DETERMINANTS OF HOUSEHOLD FOOD SECURITY IN RURAL BANGLADESH: AN EMPIRICAL ANALYSIS OF FARM LEVEL DATA

K. S. Rahman[1], M. K. Hasan[2] and M. Hasan

Abstract

The study endeavors to estimate the food security status and identify the determinants of food security among households in Hakimpur Upazila in Dinajpur district, Bangladesh. it was found that households of Hakimpur upazila in Dinajpur district were food insecure during the period of the survey. Number of dependents, income of household head, age of household head and level of education were found to significantly influence household head food security in the study area positively. It is recommended that social security measures must ensure that the benefits of public efforts to improve food security and nutrition are universal. Human rights based practices are preferable.

Introduction

Now a day's food security issue is getting more attention in the world. The stability means both the availability and accessibility of food in various dimensions of food. Food security comprised of four components such as food availability, accessibility, utilization and stability. Bangladesh is an over populated country having a population density of 1104 per square kilometer. Agriculture is the most important sector for the economy of Bangladesh contributing 14.74% to the GDP. The huge population of the country depends on agriculture sector for their foods and calories.

The population growth rate of Bangladesh is 1.03%. According to this rate, the total population will become 233.2 million within 2050. In Bangladesh, about 0.08 million of arable land are going out of production every year (Mondal, 2010). However, the country faces a tremendous challenge for providing food security to the increasing population. Therefore, it is important to increase food production in order to meet the growing demand for food emanating from population growth. Although there are significant achievements in food grain production but, food insecurity both in national and household level remains a matter of major concern in Bangladesh. Like many other developing countries, food security in Bangladesh is also threatened by the global economic crisis and soaring price of essentials. Food security is viewed as the "number one" priority of the government. Poverty is the major factor effecting food security in

[1]Scientific Officer, [2]Chief Scientific Officer, Agricultural Statistics & ICT, Bangladesh Agricultural Research Institute (BARI), Gazipur, [3]Scientific Officer, Farm Machinery and Post-harvest Process Engineering Division, BARI, Gazipur, Bangladesh.

Bangladesh. According to World food Summit, 1996 food security is defined as "when all people all the times access to sufficient, safe, nutritious food to maintain a healthy and active life." Commonly, the food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences. Food security is built on three pillars namely, Food availability, Food access and Food use. People are considered food secure when they have availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life. Food security analysts look at the combination of the following three main elements such as food availability, food accessibility and food utilization.

Rice is the staple food and its production plays an important role in the economy of the country. In Bangladesh, rice alone constitutes 92 percent of the total food grain production annually. It provides about 80 percent of the people's energy intake (Tetens *et al*. 2003), the majority of their protein intake, and a considerable proportion of several micronutrients in their average daily diet (Hels *et al*. 2003). Food availability of a country may depend on some other factor also. Among them, different socio-economic and demographic variables like population, total food production, imports of the food items, per capita income, adult literacy rate, female attending school, male attending school, infant mortality rate, employed labour force are remarkable. Therefore it is our particular interest to investigate the determinants of food security of Bangladesh using econometric time series approach. In this view points a number of studies which have been conducted to investigate such determinants are reviewed are noted bellow.

Gebre (2012) applied logistic regression model to examined the determinants of food insecurity among urban households in Addis Ababa city and pointed out six important factors out of ten factors. The identified significant factors are household size, age of household head, education of the household head, and access to credit, household asset possession, and access to employment. Sultana and Kiani (2011) studied to examine the determinants of household's food security in Pakistan using micro data for the year of 2007-08 and found that place of residence has a significant and negative effect on household's food security status. They also identified that the dependency ratio has a significant impact on food security and has expected sign negative. Educational attainment level of household's head beyond intermediate level has also significant and positive impact on food security status of household. Whereas social capital and employment do not effect household's food security significantly. They advised different policies and programs that should be needed to address for the wellbeing of their people. Some other remarkable research have been cited in the literature [Iram and Butt (2004), Hazarika and Khasnobis (2005); Omotesho *et. al.*, (2010); Arene and Anyaeji (2010); Sisay and Edriss, (2012); Bogale and

Shimelis (2009) and Mitiku *et. al.,* (2012)] to investigate and idetified some important factors through their research in food security area.

Faridi and Wadood (2010) studied to investigate the determinants of household food security situation in Bangladesh applying the logistic regression. They found different household characteristics which are strongly correlated with food security indicator. They also show that food security indicator is also highly sensitive to rice price changes. Most of the studies have been introduced regression technique. As therefore, it is our particular interest to investigate the determinants of food security of Bangladesh using household level data. Most of the studies have been introduced regression techniques having without or partial involvement of econometric tests may questionable on their application. As therefore, it is our particular interest to investigate the determinants of food security of Bangladesh using Logistic Regression Analysis approach which could be able to meet the existing research gap. Therefore the study is very important to have an idea about the factors affecting food security might help in making decision by the policymakers for policy making in future.

