There is a slight improvement in Nepal in total food production since late 1990s and “the aggregate supply is regarded as adequate to fulfill the requirement of the country population” (CBS, 2003). In spite of this growing abundance of food in the country, about 47% of population consumes less than the dietary requirements and 48% of the children are undernourished (FAO, 2004). This disparity indicates merely increase in food supply is not sufficient to make all people food secure or national level supply indicators may not be true indicators of household or individual access to food.

Table 1: Food security related indicators

Selected statistics	1990-92	1995-97	2000-02
1. Food supply (Kcal/person/day)	2340	2230	2440
2. Number of undernourishment (million)	3.9	5.6	4.0
3. Percentage of population below dietary energy consumption	49	NA	47
4. Proportion of undernourishment (%)			
Nepal	20	26	17
South Asia	26	23	22
Asia and the Pacific	20	17	16

Source: FAOSTAT, 2004.

In order to understand the food security status and factors affecting access to food at the household level, a detail study at that level is necessary. Hence, this study seeks to understand the relationship between household socio-economic characteristics and food security status in

rural areas of Nepal. Identification of the food insecure groups and achieving a better understanding of the determinants of food security are crucial for designing effective food security programs. Therefore, this study attempts to grasp the household food security condition in Nepal by focusing on the following objectives of, (i) identifying the relationship between household socio-economic characteristics and food security status in the study area, (ii) finding out the incidence, depth and severity of food insecurity among the rural households, and (iii) identifying the possibilities to increase agriculture production to improve household food security status.

## **2. Data and analysis methods**

In this study the household is recognized as basic unit of analysis, which includes one or more individuals, who share economic activities necessary for the survival of the household and for the generation of well being for its members. New household economics views the household as a utility-maximizing unit under the altruistic leadership of the household head as ignoring gender-based intra-household inequalities (Niehof, 2004). The unitary model assumes that decisions within a household are made jointly and that the household maximizes a single set of objectives for its members (Ellis 1988).

Primary data on household level variables were collected through a survey of 128 households in two village development committees (VDC<sup>1</sup>) in Dailekh district of Nepal. All sample households were selected based on stratified random sampling to capture the different socio-economic variations of the households. Through the questionnaire survey, data were collected on different aspects of household livelihood, including household demography, food production, marketing and consumption of food items, assets, and total consumption expenses including non-food items.

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<sup>1</sup> Lowest administrative unit, which includes 9 wards within its area.



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

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

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

### 3. Socio-economic characteristics and resource distribution

Table 2 presents the demographic and socio-economic characteristics of households from the survey of all households (1,372) in two VDCs. The average family size in study area (6.2) is higher than national average (5.4) and majority of the households (56.8%) have 5-10 members in their family. Family size would have effect on labor resource as well as on consumption of the household. Only 48.8% people are literate in the study villages. It is argued that higher education in the rural community opens up better employment opportunity and diverts people from subsistence agriculture to off-farm economic activities. This can help to increase the access to food through increase in income level.

The farming in the village, which is subsistence in nature, is operated on an average farm of less than a hectare per household. The average landholding size is 0.58ha per household. Nearly



half (45.5%) of the households are small farms (with < 0.5ha of landholding) but they own only 24.2% of the total land indicating that the land distribution is rather unequal. Only 18% of the land is irrigated. The average livestock holding per household is 5.8 and more than 50% of the households own only 1-5 Livestock Standard Unit (LSU<sup>2</sup>).

Table 2: Demographic and socio-economic characteristics of sample households

Attributes	Value
Average family size	6.24
Literacy rate	48.8%
Dependency ratio (ratio of no. of members under 16 to the family size)	0.41
Total landholding (ha)	0.58
Share of non-irrigated land	82 %
Share of irrigated land	18 %
Livestock holding (LSU <sup>*</sup> )	5.78
Caste/ethnicity	
Bahun	12.2 %
Chhetri	52.4 %
Magar	21.4 %
Occupational caste	14.0 %
Main job of household head	
Agriculture dependent	85.9 %
Other occupation	14.1 %

Source: Field survey, 2002. Note: \* Livestock Standard Unit.

Majority of the households in the study villages depend on agriculture as a major occupation (85.9%) and dominant caste<sup>3</sup> is *Chhetri* (52.5%). About 14.0% of the households belong to occupational castes, such as, Damai (tailor), Kami (iron smith), Sarki (shoe maker), and Sunar (jewelry makers). Of the rest, Bahuns and Magars are 12.2% and 21.4%, respectively. The productive resources, such as, land, labor and livestock are crucial assets for farming households

<sup>2</sup> According to Central Bureau of Statistics of Nepal, 1 Buffalo and Cattle = 1 LSU, 1 Sheep and Goat = 0.2 LSU, 1 Poultry = 0.01 LSU.

