

An Assessment of Food Security: A Case Study of Lakhimpur District of Assam, India

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Abstract: Food and nutritional security is very must important for living an active and healthy life. Again, health is also an important determinant for human resource development and productivity. So, adequate amount of quality food should be avail by all people at all time is very must necessary. Food insecurity is a major problem of the state like Assam, because of shortage of food grain production, poverty and lack of nutritional knowledge. In the present study, an attempt has been made to assess the present level of food security among different sections of society of Lakhimpur district of Assam. For finding out the level of food security from primary data, Per Consumer unit Calorie Intake (PCCI) has been employed. Calculated per capita calorie intake of sample household has been compared with the 2730 and 2230 kilocalories, which is recommended by Indian Council of Medical Research for an adult man and woman doing moderate activity respectively (NIN, 2010). For obtaining final sample, multistage mix-sampling technique has been used. It has been found that out of 511 sample households only 267 are food secure, i.e. only 52.25 percent, another 47.75 percent households are food insecure. For understanding the depth and severity of food insecurity of sample household, Total food Insecurity Gap and Squared food Insecurity Gap have also been calculated.

Index Terms: Food Insecurity Gap, Food Security, Lakhimpur, Per Consumer unit Calorie Intake.

I.INTRODUCTION

Food is the basic necessity of life. Removal of malnutrition and hunger from the country is not only socially desirable but also necessary for improving overall economic development, as healthy people contribute more to the economy with their relatively higher level of productivity and efficiency. Hunger and malnutrition put enormous cost burden on the society. A World Bank Report states that malnutrition brings down three percent of countries GDP annually. The Indian planners, right from the beginning, realized the need to attain self-sufficiency in food grains as one of the impotent goals of planning (Singh, 2013).

Food security refers to a household's physical and economic access to sufficient, safe and nutritious food that fulfils the dietary needs and food preferences of that household. The Universal Declaration of Human Rights in 1948 recognized right to food as a core element of an adequate standard of living. Following this, and more especially from world food crisis of 1972-74, food security became an important "organizing principle" in development. Following are the some important definitions of food security:

World Development Report (1986) defined food security as "access by all people at all times to enough food for an active, healthy life."

The 1996 World Food Summit redefined food security 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."

In 2001, the FAO Expert Consultation on Food Security gives a working definition of food security: Food security exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

Food insecurity exists when people do not have adequate physical, social or economic access to food as defined above. Food insecurity, thus, is just an opposite situation of food security.

Worldwide around 852 million people out of 6.35 billion are chronically hungry due to extreme poverty, while up to 2 billion people lack food security intermittently due to varying degrees of poverty (FAO, 2003). At the global level, the South Asian region is home to more chronically food insecure people than any other region in the world and Global Hunger Index (2008) placed India in 94th rank among 119 countries.

As like national scenario, the situation of Assam is almost similar. According to BPL census 2002, the percentage of poverty in Assam is very high (Handique, et. al 2016). On the other hand, food grain production of the state is not self-sufficient. Although, the Public Distribution System of the country is a large food security mechanism and it covers a huge portion of the population. But its performance is still to be questioned, especially the level of food security of the BPL families are not satisfactory.

II. OBJECTIVES

The present study has its general objective is to assess the level of food security of the people of Lakhimpur district of Assam and to identify and assess the factors effecting the level of food security and its challenges. The specific objectives of the study are-

- (1) To assess the level of food security of different section of the society of Lakhimpur district.
- (2) To identify the determinants influencing the level of food security.

