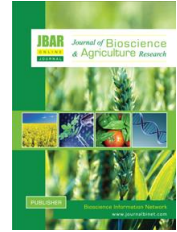


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## Status of household food insecurity in Bajura district of Nepal

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### ABSTRACT

Food insecurity is a condition of limited food availability owing to a lack of money and resources. The study examined the household food insecurity status along with its affecting factors in Bajura district Nepal. Purposive and simple random sampling procedure was used in selecting 120 household respondents of Budhiganga and Triveni Municipality. Data were collected during June-July 2018 with the use of interview schedule and structured and semi-structured questionnaires. The Household Food Insecurity Access Scale was used to assess the food insecurity status. The result revealed that 55% of the households were food insecure comprising 33.34%, 15% and 6.66% as mildly, moderately and severely food insecure respectively. Similarly, ordered Probit regression model was used for assessing determinants of household food insecurity using the Household Food Insecurity Access Scale as the dependent variable which showed that average annual income, amount of rice, family size, and distance to nearby market were found significantly determining the food insecurity level. The months of March, June and July were found most shortage for food grains in the study area. The identified constraints were drought, rare use of improved farm technology, low farm and off farm income and poor agriculture extension services leading to food shortage. The study recommends on agricultural policies aiming at promoting farmers access to irrigation facility, improving farm household productivity and market access as well as farmers be provided with extension services and non-farm income generating activities.

**Key Words:** Food insecurity, Socio-economic characteristics, Household and Sampling

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### I. Introduction

Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). The acute and chronic physical and mental health conditions such as higher levels of

stress, anxiety, irritability, social isolation, heightened emotional responsiveness, eating disorders, depression as well as impaired cognitive abilities are linked with food insecurity (Collins, 2005). In this connection, food security has three dimensions; availability, accessibility and utilization. The population is estimated to reach 40.5 million by 2025, posing further challenges to fulfilling the food requirements (Khadka, 2010). Nepal is ranked "serious" on the 2017 Global Hunger Index and one-fifth of the population has inadequate food consumption (IFPRI, 2017). Nepal's unique geographical characteristics often make it more challenging to improve food security and substantive measures of well-being. While the national poverty rate is 31%, it is much higher in the Mid-Western and Far-Western regions at about 45% (UNDP, 2008). These hilly and mountainous regions have rugged terrain, low rainfall, and poor-quality soil (Lal, 1997) which make farming, economic activity, and service delivery difficult in these areas. These areas are physically isolated, with insufficient infrastructure and poor communication capabilities. Understanding the regional differences in the relationship between food insecurity and measures of well-being is important to address food insecurity on a national level. The key factors causing food insecurity, especially in remote mountain districts, are an increasing population, remoteness, low income-generating opportunities, and lack of access to food. Bajura district, being one of the remote districts of Nepal, has faced the food insecurity problem. Absence of fertile land, lack of new efficient agricultural technologies and lack of irrigation facility for cultivation make the agricultural productivity low. Another social aspect of less production is migration of young male population to India for employment. Similarly, extreme poverty is one of the chief reasons behind food insecurity in Bajura. Many families in remote region of the district can't afford to buy foods.

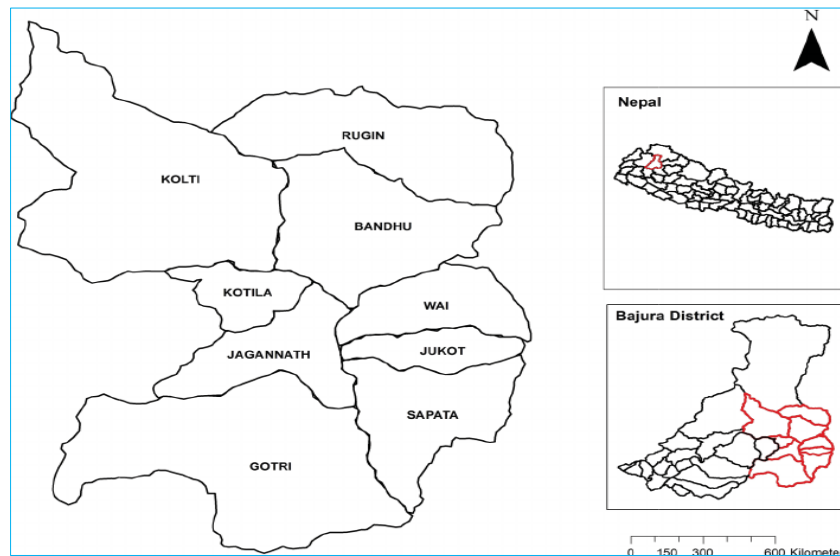
Although, a lot of researches were conducted in Nepal, Maharjan and Joshi (2011), Singh *et al.* (2014), Joshi and Joshi (2017), however, the study was designed against some backdrop of previous studies like factors affecting the food insecurity were not assessed; most food insecure region was not selected as research site. Therefore, the study is aimed at answering the following research questions:

- What are the socio-economic characteristics of households in the study area?
- What is the household level food insecurity status in the study area?
- What are the determinants of food insecurity in the study area?

Since many years ago, Government of Nepal in collaboration with international organizations like GAFSP, USAID and Practical Action has implemented various policies and programs like agriculture and food security project, Promotion of sustainable agriculture for nutrition and food security (POSAN-FS) project to address food insecurity. However, many households living in mountain and drought areas like Bajura are still food insecure. Thus, the study analyzed the household food insecurity status along with its affecting factors in Bajura district Nepal.

## II. Materials and Methods

**Study area and period:** The study was carried out in Bajura district of Nepal during June-July 2018. Bajura is a mountain district in the far-western development region (now called as Sudur Paschim Pradesh) covering an area of 2,188 km<sup>2</sup>. The elevation of the district varies from 300 m to 6,400 m above sea level (masl), which divides the district into three distinct regions from north to south: higher Himalayan, higher mountains and mid mountains. This results in a variation in temperature, which ranges from 0°C during winter to 40°C during summer. The annual average rainfall is 1,343 mm, which decreased at a rate of 18.25 mm/year over the period 1976-2011. In addition, the inter-annual variation of rainfall is pronounced over the same period. The combined climate change vulnerability index for Bajura is moderate; however, it is highly vulnerable for drought and moderately vulnerable for landslide. In addition, ecologically, this district is highly sensitive to climate change (Sherpa *et al.*, 2015). The average population density is around 62 people per square km, with a family size of 5.4. The average land holding is 0.42 ha and almost 75% of the agricultural land is non-irrigated (CBS, 2013).



**Figure 01. Study location in Nepal.**

**Sample size determination and sampling procedure:** Household's respondents of the study were selected through purposive and simple random sampling technique. Bajura was selected purposively as it is the most food insecure district of Nepal being a mountain district of far west with severe drought and the two municipalities; Triveni and Budhiganga were selected as Agriculture Food Security Project (Phase I) was carried out there during 2013-2018. Altogether 120 respondents were selected from these two municipalities by simple random sampling method. Data were collected with the use of interview schedule and structured and semi-structured questionnaires.

The main independent variable is a measure of household food insecurity. This variable was created using a series of questions on household food insecurity included in Nepal Demographic and Health Survey, (NDHS, 2011). The questions on food insecurity included in NDHS 2011 were adopted from the Household Food Insecurity Access Scale (HFIAS). Of the nine generic questions constituting HFIAS, seven were included in NDHS (2011), and the reference period for assessment was extended to 12 months from 1 month to allow for seasonal variations (MoHP, 2011). The questions used were as follows:

- In the past 12 months, how frequently did you worry that your household would not have enough food?
- In the past 12 months, how often were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?
- In the past 12 months, how often did you or any household member have to eat a limited variety of foods due to lack of resources?
- In the past 12 months, how often did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?
- In the past 12 months, how often did you or any household member eat fewer meals in a day because of lack of resources to get food?
- In the past 12 months, how often was there no food to eat of any kind in your household because of lack of resources to get food?
- In the past 12 months, how often did you or any household member go to sleep at night hungry because there was not enough food?

