

Research Paper

A Snapshot of Food Accessibility and Dietary Diversity of Households in A Marginal Farmer Dominant Economy: A Study in Birbhum, West Bengal

Shibani Bagchi^{1*} and Archita Ghosh²

¹Department of Economics, City College of Commerce & Business Administration, Kolkata, West Bengal, India

²Department of Economics, University of Kalyani, West Bengal, India

*Corresponding author: shibani.santiniketan@gmail.com (ORCID ID: 0000-0002-5604-7663)

Received: 19-01-2023

Revised: 22-05-2023

Accepted: 02-06-2023

ABSTRACT

Not even a decade remains to achieve the goal of 'Zero Hunger' by 2030, adopted in the UN Summit of September 2015. In this perspective the present study, based on the field survey conducted during 2018, i.e., much before the COVID-19 pandemic, intends to analyse the extent of food accessibility of the households across different land-size classes in six villages of the district of Birbhum, West Bengal. The study reveals that the problem of food inaccessibility is faced mainly by households with no operational land, and by marginal and small farmers, who unfortunately constitute more than 97 percent of the sample households. Since dietary diversity of the households indicates their economic capability, the study also probes into that. It comes out from the study that there exists an inverse relation between the extent of food inaccessibility and dietary diversity scores of the households. Creation of sustainable employment opportunities is the only solution to overcome this misery.

HIGHLIGHTS

- Households without operational land and marginal farmers suffer mostly from food inaccessibility and lack of dietary diversity.
- Policy for sustainable employment is urgently needed.

Keywords: Marginal-farmer Dominant Economy, Zero Hunger, MPCE on Food, Minimum Food Basket, Dietary Diversity Score

The rural economy of West Bengal has been experiencing a skewed distribution of landholdings in favour of relatively larger farmers at the cost of marginal farmers in the last few decades. From table 1, it is observed that, as per the latest Agricultural Census (Government of India, 2020), the percentage share of marginal farmers in all categories of farming households was almost 83 and these marginal farmers cultivated a little more than 53 per cent of total operational land during 2015-16. In contrast, small, semi-medium, medium and large farmers, taken together, constituted only 17.19 percent and they jointly cultivated about 47 percent of total operational land. The average operational

landholding of marginal farmers was only about 0.5 ha during 2015-16. Obviously, the rural economy of West Bengal is nothing but a marginal-farm dominant economy.

Assuring food security, which has been recognized as a basic human right since the Universal Declaration of Human Rights of 1948 (United Nations, 1949), to these numerous marginal as well as small farmers and the vast landless households

How to cite this article: Bagchi, S. and Ghosh, A. (2023). A Snapshot of Food Accessibility and Dietary Diversity of Households in A Marginal Farmer Dominant Economy: A Study in Birbhum, West Bengal. *Econ. Aff.*, 68(02): 1135-1140.

Source of Support: None; **Conflict of Interest:** None



Table 1: Distribution of Number of Operational Holdings, Area Operated by Operational Holdings and Average Size of Operational Holding for All Land-Size Groups in West Bengal

Size Class	Number of Holdings (Percentage)			Area Cultivated (Percentage)			Average Size of Operational Holding (in ha.)		
	2005-06	2010-11	2015-16	2005-06	2010-11	2015-16	2005-06	2010-11	2015-16
Marginal	81.17	82.16	82.81	50.65	52.47	53.39	0.49	0.49	0.49
Small	14.38	13.76	13.41	28.87	28.25	28.31	1.59	1.59	1.60
Semi-Medium	4.04	3.75	3.53	13.98	13.26	12.76	2.73	2.73	2.74
Medium	0.40	0.32	0.24	2.49	1.99	1.54	4.94	4.85	4.81
Large	0.01	0.01	0.01	4.00	4.03	4.00	339.42	316.20	361.08

Source: Government of India, 2020.

is of utmost importance to the policy makers. At the UN Summit of September 2015, a unanimous decision has been taken to achieve 'Zero Hunger', the aim of which is to end all forms of hunger and malnutrition by 2030. (<https://www.un.org/sustainable-development/sustainable-development-goals>) In this connection, it should be mentioned that long back Sen (1981), through his pioneering concept of 'food entitlement', emphasized that food access ultimately depends on access to productive assets and livelihood opportunities.

