Food Security in the District of Paschim Bardhaman

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Abstract

Now a day, in a fast developing world food security is subject to food consumption pattern and food habit of new age people also. It is evident in many cases that people are having enough of availability and access to food but still suffering from under nutrition and health issues due to unbalanced diet and unhealthy food habits. Our present study aims to investigate the food security status of Paschim Bardhaman district with a special emphasis on the food consumption pattern of it's households. Using the report of ICMR-2020 we have tried to observe whether the households of the district able to achieve required daily medically prescribed calorie or not? Our food security indicator is the ratio of actual daily calorie enjoyed by the household members and the prescribed required calorie for that household by the medical practitioner or dietician, where value of the indicator greater than or equal to one implies that the household is 'food secure'. We have opted for a cross sectional study on 650 households of Paschim Bardhaman district and observed that almost 41.08% households failed to achieve required medically prescribed calorie on daily basis. Logit regression analysis has been used on food security to look into the impact of some important factors on the household's food security and the result indicates a significant impact of food consumption pattern of the household's on their food security status. Also family income, expenditure made on food, family size has a huge impact on household level food security of the district.

Key Words: Food Security, Consumption Pattern, Balanced Diet, Calorie Consumption

JEL Classification: Z18, Q18, Y10

Introduction

Even after 75 years of Independence food security is a widely discussed concept in India. Initially it was all about the four dimensions of food security namely, food availability, food accessibility, food utilization and stability. But now a day we cannot restrict it into these four dimensions only. Actually food insecurity can be interlinked with several other concepts like nutrition security, balanced diet, achieving medically prescribed required daily calorie, healthy food consumption pattern and also the knowledge of what to eat and what not to eat.

Several contemporary studies (Chand and Jurani 2013, Deaton and Dreze 2009, Patnaik 2010) now a day considers the fact that even after achieving so much self sufficiency in production of food grains, improvement in availability and accessibility to food grains, no significant improvement or progress achieved in the state of reduction of hunger or undernourishment. According to these studies there is significant decline in calorie consumption over the period and therefore existence of undernourishment even after achieving self sufficiency in food grain stock. Here we found our research gap or the motivation of the study that not very much study attained these problems till now in their research studies.

Relation between poverty and calorie deprivation is actually visible in socially backward classes, illiterates, economically backward classes, in Muslim communities (Mishra and Gupta 2013). Rural population suffers most due to Poverty and Nutrition Trap as their lack of income leads lower calorie intake and then they became energy deprived and less productive that in return leads lower wage earning and that circle goes on (Jha et al 2006). Cereal based consumption pattern is another important factor that restricts especially the rural population to achieve adequate nutrition, calorie from balanced diet (Ismail and Mustaquim 2012). Rural urban disparities therefore visible in the consumption pattern and that is because of choice and preferences of consumption which creates the gap between recommended daily calories and actually consumed calories by the households of different rural urban regions (Golait et al 2006).

Calorie deprivation or unhealthy unbalanced diet can cause several health issues and anthropometric failure among population especially among children. More than 50% of children of below five age group suffer from vitamins, minerals and various micronutrient deficiencies, which is considered as hidden hunger now a days (Stevens. A. G et.al 2022). Therefore it is important to consider the factors that affect or influence child eating behaviour (Scaglioni et al 2018) and also there is a necessity to overcome the problem of assessing the gap between required calorie daily and actual daily calorie intake (Jensen et al 2010).

It is possible that a person or a household has enough of food to fill the stomach throughout the day but unbalance or unplanned diet pattern and munching leads food insecurity. To this en in our present study we are going to consider food security with respect to food consumption pattern i.e.; to establish the relation between food consumption pattern and food security status of the household.

Objective of the study

Objective of our present study is to estimate first the food consumption pattern of the households of the Paschim Bardhaman district and then to check the existing status of food security/insecurity of the district. The district is very well off in terms of its earnings and revenue. A large section of population or households earn enough or more than enough for their living but still due to unhealthy food habit a large section of them suffers from several health issues and under nutrition or malnutrition. To be specific objective of our present study is

First, to estimate the food consumption pattern of the district

Second is to estimate the relationship between food consumption pattern of the households of the district and their food security status.

