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Determinants of Per Capita Food Expenditure to Assess Food Security Status of Nepal

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Abstract

Food security is the global issue as the Sustainable Development Goal (SDG) has explicitly considered zero hunger in the Goal 2. Nonetheless, in the recent years, the number of hunger population is in constant rise. Therefore, the paper attempts to estimate the determinants of the per capita food expenditure from the household expenditure. The data of National Living Standard Survey 2010/11 by the Central Bureau of Statistics Nepal has been used for the study. The multiple regression analysis has been performed. The per capita food expenditure has been used as the dependent variable. The model was found significant and the R-squared value was found 0.77. All the explanatory variables – except gender and education level (completed grade 5-7), were found significant. The number of households, area related variables urban rural and few development regions were found negatively associated with the per capita food expenditure.

Keywords: Food Security; Per capita food expenditure; Household expenditure; Nepal.

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1. Introduction

The United Nations (UN) has recognized "Food" as a global issue among other including Africa, Ageing, AIDS, Atomic Energy, Big Data for the SDGs, Children, Climate Change, Decolonization, Democracy, Ending Poverty, Gender Equality, Health, Human Rights, International Law and Justice, Migration, Oceans and the Law of the Sea, and Peace and Security [1]. The significant achievement on reduction of hunger during MDG era is reversing since 2015. The world is witness of increasing global hunger in past three years and in 2017 it reached to around 821 million [2]. In this backdrop and in the context of exponential rise in population have possessed challenge to feed the world sustainably [3]. Further, climate change has also deteriorated the condition of sustainable food security [4]. A general consensus was not found among various scholars regarding the food security situation in Nepal. Some scholars believe that the food security situation in Nepal is not at normal level [5, 6]. However, some scholars believe that food security in Nepal is not at panic stage [7, 8, 9]. Food security and household expenditure is closely related. Therefore, household food security can be measured by using household expenditure [10, 11, 12, 13]. Therefore, we attempted to assess the determinants of food expenditure of the household.

1.1 Food Security in Nepal

Until the decade of 1970s, food security in Nepal was understood more generally as the ability of people to meet their aggregate food needs in a constant manner [14]. Aggregate food need at national level was calculated by multiplying per capita annual food requirement (about 200 kg/capita/year) related to calorie requirement, by total population in the country. However, food security is not only food self-sufficiency. The concept involves many other dimensions than food self-sufficiency. This thought ignore if self-sufficiency in food grains is economically viable option and dominantly over-ridden by the principle that describe food security as food availability and food availability as food grain production at a higher level than requirements. However, the evidence shows that there are cases of persistent food poverty, malnutrition, and food vulnerability in food self-sufficient and even food surplus areas [15]. There are continuous advances in the understanding and working approaches of food security issue. In 1974, the World Food Summit identified reliable supply and less fluctuating prices (in addition to sufficient food production) as essential factors for meeting food security. With this food security, being attempted merely by technological means, attracted other factors like market, transport, supply, food price etc. The food security until then was attempted through strengthening factors influencing 'supply' aspects. Later Nobel laureate Amartya Sen put forward an alternative view during 1980s, which emphasized the importance of access or entitlements to food in achieving food security. With this the focus on food security tilted towards 'demand' aspects instigated to receive attention. Recently, development practitioners and activists are advocating and lobbying for food safety, food right and food sovereignty of people. In Nepal, the efforts of development practitioners and activists played vital role in convincing politicians about the issue, as a result food security has been mentioned as the Fundamental Right in the Constitution of Nepal and appeared as the national policy agenda of the Government in Nepal. Recently Government of Nepal has endorsed the food sovereignty act, which includes the concept of food security and right to food for its citizens. At present, the concept of food security assumes to meet the following conditions: *food available at all times; that all persons have means of access to it; that it is nutritionally adequate in terms of quantity, quality*

and variety; and that it is acceptable within the given culture. Only when all these conditions are in place can a population be considered 'food secure' and is defined as "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" [16]. Thus the focus of food security is on four key dimensions (availability, access, utilization and stability), known as the four pillars of food security.