III. DATABASE AND METHODOLOGY

Since the study area is Lakhimpur district of Assam, the micro level analysis is mainly based on primary data collected by carrying out field survey from the district. The sample has been collected through a process of multistage mix-sampling (i.e. mixed of random and purposive sampling). As per 2011 census, there are nine community development blocks in the district. From these nine blocks, three have been selected purposively on the basis of percentage of Below Poverty Line (BPL) household for the study. After this, five villages from each block have been taken for household survey. Lastly, a number of representative families, 15 to 20 percent (depending upon the people of the villages) of the total households have been selected randomly from each village and finally 511 households have been surveyed. A structured scheduled has been used to collect the necessary information on household food security status. For finding out the level of food security from primary information the Per Consumer unit Calorie Intake (PCCI) has been employed. The survey has been conducted as per the guideline prepared by Smith and Subandoro (2007) of International Food Policy Research Institute. For analyzing the level of food security per consumer per day calorie intake has been calculated for each household, based on average nutritive value of Indian food (Gopalan, et al, 2000). Calculated per capita calorie intake of sample household has been compared with the 2730 and 2230 kilocalories, which is recommended by Indian Council of Medical Research for an adult man and woman doing moderate activity respectively (NIN, 2010). The households' calorie intake above the recommended level has been considered as food secure and food insecure otherwise.

IV. RESULTS AND DISCUSSION

Food security is a multidimensional concept and it is a complex issue that has been raised over time. So, the level of household food security has several determinants, i.e. level of income, occupational pattern, level of education, size of household, type of the family, cast and community and government policy have different impact on incidence of food security.

4.1 Level of Food Security in terms of Per Consumer unit Calorie Intake (PCCI):

By using Per Consumer unit Calorie Intake (PCCI), level of food security of the sample households has been summarised in the following Table 4.1. The table shows that per consumer unit calorie intake across the study area are 2489 kilocalories. Among the sample households 52.25 percent are food secure,

i.e. these households have calorie intake with higher than daily recommended level of Indian Council of Medical Research (ICMR). Another 47.75 percent households are food insecure in terms of PCCI.

Table 4.1: Level of Food Security of the Sample Households in terms of Per Consumer unit Calorie Intake.

Blocks	PCCI	No. & Percentage of Food Secure Households	No. & Percentage of Food Insecure Households	Total
Dhakuakhana	2397	85(46.45)	98(53.55)	183(100.00)
Narayanpur	2548	98(57.31)	73(42.69)	171(100.00)
Ghilamara	2521	84(53.50)	73(46.50)	157(100.00)
Overall	2489	267(52.25)	244 (47.75)	511(100.00)

Source: Calculated from primary data, (Figures in the bracket indicates percentage to total).

4.2 Level of Food Security among Different Occupational Categories:

Table 4.2 reveals that the level of food security is different among the sample household with different occupation of the household head. From the table it is clear that the level of food security among daily wage labour is lowest, i.e. 29.55 percent, with compared to it, the level of food security is slight better among the agricultural labour (35.48 percent). The highest level of food security has been found among government service holders, i.e. 93.55 percent followed by retired employees (81.82 percent). Although, more than 60 percent of the sample households have been involve with cultivation as their primary occupation, but among them only 52.25 percent households are food secure, another 47.75 percent households are food insecure. It is a severe problem for economic efficiency and productivity.

Table 4.2: Level of food security among sample household's of different occupational categories.

Sl. No.	Occupation	No. & percentage of food secure households	No.& percentage of food insecure households	Total
1	1	161(52.44)	146(47.56)	307(100.00)
2	2	11(35.48)	20(64.52)	31(100.00)
3	3	6(66.67)	3(33.33)	9(100.00)
4	4	26(29.55)	62(70.45)	88(100.00)
5	5	29(93.55)	2(6.45)	31(100.00)
6	6	17(50.00)	17(50.00)	34(100.00)
7	7	9(81.82)	2(18.18)	11(100.00)
Total		267(52.25)	244 (47.75)	511(100.00)

Source: Calculated from primary data, (Figures in the bracket indicates percentage to total).

Occupation codes: 1=Cultivator, 2= Agricultural labour, 3=Animal Husbandry, 4=Other daily wage labour, 5=Service, 6=Trading and self employment, 7=Retired.

4.3 Level of Food Security among Households with Cultivation as Primary Occupation

in Lakhimpur:

The following Table 4.3 depicts per consumer unit calorie intake among the households with cultivation as primary occupation. Percentage of farming household that are food secure have been found overall area is 52.44 percent. It has been found highest in the Narayanpur block (58.33 percent) and lowest

in Dhakuakhana block (45.29 percent). Among the three block, average calorie intake is highest in Ghilamara block (2491 kilocalories) and lowest in Dhakuakhana block (2333 kilocalorie). Again, among the food insecure households, average calorie intake is highest in Ghilamara block (1907 kilocalories) and lowest in Narayanpur block (1782 kilocalories).