And the third is to check the marginal impact of some important factors on the food security of the district.

Review of Literature

Some recent trends in food security and food production have been examined by **Shah (1997)** and evidence shows that diversified production trends i.e.; production of non food crops instead of food crops leads unemployment for several farmers and hence their purchasing power became questionable.

A comparative analysis of food availability and nutritional value has been analysed for two different time period **(Kumar P et.al 2013)** and the result shows that consumption of cereals and pulses decreases over time.

Almost 21% of rural population in India are identified as food insecure because of poverty, low income, caste, religion, location **(Rammohan. A et al)**. Therefore improvements in food based safety nets and its distribution is important.

A consumption shift from cereal to non cereal high value food product observed along with undernourishment, vitamin A and iron deficiency mostly on children and pregnant women **Reddy(et.al)**.

Several issues like improper land distribution, carbohydrates dominated production pattern, lack of purchasing power of milk and other dairy products; saline soil, poverty, unhygienic drinking water and sanitation are addressed by **Basu (2020)** as the problem of achieving food security in West Bengal inspite of achieving self sufficiency in food grain production and stock.

A cross sectional study on Midnapore district of West Bengal once again proves the Engel's law by and shows whatever the income slab a household belongs that has tendency to spent more on non food items instead of food items if their income increases **(Kundu 2017)**.

Almost 60% households of the Calabarzon area are identified as food insecure with cereal based food habit that leads lack of intake of other essential micronutrients especially for the poor households **(Reyes 2010)**.

Diversity in food consumption has been found very low due to cereal based consumption habit especially of the households dominated by female members in Bihar, Jharkhand, Odisha region of India **(Parappurathu et al 2015)**.

In a cross-sectional study on rural West Bengal family size, holding live stock and source of income reflects significant impact on calorie intake thou bivariate and multivariate analysis shows male headed households are more deprived in case of calorie and protein consumption whereas reverse result observed in case of fat consumption **Sarkar(2015)**.

A huge gap observed in minimum required and actually consumed dietary diversity of the children from age group of 6 month to 23 month and hence results vitamin A deficiency among them **(Beckerman-Hsu et.al 2020)**.

Problem and complication observed like forced migration and ad-world exposure for local market due to fast changing consumption pattern since last ten years in Sundarban area of West Bengal in a study done by

Banerjee.

A relation between eating disorder and BMI has been established by **Saha(et al 2022)** on 100 female nursing student of Birbhum by applying Pearson's correlation and the result shows a positive correlation between eating disorder BMI and fat percentage in body.

Methodology

To look into the food security condition of the district Paschim Bardhaman our first and foremost job is to compute food consumption pattern of the district as our objective is to investigate the status of food security on the basis of the pattern of consumption along with some other important variable. We have collected the data of food consumption pattern using 4 point Likert scale on twelve different food components providing different essential nutrition components to human body as per common food habit and market availability of study area and then used Principal Component Analysis to get the food consumption pattern score (FDCNPT).

The formula is

FDCNPT= [*(Actual Score-Minimum Score)/(Maximum Score-Minimum Score)*]**100*

The score lies between 0 to 100 where closer to 'zero' implies unhealthy food consumption pattern and close to 'one hundred' means healthy food consumption pattern.

Our next job is to estimate the food security of the district Paschim Bardhaman on basis of food consumption pattern as an important indicator along with some other important variables using a probabilistic model i.e; logit model. Here in our case food security is considered as a dummy variable which holds binary value '1' if a household is 'food secure' and binary value '0' if household is 'not food secure'. We have used ICMR report 2020 to identify the household's food security status. If a household is able to achieve the prescribed daily required from its daily food consumption bundle then the household is identified as 'food secure' otherwise 'food insecure'. So we have formed a logit regression model for the district Paschim Bardhaman with the food consumption pattern as a continuous variable, the Logit model may be written as

$$p(FDSCRTY_i=1|X) = \gamma_0 + \gamma_1 FDCNPT_i + \gamma_2 FMINC_i + \gamma_3 FDEXP_i + \gamma_4 HTEDN_i + \gamma_5 AGEHD_i + \gamma_6 NMMEM_i + \gamma_7 NMCRD_i + \phi_1 RGN_i + \phi_2 RLGN_i + \phi_3 CST_i + \phi_4 GNHDFM_i + \phi_5 JBCRD_i + \phi_6 LND_i + \phi_7 LVSTK_i + \phi_8 LNDLVSTK_i + u_i$$