<sup>3</sup> One integral aspect of Nepalese society is the existence of the Hindu caste system, modeled after the ancient and orthodox Brahmanic system of the Indian plains. Its establishment became the basis of the emergence of the feudalistic economic structure of Nepal: the high-caste Hindus, i.e., Bahun and Chetri 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 than the occupational caste people, also known as Dalit, outside the four castes of Bahun, Chetri, Vaisha and Shudra, and ethnic people, such as Magar, who do not come under this caste system in strict sense, but accommodated as intermidietory group(s), between the Bahuns and the Dalits.

and directly affect their food acquiring abilities. The distribution of these resources according to caste/ethnicity is unequal (Table 3).

Table 3: Distribution of resources according to caste/ethnicity

Attributes	Caste/ethnicity				F-value
	Bahun	Chhetri	Magar	OC	
Total landholding (ha)	0.59	0.64	0.58	0.31	31.83***
Share of irrigated land (%)	22	20	12	11	19.01***
Share of non-irrigated land (%)	78	80	88	89	13.84***
Livestock holding size	5.42	5.95	6.75	4.09	10.08***
Family size	6.20	6.29	6.46	5.79	2.13**
Dependency ratio	0.42	0.40	0.40	0.41	0.34
Education of family members (> 6 years of age) (Average years of schooling)	1.28	0.96	0.67	0.62	25.23***

Source: Field survey, 2002. Note: OC is occupational caste. \*\* and \*\*\* indicate significance at 5% and 1% level, respectively.

In land size and quality of land, Bahuns and Chhetris are better endowed than the Magars and occupational caste people. They also have better labor endowment in terms of family size compared to the occupational caste people. Larger family size also increases the number of consuming units at the same time. The dependency ratio is more than 40% and educational level is very low in all caste/ethnic groups. Educational level is lowest in occupational caste. In order to see whether the mean values between the caste/ethnic groups differ significantly, an ANOVA was carried out to compare the true means between them. The null hypothesis for the one-way ANOVA was that all the underlying true means are identical ( $m_1=m_2=m_3=m_4$ ) against the alternate hypothesis that there are differences between some of the true means ( $m_1\neq m_2\neq m_3\neq m_4$ ).

The average values of different resources are significantly different between the four caste/ethnic groups with exception to dependency ratio. This indicates that the resources are disproportionately distributed to favor higher caste people. The occupational caste people are often among the poorest of the poor and are frequently deprived of entitlement to productive resources due to social exclusion and marginalization.

#### 4. Socio-economic characteristics and food security status

The common ways of acquiring food in these areas are own farm production (subsistence production) and purchase from markets. Other ways of acquiring food includes gift, barter with non-food items and food loans. Own farm production was found to contribute 82% and 71.1% of the total food availability and total calorie requirement, respectively. The incidence, depth and severity of food insecurity according to socio-economic characteristics are shown in Table 4.

In the 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 food insecurity gap is lower in Bahun than in other caste/ethnicity. This gap is 1.5 times higher in Occupational caste than Bahun but the severity is 2.5 times higher. The incidence of food insecurity is highest in Magar but the 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 caste, more numbers of households fall under the chronic food insecure group with more than 50% calorie deficit. Similarly, both depth and severity of food insecurity is higher in small farms and small livestock holders, laborers, and households having less household 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 on the household's food security status. Large land and livestock holders, business and salaried jobholders, and households with high-income level (proxy of household's expenses) are more food secure.

Table 4: 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
<b>Caste/ethnicity</b>			
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
<b>Farm size</b>			
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
<b>Livestock</b>			
< 6 LSU	82%	0.34	0.17
6 – 10 LSU	64%	0.31	0.13
Above 10 LSU	60%	0.30	0.11
<b>Main Job of HH</b>			
Agriculture	74%	0.32	0.14
Labor	75%	0.47	0.30
Business	75%	0.28	0.08
Service	75%	0.27	0.10
<b>Household expenses</b>			
<50 thousands	77%	0.32	0.14
50-100 thousands	77%	0.34	0.16
> 100 thousands	57%	0.28	0.09
<b>Aggregate</b>	<b>74%</b>	<b>0.33</b>	<b>0.14</b>

Source: Field survey, 2002.

Similarly, Table 5 presents the resource distribution according to household food security status. As compared to food insecure households food secure households have small family size, lower dependency ratio, higher percentage of irrigated land, more total land and more number of livestock holdings. The distribution of resources significantly differs between the groups, similar to the values between the caste/ethnicity discussed above.

