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Research Paper

Factors Affecting Food Accessibility of Rural Households: A Study in Birbhum, West Bengal

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ABSTRACT

In view of the goal of achieving 'Zero Hunger' by 2030 set in the United Nations Summit, 2015, the present study makes an attempt to identify the determinants of food accessibility of rural households in six selected villages of two blocks of the district of Birbhum, West Bengal. Food accessibility implies ability to acquire food through various means. The study is based on primary data collected from field survey in the selected villages. The total sample size is 500. Food accessibility of the households is analysed in terms of their monthly per capita consumption expenditure (MPCE) on food. This calculated MPCE has been compared with the MPCE on food as per the minimum food basket for rural India set by the Planning Commission in 2014. The households have been classified into two groups, viz, households lying above the specified threshold of food accessibility are considered to be those having food accessibility and households below that cut off of food accessibility are taken to be those not having that accessibility. Logit regression, applied for finding out the determinants, reveals that number of years of education of the heads of the households, female literacy rate, monthly income of the households, work force participation rate positively influences food accessibility, while monthly expenses on intoxicants have a deterring effect on food accessibility of the households. The study suggests that access to sustainable employment opportunities for the poor can be the most important solution for achieving 'Zero Hunger'.

Highlights

- Monthly income of the households, work force participation rate, number of years of education of the heads of the households, female literacy rate, positively influence food accessibility of the households; in contrast, monthly expenses on intoxicants have a deterring effect on food accessibility.
- Access to sustainable employment opportunities for the poor and their inclusion in literacy programmes and in higher education would be absolutely essential for achieving 'Zero Hunger'.

Keywords: Zero Hunger, Global Hunger Index, MPCE on Food, Minimum Food Basket

Food Accessibility, which is an important component of food security, represents the ability of an individual or a household to acquire food either through market exchange, or home production, or different food assistance programmes by the government. Since 1948, when food security has been recognised as a basic human right in the Universal Declaration of Human Rights, provision of this right has been considered to be the primary responsibility of the States towards their citizens in several international agreements. At the UN Summit of September 2015, 193 UN members unanimously agreed to achieve 'Zero Hunger' by 2030, i.e., to make sure that all people especially children and the more vulnerable have access to sufficient and nutritious food all the year round (https://www.un.org/sustainable development/ sustainable-development-goals).

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However, according to FAO *et al*. (2020), "The world is not on track to achieve…….. Zero Hunger by 2030. ……This buttress recent projections that the world's prevalence of undernourishment will be 9.8 percent in 2030, leaving over 840 million people undernourished even before taking into account the COVID-19 pandemic."

The Global Hunger Index (GHI) (2020) (Grebmer *et al*. 2020) calculated for 107 countries on the basis of four key indicators viz., undernourishment, child wasting, child stunting and child mortality, highlighted that at the end of 2019, "nearly 690 million people were suffering from chronic hunger, and 135 million people were experiencing crisis levels, or worse, of acute food insecurity…… Now the health and economic crises generated by the COVID-19 pandemic have resulted in income losses, food and labour shortages, and health service disruptions that affect the most vulnerable…….. According to initial predictions, the pandemic and its economic fallout could double the number of people facing acute food crises. " It should be noted that the GHI severity scale has classified the level of hunger into five categories: low, moderate, serious, alarming, and extremely alarming.

Although India has been signatory to various international agreements for combating hunger, India ranks 94 out of 107 countries on the global hunger index 2020; and is in the 'serious' hunger category. In the index, India features behind Nepal, Pakistan, Bangladesh, Indonesia among others. According to GHI 2020 report, 14 per cent of India's population is undernourished; child stunting rate is 34.7 per cent, reflecting chronic under nutrition.

It is worth mentioning here that Sen (1981) emphasised that mere presence of food in the economy would not ensure a person to acquire it. The concept of 'food entitlement' of the population of a country, pioneered by Sen, points to the conditions under which people access the available food from direct production or market exchange or social security measures or from all these together. It was thus Prof. Sen who reduced the concept of food access to that of food accessibility of the person which ultimately depends on purchasing power, determined by access to productive assets and livelihood opportunities.

It is against this background that the present study intends to analyse the factors influencing food accessibility of the rural households. The study is based on field survey conducted in six selected villages of two blocks of the district of Birbhum, West Bengal. The rural area has been focused due to the fact that the MSSRF report of 2008 warned that in India, the high economic growth rates failed to improve food security, particularly in its rural economy. As per 2011 Census, the percentage of rural population in Birbhum is 87.17. Further, it should be mentioned here that according to National Family Health Survey (NFHS)-4 (2015-16), 40.2 percent children under five years in rural Birbhum were stunted (height- for-age), 30.8 percent of them were wasted (weight-for-height) and 45.6 percent were underweight (weight-for-age) (Government of India Ministry of Health and Family Welfare, 2016). These percentages were higher compared to those of the rural areas of the state as a whole (34.0 percent and 21.6 percent, 33.6 percent respectively). Thus, Birbhum is indeed a region on which a detailed study on food accessibility is called for. In view of this, the specific objective of the present study is to find out the socio-economic factors that affect food accessibility of the rural households in Birbhum district, West Bengal.