List of Variables	Implies	Variable type
FDSCRTY	Ratio of actual daily calorie enjoyed by the household and the required medically prescribed daily calorie.	Food secure-1 Food insecure-0
FDCNPT	The pattern of food	Continuous (0-100 range)

	consumption of the households	
FMINC	Monthly family income of the households	Continuous
FDEXP	Expenditure made on food items by the households	Continuous
HTEDN	Highest educational qualification achieved by any of the household member.	Years of education
AGEHD	Age of the head of the household	Number of years
NMMEM	Number of existing members in the family	Number of members
NMCRD	Stands for the number of PDS card holding	If household holds at least one PDS card-1 Otherwise-0
RGN	Region	Urban region-1 Rural region-0
RLGN	Religion	Hindu-1 Non-Hindu-0
CST	Caste	General-1 Non-General-0
GNHDFM	The gender of the head of the family	Male-1 Female-0
JBCRD	Having a job security card provided by the government	Yes-1 No-0
LND	Agricultural land holding	Owning agri-land-1 Otherwise-0
LVSTK	Having any type of livestock	Yes-1 No-0
LNDLVSTK	Holding both the land and live stock jointly by the	Yes-1

household No-0

Now the hypothesis we are going to test for this case are-

Hypothesis 1: The probability of food security is likely to be increase with an increase in food consumption pattern score ($\gamma_1 > 0$).

Hypothesis 2: The probability of food security is likely to be increase with an increase in monthly family income ($\gamma_2 > 0$).

Hypothesis 3: Probability of food security expected to be increase with an increase in the expenditure made on food by the family ($\gamma_3 > 0$).

Hypothesis 4: Probability of food security is expected to be higher with higher educational qualification attained by any of the household member ($\gamma_4 > 0$).

Hypothesis 5: Probability of food security is expected to be reduced with rise in the age of the household head ($\gamma_5 < 0$).

Hypothesis 6: The probability of food security is reduced with addition in number of member in the family ($\gamma_6 < 0$).

Hypothesis 7: Holding ration card by the households increases the probability of food security ($\gamma_7 > 0$).

Hypothesis 8: Probability of food security is likely to be greater in the urban region than in the rural region ($\phi_1 > 0$).

Hypothesis 9: Households that belongs to Hindu community are expected to have higher probability of food security than the Non-Hindu household ($\phi_2 > 0$).

Hypothesis 10: Household belongs to General category are expected to have higher probability of being food secure than the others ($\phi_3 > 0$).

Hypothesis 11: Male headed households are expected to have greater probability of food security ($\phi_4 > 0$)

Hypothesis 12: Having a job card provided by the Government implies greater probability of food security ($\phi_5 > 0$).

Hypothesis 13: Owning agricultural land implies probability of achieving food security is likely to be higher ($\phi_6 > 0$).

Hypothesis 14: Holding live stock means an additional income hence expected to have higher probability of food security ($\phi_7 > 0$).

Hypothesis 15: Probability of achieving food security by the household is even more higher with access to both land and livestock jointly ($\phi_8 > 0$).

Data Description

A cross sectional data has been collected through a primary survey on 650 households from both rural and urban areas of Paschim Bardhaman district of West Bengal. Our study actually consists of 340 rural households and 310 urban households from several blocks of two subdivisions of the district (Asansol, Durgapur) through a mixed purposive sampling method using a pre tested own prepared questionnaire that consists several socio-economic-demographic questions along with questions regarding food consumption pattern of the households using 4-point Likert scale method. Information regarding monthly food item purchased, three course meal consumed in last 24 hours from the time of survey and skipped meal or starved meal in last 7 days also collected to assess the dietary pattern of the households.