Table 2: Distribution of Operational Holdings in the District of Birbhum

Category of Farmers	Percentage Share of Farmers	Percentage Area Owned
Marginal	79.17	44.23
Small	15.41	29.68
Semi-Medium	5.13	24.01
Medium	0.29	1.94
Big	0.00	0.14

Source: (<http://birbhum.gov.in> >DDAgri > ddadmin) accessed on 22.09.2021.

It is against this background that the present study seeks to analyse the extent of food accessibility of households across land-size classes in selected rural areas of the district of Birbhum, where also marginalisation of size of holdings is taking place. From table 2, it is clear that the percentage share of marginal farmers in all categories of farmers is about 80 percent, but they cultivate only about 44 percent of total operational land. In contrast, small, semi-medium, medium and large farmers, taken together, constitute only 20.83 percent and they cultivate nearly 56 percent of total operational land.

The precise objectives of the study are:

- to measure the extent of food accessibility in terms of incidence, depth and severity of food accessibility at the household level across the land-size classes;
- to find out the dietary diversity of the households belonging to various land-size classes.

REVIEW OF LITERATURE

In the literature incidence, depth and severity of food insecurity in terms of food accessibility of the households of different countries have been measured by head count ratio, food insecurity gap and squared food insecurity gap respectively following the poverty measures provided by Foster, Greer and Thorbecke (1984). Some recent studies viz., Shuaibu *et al.* (2015), Abu and Soom (2016), Cheema and Abbas (2016), Onasanya, and Obayelu (2016), Ahmed *et al.* (2017), Bagchi and Ghosh (2018), Basar and Das (2018), Sani and Kemaw (2019) apply these measures and find that head count ratio, food insecurity gap and squared food insecurity gap, increase with the worsening of economic conditions of the households.

Some recent studies analyzing the dietary diversity of the households, viz., Ahmed *et al.* (2015), Payne *et al.* (2016), Ogundari (2017), Antwi *et al.* (2018), Ngema *et al.* (2018) reveal that there exists a positive relation between the economic well-being of the households and their dietary diversity.

DATABASE AND METHODOLOGY

The study is based on primary data collected from field survey during 2018 in selected villages of Birbhum. A multistage stratified random sampling

method has been adopted in the selection of the final sample. Two blocks have been selected at random, one of which happens to have relatively higher and another one with lower cropping intensity than that of the district average. Three villages, each having at least 125 households, have been selected at random from each block. Households have been classified into landed and landless. Again, landed households have been stratified into five standard land-size groups, i.e., Marginal Farmer, Small Farmer, Semi-Medium Farmer, Medium Farmer and Large Farmer on the basis of their operational landholdings following the Agricultural Census (Government of India, 2020). A stratified random sample of landless and landed households from different land size groups is drawn in proportion to their shares in total households to arrive at the final sample for the study. The total sample size for the present study is 500, taking 40 percent sample of households from each village.

In the present study, food accessibility of the households has been analysed in terms of their monthly per capita consumption expenditure (MPCE) on food from all sources. 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 (Government of India, 2014), which is the latest available official estimate during the period of the field survey, adjusted by the latest consumer price index published by the Central Statistical Organization. It is taken as the threshold of food accessibility. The households have been classified into two groups: (i) one having food accessibility, if their MPCE on food lies above the threshold and (ii) the other not having the same, if their MPCE on food falls below the corresponding threshold. On the basis of the threshold, the extent of food accessibility of the households has been measured in terms of incidence, depth and severity of food accessibility. Following Foster, Greer and Thorbecke (1984), the present study uses head count ratio, total food inaccessibility gap and squared food inaccessibility gap as the measures of incidence, depth and severity of food inaccessibility respectively.