REVIEW OF LITERATURE

There has been a vast literature on the socio-economic factors determining food security. Majority of the studies relate to different African countries. There are also studies on some Asian countries. In this connection it should be mentioned that according to GHI (2020), Africa South of the Sahara and South Asia have the highest hunger and under nutrition levels among world regions. It is to be noted that in the studies on determinants of food security, the aspect of utilisation of food, which is an important element of food security, has not been considered. In fact, these studies presume that food insecurity occurs when people either does not have access to food or are unable to purchase it. Thus, these studies actually have been focusing on food security of the households in terms of their food accessibility.

A number of studies during the last two decades relating to African and Asian Countries reveal that endowments of different forms of capital have been found to be key determinants of households'

food security. Studies on India during the last two decades viz., Agarwal *et al*. (2009); Kumbhare *et al*. (2013); Chinnakali *et al*. (2014); Maitra and Rao (2015); Payne *et al*. (2016); Sayeed *et al*. (2016); Sarkar and Shekhar (2017); Basar and Das (2018) pointed out the same fact. In fact, all these studies identify that the main human capital affecting household food accessibility is age, sex, education of the household head and availability of labour. The physical capital which influences food accessibility is access to land and livestock. The main determining financial capital is availability of credit and that of remittances. All these studies applied either Logit or Probit or Tobit regression to identify the factors determining the food access of the households.

Database and Methodology

The study is based on primary data collected from field survey carried out in 2018 in selected villages of Birbhum. A multistage stratified random sampling method has been adopted in the selection of the final sample. Since the study focuses on rural areas, in the first stage of the sampling, the district of Birbhum has been selected randomly among the districts of West Bengal, having more than 85 percent of rural population, as per 2011 Census. In the second stage, among the 19 blocks of the district, two blocks have been selected at random and without replacement, one of which happens to have relatively higher cropping intensity than the district's cropping intensity and the other one, having relatively lower cropping intensity than that of the district. Three villages, each having at least 125 households, have been selected at random from each block. Thus, altogether six villages have been considered for the present study. A 40 percent sample of households has been drawn in each village. For selecting the households, complete lists of households have been prepared for every village. From those lists, households have been divided into two groups, viz, landed and landless. Then landed households, in each village, have been classified into standard land-size groups i.e., Marginal Farmer, Small Farmer, Semi-Medium Farmer, Medium Farmer and Big Farmer, on the basis of their operational landholdings following the classification of Agricultural Census. A stratified random sample of landless and landed households from different land size groups is drawn in proportion to their share in total households to arrive at the final sample for the study. Again, within each class of landless as well as landed households, households from various castes are taken randomly in proportion to their share in total households. At each stage, the random selection has been made following the procedure of Simple Random Sampling without Replacement. The total sample size for the present study is 500.

In the present study, food accessibility of the households is analysed in terms of their monthly per capita consumption expenditure (MPCE) on food from all sources. The concept of MPCE at the household level, as defined by the NSSO, has been followed. This calculated MPCE has been compared with the MPCE on food as per the minimum food basket for rural India set by the Planning Commission in 2014, which is the latest available official estimate during the period of the field survey for the present study, adjusted by the latest consumer price index published by the Central Statistical Organization (CSO). The sample households have been classified into two groups, *viz.*, households lying above the specified threshold of food accessibility are considered to be those having food accessibility and households below that cut off of food accessibility are taken to be those not having that accessibility. Thus, in the present study food accessibility status of the households is taken as the dependent variable (FA) which can take two values 0 and 1. Households, having food accessibility, is given 1 and 0 otherwise. Thus, the dependent variable is dichotomous or binary in nature. This is why binary regression technique has been applied to find out the factors influencing food accessibility of the households. Logit regression is employed in the present study following majority of previous studies in the literature. In the present study the explanatory variables have been selected on the basis of their theoretical importance reflected in the literature as well as with respect to their observed relevance in the local context. The correlation matrix of all these explanatory variables has been constructed to examine the possibility of multicollinearity. Following Napoleon *et al*. (2017), correlations of $r > 0.5$ have been treated to be collinear. Among the correlated variables, only one has been taken as predictor in the regression analysis. However, taking the correlated variables one by one, all possible alternative regressions

have been carried out. Thus, several regressions have been run and the best one has been reported for each estimation. The best fit regression has been selected on the basis of the values of Akaike Information criterion and Schwartz criterion.