Estimation Result & Discussion

In this section we are going to discuss our estimation result but before that let us discuss the summery statistics of our important quantitative variables. From table-1 we can easily observe the existence of income disparities in the district where maximum value of monthly family income reached upto Rs.150000 per month for some households and minimum value for the same is Rs. 5000 per month for some households of the district. Mean monthly family income of the district is Rs. 3386. Mean value of highest educational attainment by any of the household member is 10.33 for our data where maximum educational qualification of 19 years and minimum is 0 years of education i.e.; no years of schooling at all. Age of the head of the household is supposed to play an important role in determining household food security. In our sample mean age of the head of the household is 60.20. The sample consists 80 years of age for few household's head which is maximum and 40 years of minimum age of household head. Mean family size is 4 with maximum 7 members and minimum single member in some families. On an average three member holds PDS card in the sample with maximum of 7 number of card holding by any family and minimum of no card holding.

Table-1: Summery Statistic of Important Quantitative Variables.

	FMINC	*HTEDN*	*AGEHD*	*NMMEM*	*NMCRD*
Mean	33861	10.33	60.20	4	3
Median	30000	12	62	5	4
Maximum Value	150000	19	80	7	7
Minimum Value	5000	0	40	1	0

*Author's own computation based on primary data

Table-2: Distribution of Important Qualitative Variables

Region	Rural	Urban
	47.69%	**52.31%**
Religion	**Hindu**	**Non-Hindu**
	83.08%	**16.92%**
Caste	**General**	**Non-General**
	50.62%	**49.38%**
Gender of the Household Head	**Male Headed HH**	**Female Headed HH**
	74.92%	**25.08%**
Food Security/Insecurity	**Food Secure**	**Food Insecure**
	58.92%	**41.08%**

*Author's own computation based on primary data

Table-2 represents the percentage distribution of some of our important qualitative variables. Our data consists of 47.69% rural household and 52.31% urban household. The district is mostly Hindu dominated therefore 83.08% Hindu households are there in the sample and rest 16.92% are Non-Hindu household which consists Muslims, Christians and Sikhs. Our data is a combination of 50.62% General caste households and 49.38% Non-General caste households and also 74.92% male headed family and 25.08% female headed families. Finally to discuss about the food security status of the district we got 58.92% food secure household and 41.08% food insecure household.

Table-3: Logit Regression Analysis of Food Security in the District of Paschim Barddhaman

Iteration:	1			log-likelihood	=	-440.1392
Iteration:	2			log-likelihood	=	-375.8001
Iteration:	3			log-likelihood	=	-375.0679
Iteration:	4			log-likelihood	=	-375.0662
Iteration:	5			log-likelihood	=	-375.0662
Logistic regression				Number of obs	=	650
				LR chi2(15)	=	130.15
				Prob > chi2	=	0.00
Log likelihood = -375.06615				Pseudo R2	=	0.15
FDSCRTY	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
FDCNPT	0.00318	0.00047	6.7682	0.0005	-0.00603	0.01239
FMINC	0.00410	0.00086	4.7692	0.0009	-0.00017	0.00218
FDEXP	-0.01424	0.00366	-3.8907	0.0000	-0.02142	-0.07060

HTEDN	-0.00216	0.02479	-0.0871	0.9310	-0.05076	0.04644
AGEHD	-0.00568	0.01050	-0.5406	0.5890	-0.02625	0.01490
NMMEM	-0.85605	0.11122	-7.6972	0.0000	-1.07403	-0.63807
NMCRD	0.13978	0.07957	1.7568	0.0790	-0.01617	0.29573
RGN	0.24477	0.11677	2.0961	0.0361	-0.27996	0.76951
RLGN	-0.29864	0.26533	-1.1256	0.2600	-0.81868	0.22139
CST	-0.23045	0.25262	-0.9123	0.3620	-0.72557	0.26466
GNHDFM	0.62097	0.31841	1.9502	0.0510	-0.00310	1.24505
JBCRD	0.27753	0.09816	2.8274	0.0016	-0.66591	0.11085
LND	0.23286	0.10242	2.2734	0.0034	-0.24241	0.70812
LVSTK	0.36929	0.18115	2.0386	0.0134	-0.11384	0.85242
LNDLVSTK	0.34396	0.13929	2.4694	0.0038	-1.11403	0.42610
_cons	4.50945	0.87576	5.1492	0.0000	2.79298	6.22591