The Specific Objectives of the study are:

(i)   To explore the present status of food security in Bangladesh on the basis of availability, accessibility and utilization of food.

(ii) To identify the factors influencing food security/ insecurity in Bangladesh.

(iii) To establish an econometric time series model to forecast the future food security status.

(iv) To formulate policy guidelines/suggestions

Materials and Method

The study was conducted in Hakimpur (Hili) Upazila in Dinajpur district in Bangladesh. Hakimpur (Hili) is located at the North-Western part of the country and considered as the center of northwestern Bangladesh. Hakimpur (Hili) is an emerging urban center and magnification rate of the urban population has been incrementing at an expeditious rate and commercialization active have been on the incrimination placing most of the inhabitants who are mostly farmers, civil servants, handicrafts worker and traders under economic stress.

Selection of the Study area and Sample Size

Purposive Simple random sampling techniques were adopted for selecting reasonable numbers of sample from farmers, traders/merchants, handicrafts worker and civil/public servants. At the first stage of Sampling, one districts was selected from 10 most poor districts (Kurigram, Dinajpur, Magura, Bandarban,

Khagrachari, Shariatpur, Lalmonirhat, Gaibandha, Nilphamari and Thakurgaon) for the study. At the second stage of sampling, one Upazila, Hakimpur was selected purposively for the study. Then sample farmers, traders/merchants, handicrafts worker and Civil/public servants were randomly selected for primary data collection. The population of the study was purposively drawn from respondents who are mainly farmers. Traders/merchants, handicrafts, worker and civil/public servants. A total of 56 respondents were arbitrarily drawn from the Hakimpur (Hili) Upazila in Dinajpur district.

Data/information and Analytical Technique

Both primary and secondary data and information were used for the study. Primary data were collected from field level through questionnaire survey from the aforesaid locations. Secondary data and information relating to different statistics were gathered from various published Sources like BBS, FAOStat, research reports etc.

Data were analyzed applying descriptive statistics and logistic regression analysis. Firstly, a set of brief descriptive coefficients that summarizes a given data set. Which can either be a representation of the entire population or a sample. The measures used to describe the data set are measures of central tendency and measures of variability or dispersion. Measures of central tendency include the Mean, Median and Mode while measures of variability include the Standard Deviation (or variance), the minimum and maximum variables, Kurtosis and Skewness. Food security status was quantified setting a binary value of one or zero. Where one represents food secure and zero represents food insecure. The logistic regression then provides a model of observing the probability of a household becoming food secure or food insecure.

The logistic model is designated explicitly as:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6$$

Where Y=Food security status (1, if household is food secure; 0,if household is food insecure)

X_1 = *Sex of household head (Male=1; female=0)*

X_2 = *Household size (Member of dependents)*

X_3 = *Manthly Income of household (TK)*

X_4 = *Age of household head (Year)*

X_5 = *Level of education of household head (Year of schooling)*

X_6 = *Per Capita monthly food expenditure*

Results and Discussion

Socioeconomic characteristics of the respondents:

Age of the respondents

It was found that the highest percentage (46.42%) of the respondents was in the age group of 46-60 years followed by 31-45 years (44.67%) and age group up to 30 years (5.36%) and age group above 60 years has the lowest percentage (3.58%) (Table 1)

Education level of the respondents

On an average, 10.71% respondents were illiterate and others having variable levels of academic background. Among the educated respondents 21.43% had primary level of education, 33.92% had S S C level of education, 19.65% had H S C level of education, 14.29% had education at above H.S.C.(Table 1)

Table 1. Socioeconomic characteristics of the respondents

Items		
Age :	No. of the respondents	% of the respondents
Up to 30 years	3	5.36%
31-45 years	25	44.64%
46-60 years	26	46.42%
Above 60 years	2	3.58%
Education :		
Illiterate	6	10.71
Primary	12	21.43
SSC	19	33.92
HSC	11	19.65
Above HSC	8	14.29

Descriptive Statistics

Descriptive Statistics provide a useful summary of security returns when performing empirical and analytical analysis, as they provide a historical account behavior. Although past information is useful in any analysis, one should always consider the expectations of future events. There are 48 male and 8 female among 56 respondents.