RESULTS AND DISCUSSION

At the outset, an attempt has been made to analyse the socio-economic characteristics of the households that are likely to influence their food accessibility. It should be noted that the characteristics, obtained from the literature and those which seem relevant in the local context, have been analysed in Table 1. It is observed that the average family size of the households is little bit bigger and the workforce participation rate is marginally lower among the households which do not have the ability to consume as per the cut- off of the MPCE on food for the minimum food basket for rural India than the households having the ability to consume as per the same cut-off point. The percentages of overall literacy, female literacy as well as the households heads' average years of education – all are found to be higher for the households which have food accessibility than those not having that. Farming experiences of the heads of the households are greater for the former group than that of the latter. With respect to monthly income, as well as different properties, viz., operational land, land-man ratio, percentage of area under irrigation in the total operational area, value of agriculture allied property, value of farm implement, value of livestock, value of durable asset, households having food accessibility are in a better position than the households not having food accessibility as expected. A probe into households' monthly expenses on intoxicants reveals that this is lower for the former group than that of the latter.

Finally, an attempt has been made to find out the determinants of food accessibility of the households In accordance with the correlation matrix, the following explanatory variables have been considered in the best regression model.

CST = caste of the household

FMSZ = family size of the household

HDAG = age of the head of the household

HDED = number of years of education of the head of the household

FMLT = female literacy rate

Table 1: Socio Economic Characteristics of the Sample Households Classified according to the MPCE on Food for the Minimum Food Basket for Rural India as the Threshold

Households' Characteristics	Households having food accessibility	Households not having food accessibility
Family Size of Household	4.04	4.77
Work Force Participation Rate	52.82	52.30
Percentage of Literacy	70.62	62.67
Percentage of Female Literacy	64.55	59.41
Household Head's Years of Education	4.81	2.59
Household Heads 'Farming Experience (in years)	23.86	19.66
Operational Land (in acres)	1.29	0.65
Land-Man Ratio (in acres)	0.32	0.16
Percentage of Area under Irrigation to the total Operational Area	76.05	74.38
Value of Agriculture Allied Property (in rupees)	75822.72	4703.30
Value of Farm Implement (in rupees)	42042.54	8696.70
Value of Livestock (in rupees)	24447.60	15098.79
Value of Durable Asset (in rupees)	41861.24	15291.87
Monthly Income (in rupees)	11690.70	8000.18
Monthly Income from farm Production (in rupees)	2281.85	1034.15
Monthly Income from Sources other than Farming (in rupees)	9408.85	6966.03
Monthly Expenses on intoxicants (in rupees)	377.84	416.59

Source: *own calculation based on field survey.*

MI = monthly income of the household

WRKPRT = workforce participation rate

AGALPRP = agriculture allied property

LSTK = value of livestock

INTXEXP = households' monthly expenses on intoxicant

BLKDM = block dummy

The result of the best fit regression is presented in Table 2. It has been found that number of years of education of the head of the household, female literacy rate, work force participation rate, household's monthly expenses on intoxicants, monthly income and value of the agriculture allied properties are statistically significant affecting food accessibility of the households. On the other hand, caste, family size, age of the head of the household, values of livestock and block dummy are statistically insignificant. The insignificance of the block dummy implies that there is no block- specific characteristic, which can influence food accessibility of the households in different blocks. All these significant variables, other than household's monthly expenses on intoxicant have positive influence on the log-odds ratio of households' food accessibility.

Table 2: Result of regression

Variable	Coefficient	Marginal Effect
Constant	-4.481280 (0.0001)	
CST	-0.315892 (0.5493)	-.004655
FMSZ	-0.135701 (0.4133)	-.0019037
HDAG	-0.008440 (0.6046)	-.0001184
HDED	0.281195*** (0.0000)	. 039449
FMLT	0.019323*** (0.0006)	.002711
MI	0.000137** (0.0202)	.000019
WRKPRT	0.102945*** (0.0000)	.014442
AGALPRP	1.19E-05* (0.0607)	1.66E-06
LSTK	4.39E-06 (0.5754)	6.16E-08
INTXEXP	-0.004627 ***(0.0000)	-.0000649
BLKDM	0.341179 (0.3787)	.00483
Number of observations	499	
McFadden R – Squared	0.559674	
LR Statistic	265.2915 (0.000000)	