*Author's own computation based on primary data

Table-3 presents the estimation result of logit regression analysis of food security of the district Paschim Bardhaman. Our first parameter is the food consumption pattern and probability of food security is likely to be increase with the improvement in consumption pattern. The result is statistically significant at 1% level of significance.

Probability of food security is expected to increase with higher income. Result is significant at 1% level of significance.

Probability of food security is likely to be higher with increase in expenditure made on food items by the household. This result may vary if household spends more on high priced processed food or fast food or for some reason there is price hike in market for food items. In that case expenditure may increase but probability of food security may decrease. In our logit regression estimation we found an inverse probabilistic relationship between food security and food expenditure for the district Paschim Bardhaman and the result is significant at 1%.

Our estimation result shows insignificant result for highest educational attainment by any of the household members and age of the head of the household.

Probability of food security is expected to reduce with increase in family size and the result is significant at 1% level of significance.

Number of PDS card holding is a dummy variable in our study where dummy value 1 implies household holding at least one PDS card and avails the facility and 0 otherwise. The empirical result shows higher probability of food security with holding PDS card. The result is significant at 10% level of significance.

Probability of achieving food security is higher for urban households than rural household and the coefficient (0.24) is significant at 5% level.

Religion and caste are next two dummy variables that are insignificant in our present study.

Male headed households have greater probability of achieving food security than female headed household and the result is statistically significant at 5% level.

Holding a job card provides greater probability of being food secure. The result is significant at 1% level.

Holding agricultural land means greater probability of achieving food security which is significant at 1% level in our present study. Holding livestock also provides greater probability of food security and the result is significant at 5% level of significance.

Holding agricultural land and live stock jointly definitely ensures greater probability of food security at 1% level of significance.

Now let us discuss the table-4, which discusses about the marginal impact on food security due to change in some important explanatory variables. Food consumption pattern, highest educational qualification of any of the family member and age of the head of the household are three statistically insignificant variable in our marginal effect equation of logit model.

Monthly family income has positive marginal effect at 10% significance level.

As we observed during our survey work that households of Paschim Bardhaman district has tendency to spent more on fast food and high priced processed food our marginal effect model also reflects that tendency and shows negative marginal effect of expenditure made in food on food security of the household. The result is significant at 1% level of significance.

Number of existing member of existing family member in the household definitely has a negative marginal effect on food security at 1% significance level.

And last but not the least holding PDS card by at least a family member in the district shows inverse marginal impact on food security of the household at 10% level of significance.

Table-4: Marginal Impact on the Food Security of the Households due to Change in the Explanatory Variables

dy/dx w.r.t.	dy/dx	Std. Err.	z	P>|z|	[95% Conf. Interval]	
FDCNPT	0.00063	0.00092	0.67770	0.49800	-0.00119	0.00244
FMINC	0.00000	0.00000	1.70085	0.09000	0.00000	0.00000
FDEXP	-0.00003	0.00001	-4.06069	0.00000	-0.00004	-0.00001
HTEDN	-0.00043	0.00489	-0.08709	0.93100	-0.01000	0.00915
AGEHD	-0.00112	0.00207	-0.54107	0.58800	-0.00517	0.00293
NMMEM	-0.16869	0.01808	-9.32846	0.00000	-0.20413	-0.13324
NMCRD	0.02754	0.01554	1.77211	0.07600	-0.00292	0.05801

*Author's own computation based on primary data

Conclusion and Policy Prescription

Food security is all about achieving required calorie for all the household member, having a healthy balanced diet that fulfils nutrition requirement for all the members in the family in our study as availability and access to diversified food items are not the problem in our study area but the choice and preferences of food and unhealthy consumption nature are the main problem here.