Table 2. Descriptive Statistics on the selected variable

Variables	Maximum	Minimum	Average
Number of Dependents	10	1	3.694
Income of Household head (Tk./Month)	75000	3500	24022
Age of Household Head	65	28	46.34
Per Capita monthly food expenditure	9000	1200	3313
Level of Education	15	0	8.304

Source Field Survey 2019

Table 2 shows the descriptive statistics. The variable number of dependents means value is 3.694, and the maximum and the minimum value are 10 and 01 respectively. Consequently, the average income, the maximum income and the minimum income of household head are respectively Tk. 75000, Tk. 3500. Similarly, the respondents average age, maximum age and are respectively 46, 65 and 28. Per Capita monthly food expenditure, the maximum food expenditure and the minimum food expenditure of the household are respectively Tk. 3313, Tk. 9000 and Tk.1200.

Food Security index

This analysis evaluates the food security status of respondents using per capta expenditure on food (Table 3).

Table 3. Food Security line for the respondents

Respondents	MPCFE (Tk.)	Stats	Respondents	MPCFE (Tk.)	Stats
01	2600	High	31	3000	High
02	2500	High	32	3500	High
03	3900	High	33	2500	High
04	4000	High	34	2500	High
05	4000	High	35	2500	High
06	5000	High	36	8000	High
07	3000	High	37	2500	High
08	3000	High	38	2000	Low
09	4500	High	39	2000	Low

Respondents	MPCFE (Tk.)	Stats	Respondents	MPCFE (Tk.)	Stats
10	2500	High	40	1500	Low
11	5000	High	41	2000	Low
12	2400	High	42	3000	High
13	2000	Low	43	2500	High
14	2100	Low	44	1500	Low
15	1595	Low	45	1500	Low
16	3000	High	46	1800	Low
17	2500	High	47	1800	Low
18	1900	Low	48	1950	Low
19	2000	Low	49	3500	High
20	2800	High	50	1950	Low
21	1900	Low	51	2000	Low
22	3600	High	52	2000	Low
23	7500	High	53	9000	High
24	6900	High	54	3500	High
25	7500	High	55	1200	Low
26	2200	Low	56	1950	Low
27	4500	High	Total	185545	
28	7500	High	Mean MPCFE	3313.304	
29	7500	High	2/3MPCFE	2208.869	
30	5000	High	Source: field Survey, 2019		

Note: Mean per Capita Food Expenditure = MPCFE in TK

The analysis ascertained that more than the respondents (37.5%) are food insecure since their monthly per capita food expenditure falls below two-third (2/3) of the mean monthly per capita food expenditure.

Logistic Regression Analysis Result

The logistic regression analysis identified the factors affecting the ability of the households to secure available food supplies .the result of analysis is demonstrated in Table 4.

Table 4. Logistic Regression Result for the Determinants of food Security status

Explanatory variable	Coefficients	Standard	Z-Statistics	Pr(>z)
Sex of household head	0.06138	1.181	0.520	0.60332
Number of dependents or household size	-1.227	0.4598	-2.669**	0.00761
Income of household head	0.000175	0.0000643	2.732**	0.00630
Age	-0.1229	0.05911	-2.078*	0.03768
Level of education	-0.1557	0.1332	-1.168*	0.04261
Per capita monthly food expenditure	-0.0005415	.0003338	1.622	0.10474
Constant	6.825	3.829	1.782	0.07472
chi-square	39.182			
R^2	67.22			

*Significant at 5 % level of probability,**Significant at 1 % level of probability

Source: field survey, 2019

Four Variables are important in explaining the food security status of the household . They are number of dependents, income of household head, age of household head and level of education. The other variables demonstrate not to be important. Sex of household head has a negative impact on food security status because more dependents want more food with in the household with a fixed income of household head. Income of household has positive effect on food security status suggesting that the more gainfully employed a household head is, the greater his or her chances of being food secure. The level of education has positive effects on food security status point toward that higher of level education has a greater chance to get a better job, which indirectly helps to earn higher income. Higher income also has positive effects on food security status

 In brief, it is yielded that number of dependents, income of household head, age of household head and level of education of the households are the determinants of food security status among the responds of Hakimpur Upazila in Dinajpur District. The coefficient of determination, R^2 is 67.22 percent inferring that the variation in food security status is due to the stated socio-economic characteristics of Hakimpur Upazila in Dinajpur District households. The result further showed that the overall logistic model was significant based on the chi-square. Thus representing that the explanatory variables are relevant in determining the household food security status.

Conclusion

The study has found that households of Hakimpur Upazila in Dinajpur District were food insecure during the period of the survey. Number of dependents, income of household head, age of household head and level of education were found to significantly influence household head food security in the study area positively. However, sex of household head, Per Capita monthly food expenditure was found to influence food security negatively at the household level.

Based on the results, It is recommended that social security measures must ensure that the benefits of public efforts to improve food security and nutrition are universal. Human rights based practices are preferable. Extremely versatile, tolerant and nutrient-sensitive, it is vital to grow agriculture.

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