Head count ratio measures the percentage of incidence, i.e., the proportion of people who do not have food accessibility in total population.

Food inaccessibility gap of the i^{th} household (FIG_i) is defined as;

$$FIG_i = (MPCEFR - MPCEFI_i) / MPCEFR$$

where $MPCEFR$ = Monthly per capita consumption expenditure on food required by the households not having food accessibility and $MPCEFI_i$ = Monthly per capita consumption expenditure on food incurred by the i^{th} household not having food accessibility. Total food inaccessibility gap ($TFIG$), which indicates the depth of food inaccessibility among the households not having food accessibility, is expressed by;

$$TFIG = \sum_{i=1}^m FIG_i / m$$

where m is the number of households not having food accessibility. The squared food inaccessibility gap ($SFIG$) indicates severity of food inaccessibility among the households who do not have food accessibility, i.e., the extent to which the MPCE on food of the respective households falls below the pre-determined threshold. It is given by;

$$(SFIG) = \sum_{i=1}^m (FIG_i)^2 / m$$

The Household Dietary Diversity Score (HDDS), developed by the US Agency for International Development (USAID)'s Food and Nutrition Technical Assistance Project (FANTA) II (Swindale and Bilinsky, 2006), is the sum total of twelve food groups, viz., (i) Cereals, (ii) White root and tubers, (iii) Vegetables, (iv) Fruits, (v) Meat, (vi) Egg, (vii) Fish, (viii) Legumes, (ix) Nuts and seeds, (x) Milk, (xi) Oils and Fats, (xii) Sweets consumed over a given period of time, generally taken as last twenty four hours. The respondents are asked to recall whether any members of the households consumed these food items in the last twenty-four hours. Two response options, viz. positive (yes =1) and negative (no=0) with respect to each food group are noted to arrive at the final HDDS. Thus, the lowest possible HDDS is 0 and the highest is 12. In the present study, households' recall for last seven days, in addition to twenty-four hours, has also been recorded to get a more comprehensive picture of their diet quality.

RESULTS AND DISCUSSION

From table 3, it is clear that the sample households are dominated by marginal farmers and land less households. There is no large farmer in the study area. It has been found that insecurity of food access is faced by households with no operational land, and by the marginal and small farmers who altogether constitute 97.4 percent of the sample households. 22.46 percent of households with zero operational land do not have food accessibility, whereas the corresponding percentages for marginal and small farmers are 18.63 and 06.98 respectively. The MPCE on food of all households belonging to other land-size classes are found to be greater than that as per the minimum food basket for rural India, but they constitute only 02.6 percent of total population in the sample. The total food inaccessibility gap and the squared food inaccessibility gap are found to be more or less the same for the households with zero operational land (0.1689 and 0.04683) and for the marginal farmers (0.1546 and 0.0355), but these two are much less for the small farmers (0.0114 and 0.0002). Thus, an inverse relation is observed between the operational land size of the households and their incidence, depth and severity of food inaccessibility as expected.

The dietary diversity of the households has been analysed in terms of the Household Dietary

Diversity Score (HDDS). From table 4, it has been observed that the average dietary diversity score (DDS) of the households without any operational land are the lowest for both twenty-four hours and for seven days (05.49 and 06.61 respectively). In this connection, it is to be noted that the extent of food inaccessibility is observed to be the highest among these households (table 3). Thus households, with the highest extent of food inaccessibility, have the lowest dietary diversity. Among the other two categories of households which also suffer from the lack of having food accessibility, viz, marginal and small farmers (table 3), the first group having more extent of food inaccessibility has less DDS (05.78 and 06.62) compared to the second group having less extent of food inaccessibility and more DDS (08.00 and 09.14). Thus, an inverse relation has been observed between the extent of food inaccessibility and dietary diversity of the households. However, a positive relation has been found between HDDS and the land-size of the households. Since land is an important indicator of the economic status of the households in rural areas, the findings of the positive relation between the operational land of the households and their DDS are consistent with the notion of Hoddinott and Yohanne (2002) that HDDS indicates economic capability of the households to consume a variety of food. It should be pointed out here that for all categories of households, the DDS