2. Methodology

The study uses data obtained from the Nepal Living Standard Survey 2010/11 (NLSS III) of the Central Bureau of Statistics, Nepal. The methodology used in the NLSS III was applied in more than 50 developing countries by the World Bank with the purpose of the Government to monitor progress in improving living conditions and to evaluate the impact of government policies and programs in the country. NLSS III is the third national survey of Nepal conducted by the Central Bureau of Statistics, with technical and financial cooperation from the World Bank. The survey was applied two-stage sampling procedure to select the 500 primary sampling units for the first stage of the 14 ecological strata, where size was measured from the number of households in the ward. For NLSS III, the number of households in each PSU was fixed as twelve resulting the final sample size of 6000 households. However only 5988 households were interviewed at the end and data are available from those households. These households include 28474 household members and 142088 data items on food consumption. NLSSs provide a large number of data set about household food consumption from different sources including the information of demographic characteristics of households, household activities both farm and off-farm, education and literacy, wage rates and remittances covering all administrative and ecological zones. For the purpose of this study, information includes the food consumption in quantity and monetary value, total household expenditure, household size, and other social and demographic characteristics like age, gender, height etc. of household head and members. The summary of the variables has been presented in Table 1. The table also have the description of the variables.

Source: Derived from NLSS III survey dataset.

Food expenditure per capita was calculated by total household food expenditure and total number of household member.

$$FD\_PP = \sum_{i}^{n} \frac{FD\_MV}{HHSize} \quad \text{.....(1)}$$

Where, FD_PP = Food expenditure per capita

FD_MV = Total household expenditure

HHSize = Number of Household member

n = Total number of observations

Table 1: Descriptive summary of the variables

Variables	Description	Mean	Standard Deviation
FD_PP	Food expenditure per capita	2.2748	5.148
fd_mv	food expenditure in monetary value	12.21	22.458
CPI	Consumer Price Index	145.6	5.148
hhsize	Household size	5.935	2.826766
totinc	Total Household Income in Rs per day	1446.7	244255.1
Region1	Frequency of Eastern Region	140685	NA
Region2	Frequency of Central Region	269277	NA
Region3	Frequency of Western Region	132743	NA
Region4	Frequency of mid-Western Region	81937	NA
Region5	Frequency of far Western Region	58839	NA
Gender	Gender of the respondent	1.536	0.499
Age	Age of the respondent	27.12	19.955
Urb_Rur	Urban or Rural	1.64	0.480
Head_Occ	Occupation of the head of household	3.951	2.972
Head_edu	Education of the head of household	2.519	1.562
Head_edu1	No schooling	NA	NA
Head_edu2	Literate or less than grade 5	NA	NA
Head_edu3	Completed grade 5 to 7	NA	NA
Head_edu4	Completed grade 8 to 10	NA	NA
Head_edu5	Completed grade 11 or more	NA	NA

The per capita food expenditure was considered as a dependent variable for the regression analysis and total quantity consumed, gender, age of respondent, education, occupation of head of household, total household consumption, consumer price index and household size were utilized as the explanatory variables.

The generalized equation for the multiple regression model can be written as [17].

$$FD\_PP = \alpha + \beta X_i + \varepsilon \quad \text{.....(2)}$$

Where, FD_PP is the per capita food expenditure as calculated by using equation (1), α is an intercept, β is the matrix of coefficient of independent variables, X_i is the matrix of independent variables and ε is the error terms.

3. Results and Discussion

The multiple correlation as well as regression analysis was carried out for the study. The relationship among the variables are presented on Table 2. Food expenditure in monetary value is positively associated with the variables like cpi, household size, gender, age etc. and negatively associated with area variables like urban rural.

Table 2: Correlation Coefficient among the variables.

	cpi	hhsize	totinc	urb_rur	age	fd_mv
cpi	1.000					
hhsize	-0.001	1.000				
totinc	0.013	0.015	1.000			
urb_rur	0.036	0.132	-0.012	1.000		
age	0.008	-0.118	0.004	-0.048	1.000	
fd_mv	0.011	0.138	0.013	-0.010	0.000	1.000

Source: Derived from NLSS III survey dataset.