Note: *(Probabilities in the parentheses), legend: * p<.1; ** p<.05; *** p<.01*

Source: *own calculation based on field survey.*

The coefficient of the number of years of education of the head of the household indicates that the variable is significant at 1 percent level and a unit increase of that would lead to an increase in the log odds ratio of food accessibility of the households almost by 0.28. This implies that the probability of having food accessibility in relation to the probability of not having food accessibility increases when number of years of education of the head of the household increases. A unit increase in the number of years of education of the head of the household increases the probability of having food accessibility by 0.039, as captured by the marginal effect. This observed positive relation between education level of the head of the households and food accessibility of the households reaffirms the findings of the earlier studies, e.g., Sultana and Adiqa (2011), Bashir *et al*. (2012), Gebre (2012), Musemwa *et al*. (2013), Ifeoma and Agwu (2014), Muche *et al*. (2014), Abdullah *et al*. (2017), Ehebhamen *et al*. (2017), Jabo *et al*. (2017), Valešová *et al*. (2017), Antwi *et al*. (2018), Mustapha *et al*. (2018), Omotayo *et al*. (2018).

Female literacy rate is also significant at 1 percent level; one unit increase of female literacy rate results in about 0.02 units increase in the food accessibility of the households with 0.27 percent increase in the probability of having food accessibility.

Monthly income of the households is found to be significant at 5 percent level. For every 100 rupees increase in the monthly income of the households, the probability of households having food accessibility increases almost by 0.2 percent. The finding of a positive relation between monthly income of the households and their food accessibility is in line with many earlier studies, like Arene, and Anyaeji (2010), Carter *et al*. (2010), Bashir *et al*. (2012), Musemwa *et al*. (2013), Loopstra and Tarasuk (2013), Abu and Soom (2016), Ahmed *et al*. (2017), Ehebhamen *et al*. (2017), Valešová *et al*. (2017), Mustapha *et al*. (2018).

The workforce participation rate is significant at 1 percent. It is observed that if the workforce participation rate is increased by one unit, the log odds ratio of food accessibility of the households would increase by 0.1 units with an increase of probability of having food accessibility by 1.4 percent. The positive relation between workforce participation rate and food accessibility of the households is consistent with many previous

studies, e.g., Shariff and Lin (2004), Sultana and Adiqa (2011), Loopstra and Tarasuk (2013), Odusina (2014), Abdullah *et al*. (2017), Onunka *et al*. (2018).

The regression result further indicates that the value of the agriculture allied property is significant at 10 percent level. An increase of rupees 1000 in agriculture allied property of the households increases the likelihood of the households having food accessibility by 0.1 percent.

Households' monthly expenditure on intoxicant has been observed to be significant at 1 percent. If the monthly expenditure on intoxicants is increased by 100 rupees, the probability of households having food accessibility decreases by 0.6 percent.

Thus, it appears that the findings of the present study are in conformity with the existing literature, except the impact of agriculture allied property and intoxicant, which has been included in the present study based on field experiences. Since the rural households mainly depend on agriculture, possession of more and more agriculture allied property is likely to enhance their food accessibility and that exactly has been revealed in the present study. The possibility of reverse causality between monthly expenses on intoxicants and food accessibility of the households has been ruled out on the basis of the experience narrated by the female members of the households, many of whom reported that even the meagre earnings of the households had often been wasted due to the addiction of the male members to intoxicants.

There are a few variables which are significant in some earlier studies but have not turned out to be significant or appeared in the best regression in the present study. These are age of the head of the household, operational land, value of the livestock owned, and outstanding credit. However, all these variables have their expected signs in alternative regressions carried out in the present study.

CONCLUSION

The result of the Logit regression model applied for finding out the determinants of food accessibility of the households reveals that number of years of education of the heads of the households, female literacy rate, monthly income of the households, work force participation rate positively influences food accessibility, while monthly expenses on intoxicants have a deterring effect on food accessibility of the households. Value of households' agriculture allied property is found to be significant only at 10 percent level. All other social or institutional factors do not have any significant impact on food accessibility. The findings of the present study thus point out to the importance of economic variables, education as well as consumption of intoxicants in determining food accessibility of households in the surveyed area for the present study.

In view of the apprehended long lasting devastating impact of the COVID-19 pandemic, the following basic suggestions are absolutely essential. As monthly income and workforce participation rate are found to be significant determinants of food accessibility of the households, access to sustainable employment opportunities for the poor can be the most important solution for achieving 'Zero Hunger'.

Educational level of the heads of the households as well as female literacy rate being significant factors in the present study influencing food accessibility positively, more and more people should be included in the literacy programmes and also in higher education. This will result in development of skill of the rural mass leading to the possibility of enhancement of their earning in a sustainable manner. Moreover, it is expected that with increase in the number of educated people there will be more awareness against the harmful effects of consuming intoxicants and hence more realisation of the value of consuming healthy food rather than intoxicants, which have been found to have a strong deterring effect on the food accessibility of the households in the surveyed area.

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