Table 3: Land Size Class -wise Measures of Food Inaccessibility

Category of Households	Percentage of Sample Households	Head Count Ratio	Total Food Inaccessibility Gap	Squared Food Inaccessibility Gap
Households with Zero Operational Land	27.6	22.46	0.1689	0.0468
Marginal Farmer	61.2	18.63	0.1546	0.0355
Small Farmer	08.6	06.98	0.0114	0.0002
Semi-Medium Farmer	02.2	0.00	Not Applicable	Not Applicable
Medium Farmer	00.4	0.00	Not Applicable	Not Applicable

Source: Own calculation based on field survey.

Table 4: Dietary Diversity Score of the Households by Land-Size Class

Category of Households	HDDS for 24 hours	HDDS for 7 days
Households with Zero Operational Land	5.49	6.61
Marginal Farmer	5.78	6.62
Small Farmer	8.14	9.14
Semi-Medium Farmer	8.73	9.82
Medium Farmer	10.00	10.5

Source: Own calculation based on field survey.

for seven days have been found to be marginally higher than that for twenty-four hours. This is perhaps due to the fact that for a longer recall period households are likely to acquire more diverse food by taking recourse to various sources. However, it is an alarming reality that DDS of vast majority of landless and marginal farmers are much less.

CONCLUSION

The study, based on the field survey conducted during 2018, i.e., much before the COVID-19 pandemic, reveals that the condition of food accessibility of the rural households in the surveyed areas of the district of Birbhum, where landless households and marginal farmers are the majority, is quite disturbing and needs to be addressed immediately. It has been observed that the problem of food inaccessibility is faced by households with no operational land, and by marginal and small farmers who altogether constitute more than 97.4 percent of the sample households. In fact, there exists an inverse relation between the size of the operational landholdings of the households and their incidence, depth and severity of food inaccessibility. Moreover, an inverse relation between the extent of food inaccessibility and dietary diversity scores of the households has been found. This implies that as the households suffer more from insecurity of food access, the diversity in their diet is adversely affected.

Thus the present micro level study seems to be consistent with the findings of the latest available Global Hunger Index 2022 (which classified the level of hunger into five categories, viz., low, moderate, serious, alarming, and extremely alarming) (Grebmer *et al.* 2022), according to which, India remains in the 'serious' hunger category. It is therefore vital that policies, oriented towards generation of sustainable employment opportunities leading to improvement of food accessibility of all, should be implemented immediately -- more so, in view of the caution sounded by:

- i) the GHI report 2022 that "the three key drivers of hunger—climate change, violent conflict, and economic downturns including those caused by the COVID-19 pandemic—are each worsening." (Grebmer *et al.* 2022).
- ii) the report of FAO, IFAD, UNICEF, WFP and WHO (2022) that the "persistence of the COVID-19

pandemic and other emergencies such as the war in Ukraine threaten progress towards ending all forms of malnutrition."