The results of the multiple regression analysis have been presented in the Table 3.

The R- squared value suggested that 77 percent of variation on per capita food expenditure can be described by the model. The p-value suggests that the model is highly significant since its value is far less than 0.001. Residue of standard error is 1.994 which is acceptable. Likewise, except gender and head_edu3 all other variables are found highly significant in the model.

Table 3: Summary of Regression Analysis

Variables	Coefficients	Std. Error	t value	Pr(>|t|)	Signif
(Intercept)	2.053	0.070	29.190	0.000	***
cpi	0.001	0.000	2.499	0.012	*
hhsize	-0.336	0.001	-379.291	0.000	***
Central	0.030	0.007	4.433	0.000	***
Western	0.092	0.008	11.999	0.000	***
Mid-Western	-0.047	0.009	-5.330	0.000	***
Far-Western	-0.020	0.010	-1.969	0.049	*
totinc	0.001	0.000	-2.582	0.010	**
urb_rur	-0.012	0.006	-2.132	0.033	*
gender	-0.007	0.005	-1.511	0.131	
age	0.003	0.000	25.714	0.000	***
head_educ2	-0.038	0.008	-4.957	0.000	***
head_educ3	-0.008	0.008	-1.022	0.307	
head_educ4	-0.042	0.008	-5.348	0.000	***
head_educ5	0.087	0.007	11.950	0.000	***
head_occup	-0.042	0.001	-47.594	0.000	***
fd_mv	0.163	0.000	1463.782	0.000	***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Residual standard error: 1.994 on 670635 degrees of freedom					
Multiple R-squared: 0.7678, Adjusted R-squared: 0.7678					
F-statistic: 1.386e+05 on 16 and 670635 DF, p-value: < 2.2e-16					

Source: Derived from NLSS III survey dataset.

The estimated model can be expressed as

FD_PP = 2.053+ 0.001 cpi - 0.336 hhsize + 0.030 Central + 0.092 Western – 0.047 Mid-Western – 0.002 Far-Western + 0.001 totin – 0.012 urb_rur – 0.007 gender + 0.003 age – 0.038 head_educ2 -0.008 head_educ3 – 0.042 head_educ4 + 0.087 head_educ5 – 0.042 head_occup + 0.163 fd_mv……..(3)

Household size, development regions, occupation of the household head and education category of household head variables are found negatively contributing to the per capita food expenditure. Keeping income and other variable constant, increasing number of household size reduces the per capita food expenditure. The location of the development regions also affects the food consumption. Therefore, it is important to note that total household expenditure alone may not be sufficient to capture the food security for individual. Further, per capita food expenditure will greatly determine by one's age, sex and health status along with other. Likewise, age of the household member has positive relationship with per capita food expenditure. It signifies that higher the age of head of household higher could be the total earning which might have leveraged positive impact on per capita food expenditure. Along with income, higher age also might have higher correlation with education and other associated factors which might have affirmative influence on per capita food expenditure.

4. Conclusion

The determinants of per capita food expenditure have been estimated using the multiple regression analysis. The higher the per capita food expenditure, the probability of being food secure will be greater. Therefore, total quantity of food consumption in the household, age of the head of household and price indices were found positively contributing to the individual food security. However, increasing number of family member with constant income and other resources, area of residence will reduce the welfare at individual level and ultimately hamper the food security. Therefore, it is important to understand the individual food security even the household is food secure.

5. Limitations

The study uses secondary data collected by Central Bureau of Statistics, Government of Nepal in 2010/11. Only multiple correlation and regression tools are used to explain the findings of this study.

6. Recommendations

We would like to recommend Government of Nepal to conduct another round of Nepal Living Standard Survey as soon as possible so that the students, researchers, academia and policy makers will benefit for the evidence based planning, monitoring and policy analysis as well as reporting the progress of Sustainable Development Goals.

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