Table 5: Household food security status and resource distribution

Attribute	Food Secure	Food insecure	Difference
Family size	5.8	8.1	-2.3*** (-4.01)
Dependency ratio	37	42	-5*** (-3.73)
Education of family members	2.1	2.03	0.07 (0.83)
Total land holding (ha)	0.86	0.49	0.37*** (13.12)
Share of non-irrigated land (%)	65.7	69.7	-4*** (-5.89)
Share of irrigated land (%)	27.07	15.44	11.63*** (9.57)
Total livestock holding	7.13	5.39	1.74*** (5.04)

Source: Field survey, 2002. \*\*\* Indicate significance at 1%. t-value in parentheses ( )

## 5. Possibility to improve household food security status

It was found that the major proportion (about 82%) of household calorie requirement is fulfilled by own production and the yield of the main food crops is quite low as compared to national average yields of the hills, with similar topographical and other natural conditions as the study villages. As compared to the national level average production of the hills, yields of paddy, maize, wheat and barley are 29%, 13%, 28% and 48% lower, respectively (Table 6). Only yields of millet and pulses are 10% and 25 % higher than the national average values, respectively. This indicates that most viable option to increase food security status in the study area is to increase yields of these crops. Currently, majority of the households are 6-10 month food self-sufficient and increase in food production by raising the yield of these crops in the study area to the level of the national average yields of the hills can make these households year round food self-sufficient, consequently enhancing their food security status. However, villagers face various problems in farming that adversely affect the production. Although the problems related to farm production as perceived by the villagers are similar to the ones commonly found in the rural areas anywhere, this study found that some of them directly affect the overall food production and sever their food security status.

Table 6: Production of major food crops in study villages

Crops	Avg. production (Qt./ha)	National avg. production for hill (Qt./ha)	Difference
Paddy	16.71	23.6	-6.89
Maize	14.97	17.2	-2.23
Wheat	11.31	15.8	-4.49
Millet	12.19	11.1	+1.09
Barley	5.96	11.6	-5.64
Pulses	10.27	8.24	+2.03

Source: Field survey, 2002.

Based on farmers perceptions, diseases and insects, lack of improved seeds, lack of knowledge and training, lack of manure and fertilizers, rainfed farming and lack of irrigation provision, and traditional methods of cultivation are major problems in the study area. The application of manure is low and chemical fertilizers are seldom used. Soil erosion is high. All these problems directly affect the production of these major crops. However, proper usage of already available local inputs and technology, such as, optimal use of compost and its time of application in the farm, use of green manuring plants, cultivation of legumes and nitrogen-fixing plants in the cropping system, irrigation using gravitational force, organizing people to build and manage irrigation, transportation and marketing facilities, etc., with some extra efforts can make a big difference in contributing towards increasing the yield. All of these efforts do not necessarily need much cash but do need some reorganization of the prevailing systems, centered in the concept of mutual aid and confidence building of the people. Such localized efforts do contribute in enhancing the local production, consequently alleviating the food insecurity of the households<sup>4</sup>. Thus, the above mentioned differences in the yields of the crops in the study area can be regarded as the indicators of the possible improvement in the food production that can be achieved with almost no external intervention.

## 6. Conclusions and policy implications

This study found that about 74 percent of the households in the study area were food insecure. The majority of the household's family members consume below the recommended level of calorie in the study area. On the other hand, food security status varies according to socio-

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<sup>4</sup> Maharjan (2005) empirically discusses efficient management of forest resources that consequently contributed in enhancing the welfare of the people by such reorganization of the prevailing systems, centered in the concept of mutual aid and confidence building of the people, at the community level in the hills of Nepal, similar to this study area. The concept of his discussion, although on forest resource management, can well be adopted even in the hill farming, which is well integrated with forest and livestock in a subsistence manner.

economic characteristics of the households. Land distribution (both quantity and quality) is a major factor to maintain household food security. The average landholding size of food secure household is almost double that of food insecure household. It was also found that large numbers of lower caste households are small holders of land as compared to higher caste households. The discrimination based on caste/ethnicity in relation to resource distribution, access to opportunities outside the household is severe. Land-poor households have less human capital (education), physical capital (building and equipments, livestock holding), natural capital (poor quality land and less access to irrigation facilities), financial capital (less access to loan service and low saving), and social capital (no membership in social organization and narrow social network). This caste/ethnicity and resource ownership has ultimate effect on food security. Since Occupational caste people are the ones who are disadvantaged, at times even discriminated, they are the ones who are most food insecure in terms of incidence, depth and severity.

All the households regardless of caste/ethnicity are more dependent on agriculture production to fulfill their household food demand. More than 80% of household food demand is fulfilled by own production. But this production level is still low as compared to national average for the hills. Increase in the production of food crops up to the national average level alone would greatly enhance the food security level of the people in the region. None of the households had received any form of direct food assistance from the government or non-governmental organizations to maintain food security status.

The findings of this study imply that the consideration of household socio-economic characteristics is very essential for successful food security management programs that address the food insecurity problems. The high risk to food security in the study area is the lack of access to land and low food production. Due to limited off-farm and nonfarm income opportunities and

high level of dependence on own production for food in such areas, policies designed to improve agricultural production will have a positive effect on household food security, although at varying degrees, regardless of caste/ethnicity or main job holdings. Efforts to increase the production can be initiated using and rearranging local technology, local know-how and local systems with core concept of mutual aid and confidence building.

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