REFERENCES

- Abu, Godwin Anjeinu, and Aondonenge Soom. 2016. "Analysis of Factors Affecting Food Security in Rural and Urban Farming Households of Benue State, Nigeria". *Int. J. Food and Agril. Econ.*, **4**(1): 55-68.
- Ahmed, F.F., Eugene, C.E. and Abah, P.O. 2015. "Analysis of Food Security among Farming Households in Borno State, Nigeria." *J. Agril. Econ., Environ. and Soc. Sci.*, **1**(1): 130-141.
- Ahmed, Umar, I., Liu, Y., Muhammad, KB., Muhammad, A. and Farhad, Z. 2017. "Status and Determinants of Small Farming Households' Food Security and Role of Market Access in Enhancing Food Security in Rural Pakistan." *PLOS ONE*, **12**(10).
- Antwi, Kwaku Dei, Conrad Power Lyford, and Richard Yeboah Nartey. 2018. "Analysis of Food Security among Cocoa Producing Households in Ghana". *J. Agri. and Sustainability*, **11**(2): 129-144.
- Bagchi, S. and Ghosh, A. 2018. "A Probe into Rural Households' Food Accessibility Scenario: A Micro Level Study in West Bengal." *Econ. Aff.*, **63**(4): 953-962.
- Basar, Sk Md Abul, and Das, P. 2018. "Status of Food Security in West Bengal: A Study Based on NSSO Unit Level Data." *Int. J. Inclu. Dev.*, **4**(1): 01-07.
- Cheema, Ahmed Raza and Zafar, A. 2016. "Determinants of Food Insecurity in Pakistan: Evidence from PSLM 2010-11". *Pak. J. Appl. Econ.*, **26**(2): 183-213.
- FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable.* Rome, FAO.
- Foster, J.J. Greer, and Thorbecke, E. 1984. 'Notes and Comments: A Class of Decomposable Poverty Measures'. *Econometrica*, **52**: 761-765.
- Gebre, Girma Gezimu. 2012. "Determinants of Food Insecurity among Households in Addis Ababa City, Ethiopia." *Interdisciplinary Description of Complex Systems*, **10**(2): 159-173.
- Government of India. 2014. *Report of the Expert Group to Review the Methodology for Measurement of Poverty.* New Delhi: Planning Commission, Government of India.
- Government of India. 2020. *All India Report on Agriculture Census 2015-16.* New Delhi: Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India.
- Grebmer, Klaus von, Jill Bernstein, Miriam Wiemers, Laura Reiner, Marilena Bachmeier, Asja Hanano, Olive Towey, Reisel Ni Cheilleachair, Connell Foley, Seth Gitter, Grace Larocque, and Heidi Fritsche. 2022. *2022 Global Hunger Index. Food Systems Transformation and Local Governance.* Dublin / Bonn: welt hunger hilfe and Concern Worldwide.

- Hoddinott, J. and Yohannes, Y. 2002. *Dietary Diversity as a Household Food Security Indicator*. Washington, D.C: Food and Nutrition Technical Assistance Project, Academy for Educational Development.
- Ngema, Primrose Zama, Melusi Sibanda, and Lovemore Museumwa. 2018. "Household Food Security Status and Its Determinants in Maphumulo Local Municipality, South Africa." *Sustainability*, **10**: 3307.
- Ogundari, K. 2017. "Categorizing Households into Different Food Security States in Nigeria: the Socioeconomic and Demographic Determinants." *Agril. and Food Econ.*, **5**(8).
- Onasanya, Oluwayemisi Abidemi, and Oluwakemi Adeola Obayelu. 2016. "Determinants of Food Security Status of Maize-Based Farming Households in Southern Guinea Savannah Area of Oyo State, Nigeria." *Turkish J. Agric. - Food Sci. and Technol.*, **4**(5): 411-417.
- Payne, Hannah, E., Bobbi Gray, Siena F. Davis, Cassidy A. Hine, Arindam Das, Manisha Kabra, and Benjamin T. Crookston. 2016. "Factors Associated with Food Insecurity among Women and Children in Rural Rajasthan, India." *J. Gender, Agric. and Food Security*, **1**(3): 23-39.
- Sani, Seid, and Biruk, K. 2019. "Analysis of Households Food Insecurity and Its Coping Mechanisms in Western Ethiopia." *Agril. and Food Econ.*, **7**(5).
- Sen, A. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. New Delhi: Oxford University Press.
- Shuaibu, H., Abdullahi, A.A., Ango, A.K., Yusuf, H.A., Sulaiman, R. and Bello, M. 2015. "Food Security and Coping Strategies of Selected Villages along River Rima Affected by Flood in Sokoto State, Nigeria." *Asian J. Agril. Ext., Econ. & Soc.*, **6**(2): 77-84.
- Swindale, A. and Bilinsky, P. 2006. *Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (v.2)*. Washington, DC: FHI 360/Food and Nutrition Technical Assistance Project.
- United Nations. 1949. United Nations Universal Declaration of Human Rights 1948. New York: United Nations.