Each question had four response options: never, rarely, sometimes, or often. The households that reported that they "never" or "rarely" worried that their households would not have enough food were coded as "food secure." Households that reported that they worried about not having enough food (sometimes or often), and/or were unable to eat preferred foods, and/or ate a more monotonous diet than desired, but only rarely, were coded as "mildly food insecure." Households that reported that they ate a more monotonous diet than desired sometimes or often, and/or had started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes, were coded as "moderately food insecure." Households that reported that they often cut back on meal size or number of meals, and/or

ran out of food or went to bed hungry, even as infrequently as rarely, were coded as “severely food insecure.” These categories of household food insecurity are adapted from [Coates et al. \(2007\)](#).

**Analytical method:** The household food insecurity variable has four categories: food secure (coded as 0), mildly food insecure (coded as 1), moderately food insecure (coded as 2), and severely food insecure (coded as 3).

Since the order in the four categories of food security scale matters, the model used to obtain the estimates is an ordered Probit model, Probit and ordered probit models were used by [Gundersen et al. \(2007\)](#) to investigate gender differences in food insecurity using data from a 2004 household-based survey of children in Zimbabwe, which can briefly be described, for each individual, as:

$$Y_i^* = X_i \beta + \varepsilon_i$$

Where  $Y_i^*$  is a latent variable that can take on four values corresponding to four levels of food security in the HFIAS,  $X_i$  represents a set of socio-demographic covariates, and  $\varepsilon_i$  is a random error.

**Statistical analyses:** The data was collected and compiled from survey area and the analysis was done using social package for statistical software (SPSS) version 20.00 for windows. The descriptive statistics was used in this study. An alpha level of  $p < 0.05$  was used to test for significance.

### III. Results and Discussion

#### Socio-economic characteristics of respondents

**Table 01** revealed that majority (62.5%) of the households were male headed and the average age of the household heads was 47 years. 86.6% of the household heads were involved in agriculture as primary occupation and 43.3% were found illiterate. The average household size was 6.9 and the majority of the households (65.8%) found to be joint family type. The major ethnic group was Chhetri (85%) followed by Dalits (12.5%). The average land owned was found to be 0.29 ha. of the sampled households, the average annual income from various sources was NRs. 55,250.

**Table 01. Socio-economic Characteristics of sampled households**

Variables	Units	
Gender of HHH	<b>Frequency</b>	<b>Percentage (%)</b>
Male	75	62.5
Female	45	37.5
Primary Occupation		
Agriculture	104	86.6
Non agriculture	16	13.4
Education of HHH		
Literate	68	56.7
Illiterate	52	43.3
Age of HHH	47 years (average)	
Household size in number	6.9 (average)	
Family type		
Joint	79	65.8
Nuclear	41	34.2
Ethnicity		
Chhetri	102	85
Dalits	15	12.5
Brahmins and others	3	2.5
Land owned	0.29 ha(average)	
Annual income	NRs 55250 (average)	

#### Household food insecurity status

The result revealed that 55% of the households were food insecure comprising 33.34%, 15% and 6.66% as mildly, moderately and severely food insecure respectively. While the rest 45% of the households were food secure i.e. 55% of the households in the study area reported that they “never” or “rarely”

worried that their households would not have enough food (Table 02). The Nepal Integrated Food Security Phase Classification (IPC) analysts also concluded that the Far Western Mountain area as a whole falls under chronic food insecurity IPC Level IV (Type 3-Chronic insecurity due to Recurrent Acute Crises) as per [Nepal National Chronic Food Security Analysis \(2012\)](#).

**Table 02. Food Insecurity Status of sampled households**

Variable	Frequency	Percentage (%)
Food insecure	66	55
Mildly	40	33.34
Moderately	18	15
Severely	8	6.66
Food secure	54	45

### Factors affecting household food insecurity

Table 03 showed that the coefficient of annual income was found to be negative and significant ( $p < 0.01$ ) influencing household food insecurity among households in the study area. In the same vein, the coefficient of rice production and nearby market were also negative and significant ( $p < 0.05$ ) relating food insecurity. However, family size was found to be positively significant ( $p < 0.05$ ).