Our empirical study actually shows that unhealthy food consumption pattern leads food insecurity as the households of the district are very well off in terms of income and livelihood they are very prone to spend on high priced fast food, processed food for their daily consumption and that also leads negative impact on food security of the district at the household level. Family income, family size, region of living, holding ration card, job card, agricultural land, livestock all has significant impact on household level food security of the district.

From our study we can easily observe that not having enough food to eat or not having access to various food item is not the issue in this district but the main issue is not having knowledge of what to eat and what not to eat or the preference and choice of unhealthy food therefore providing knowledge of healthy nutritious food consumption is important. Generating income opportunity is always beneficial for the society but in district like Paschim Bardhaman where income disparity is huge, policy on income distribution is necessary. As holding agricultural land, livestock provides food security assistance therefore policies are required to encourage holding land and live stock also distribution policy is needed for the same.

References

- Shah A (1997), "Food Security and Access to Natural Resources A Review of Recent Trends. "Economic & Political Weekly Vol. 32 No. 26 (Jun. 28 - Jul 4, 1997), PP A. 46- A54
- Kumar. P, Kumar. H, " Food Security and Nutritional Scenario of India- an Overview." ICOR-JAVS, Vol-2, Issue 5, 2013, pp:28-39
- Rammohan. A ,Pritchard. B,Sekher. M, "The Determinants of Food Security in Rural India"
- Radhakrishna. R & Reddy . V, "Food Security and Nutrition ; Vision 2020." Discussion Paper.
- Basu.R, "The Saga of Food Security in West Bengal."International Journal of Research Granthalayah, vol.8(Iss 1) January 2020
- Kundu Subrata(2017), "Consumption pattern in West Bengal- A study of per capita expenditure elasticity by income group.," Journal of Economic and Social Development, vol-XIII, No.1 June 2017
- Deaton. A and Dreze. J (2009), "Food and Nutrition in India. Facts and Interpretations. ".Economics & Political Weekly , Vol. XLIV No.2 (February 2009).
- Reyes .J.D (2010) , " Food consumption patterns and household food security in Calabarzon." Journal of the International Society for South-East Asian Agricultural Sciences, Vol. 16, No-53-66(2010)
- Parappurathu. S, Kunnan A, Bantilan M.C.S & Joshi. P, "Food Consumption Pattern and dietary diversity in eastern India: evidence from Village level studies (VLS), " Springer, Food sec. DOI 10.1007 /s 125H-013--04013-2, ISSN 1876-4517. (2015)
- Jensen. RT, Miller. NH, "A Revealed Preference Approach to Measuring hunger and Undernutrition." National Bureau of Economic Research Working Paper 2010
- Mishra. DK, Gupta. A" poverty and calorie deprivation across socio-economic groups in rural India. A disaggregated analysis." Journal of regional development and planning, volume 2
- Khatun. M.M, Karmokar. P.K., "Categorized Daily Calorie Intake and its influencing factors for Rajshahi district of Bangladesh." IOSR Journal of Mathematics (IOSR-JM), Vol-16, Issue 1 Ser III(January - February 2020), PP 44-51

- Golait. R and Pradhan N.C, " changing food consumption pattern in rural India implication on food and nutritional security" Indian journal of agricultural economics, Vol-61, No 3, July- September 2006
- Sarkar S, "Consumption pattern and determinants of nutritional intake among rural households of West Bengal, India" Journal of settlements and spatial planning, Vol-6, no 2(2015) 85-94
- Beckerman JP, Kim R, Sharma S, Subramanian SV, " dietary variation among children meeting and not meeting minimum dietary diversity and empirical investigation of food group consumption pattern among 73036 children in India." Journal of American Security for Nutrition 2020
- Saha.S, Biswas. R, Dutta. A Mohanta. V, "Assessment of nutritional status and eating behaviour among undergraduate nursing female students of Birbhum district of West Bengal.A cross-sectional study." Research square 2022
- Banerjee P.S, "Study of Changes in Consumption Pattern in the Sundarban region of West Bengal." The Researcher, Kolkata