Result on annual income implies that the households with small income had the greater probability of being food insecure. This could be as a result of the fact that with less money income, households could not be able to buy the necessary foodstuffs the family requires. This finding is consistent with the findings of [Abdullah \(2015\)](#), and [Beyene and Muche \(2010\)](#). The larger the family size, the higher the probability of household being food insecure. The family size is a positive factor in determining the household food insecurity. This is consistent with the finding of [Asmelash \(2014\)](#), [Bashir et al. \(2013\)](#). Similarly, lower the rice production higher the probability of household being food insecure. Absence of market nearby also showed the probability of households being food insecure. This is consistent with the findings of [Zakari et al. \(2014\)](#).

**Table 03. Ordered Probit results of factors affecting food insecurity**

Variables	Coefficient	Z value
Age HHH in years	-0.012	0.480
Education of HHH in years of schooling	-0.139	0.324
Gender of HHH	-0.371	0.446
Family size (number)	0.205	0.020**
Total land owned (ha)	-0.054	0.173
Annual income (NRs)	-0.030	0.000***
Rice production (tons)	-0.292	0.004**
Maize production (tons)	-0.055	0.770
Wheat production (tons)	0.168	0.256
Nearby market(<10km=1, otherwise=0)	-1.346	0.001**

### Duration (months) of food shortage

Out of 12 months, we tried to identify the months with severe food shortage through direct asking with the respondents. The months of March, June and July were found most shortage for food grains in the study area. This might be due to no stock of enough food grains and no receive of own farm production of rice and wheat as well as transport problem in rainy season. Seasonal food shortages are quite common in many parts of Nepal, a pattern that is driven by sharp monsoonal influences in production, poor post-harvest storage and handling, and weak transport infrastructure and market integration ([Sanogo, 2008](#)). People in rural areas, particularly those with a single rainy season, are often affected by the 'hungry' season, which normally coincides with the rainy season. The onset of the rains occurs many months after the harvest, when food stocks are low and workloads high because the crop must be established as quickly as possible ([Gill and Hoebink, 2003](#)).



### Constraints faced by the sampled households

This study also tried to explore the various constraints/problems faced by the households in the study area. The identified constraints were drought, no rain in the district during the monsoon season and drying water resources. Consequently, lack of irrigation facility too had made the arable land dry affecting the production of monsoon crops like rice, rare use of improved farm technology, low farm and off farm income like labor work in road construction sites and poor agriculture extension services due to remoteness and hilly terrain leading to food shortage. These all factors are highly responsible for food insecurity in the study area. The findings by Shively et al. (2011) also suggested that practically all households affected by drought shifted their consumption towards less expensive and less preferred foods. Various literatures also suggests that Far-Western Mountains are characterized by extreme remoteness, low agricultural productivity, and limited access to basic services such as health care, agricultural extension services, sanitation, safe drinking water, etc. The area is drought-prone and agricultural yields are very low as the average yield of crops of area was low as compared to national averages like rice, maize and wheat of Bajura were found to be 2.3 t/ha, 2.3 t/ha, 1.754 t/ha while that of national averages were found to be 3.171 t/ha, 2.353 t/ha and 2.29 t/ha respectively (Statistical information on Nepalese agriculture 2012/13) Land use is constrained due to steep slopes and rocky soils and irrigation is almost non-existent.

### IV. Conclusion

There was high food insecurity in study area, 55% of the households were food insecure comprising 33.34%, 15% and 6.66% as mildly, moderately and severely food insecure respectively. The average annual income, amount of rice, family size, and distance to nearby market were found significantly determining the food insecurity level. The months of March, June and July were found most shortage for food grains in the study area. The identified constraints were drought, rare use of improved farm technology, low farm and off farm income and limited extension activity leading to food shortage. It is recommended to launch policies and programs aiming at promoting farmers access to irrigation facility, improving farm household productivity by distributing the improved and high yielding varieties of crops, fertilizers, efficient farm machineries and market access as well as farmers be provided with extension services and non-farm income generating activities.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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