Table 4.3: Food Security among the Households with Cultivation as Primary Occupation.

Blocks		Total Households	Food Secure Households	Food Insecure Households
Dhakuakhana	PCCI	2333	2885	1876
	Number (%)	117	53 (45.29)	64 (54.71)
Narayanpur	PCCI	2459	2943	1782
	Number (%)	108	63 (58.33)	45 (41.67)
Ghilamara	PCCI	2491	2971	1907
	Number (%)	82	45 (54.88)	37 (45.12)
Overall	PCCI	2428	2933	1855
	Number (%)	307 (100)	161 (52.44)	146 (47.56)

Source: Calculated from primary data, (Figures in the bracket indicates percentage to total).

4.4 Level of Food Security among Households with Different Level of Education:

The following Table 4.4 shows that incidence of food security is different among household with different educational level of household head. From the table, it is clear that there is a positive relationship between level of food security and level of education. In all the three blocks household head with below primary and primary to high school level education shows low level of food security. On the other hand, household head having graduate, post graduate or professional degree has shown high level of food security. But some of the households having higher degree also have found to be food insecure because of underemployment. In all the three blocks, some post graduates and a significant portion of the graduates are involved with agriculture for their livelihood.

Table 4.4: Level of Food Security among Sample Household's with Different Level of Education of the Household's Head.

Blocks	Education level	No. & percentage of food secure households	No. & percentage of food insecure households	Total
u a k	1	6(35.29)	11(64.71)	17(100)

	2	31(42.47)	42(57.53)	73(100)
	3	34(50.75)	33(49.25)	67(100)
	4	11(50.00)	11(50.00)	22(100)
	5	1(50.00)	1(50.00)	2(100)
	6	2(100.00)	0(0.00)	2(100)
Narayanpur	1	8(42.11)	11(57.89)	19(100)
	2	41(53.25)	36(46.75)	77(100)
	3	35(61.40)	22(38.60)	57(100)
	4	11(73.33)	4(26.67)	15(100)
	5	2(66.67)	1(33.33)	3(100)
	6	--	--	--
Ghilamara	1	2(33.33)	4(66.67)	6(100)
	2	26(45.61)	31(54.39)	57(100)
	3	40(57.14)	30(42.86)	70(100)
	4	12(63.16)	7(36.84)	19(100)
	5	2(50.00)	2(50.00)	4(100)
	6	1(100.00)	0(0.00)	1(100)

Source: Calculated from primary data, (Figures in the bracket indicates percentage to total).

Education Code: 1=Below Primary; 2=Primary to High School; 3=Matriculates and undergraduates; 4=Graduate; 5=Post graduate; 6=Professional degree

4.5 Determinants of Food Security:

Since, the food security is a multidimensional concept. So, the level of food security of a household has been influence by various socio-economic factors. At the time of field survey, it has been found that some socio-economic factor has significant impact on the level of food security, viz. income of the household, size of cultivable land, family size, educational attainment, occupation, type of the family, cast & community and PDS beneficiary etc. To identify and assess the determinants significantly affecting Household Food Security (HFS), following regression model has been formulated-

$$HFS = \alpha + \beta_1PCHI + \beta_2SCL + \beta_3EA + \beta_4FS + \beta_5PCFOWN + \delta_1OPD_1 + \delta_2OPD_2 + \delta_3OPD_3 + \lambda_1COMD_1 + \lambda_2COMD_2 + \gammaFTD + \mu BPDS + U_i$$

Explanation of the Explanatory Variables:

Per Capita Household Income (PCHI): It is the average income earned by per household member in a specified year. Income generally determines the purchasing power of a household and hence, higher is the level of income, better will be the level of food security. So, we expect the coefficient of the variable to bear a positive sign.

Size of Cultivable Land (SCL): Basically, the size of food grain production depends upon the size of agricultural land. Again, food supply or food availability is a major determinant of food security. Hence, we expect the coefficient of the variable to bear a positive sign.

Educational Attainment (EA): This variable represents the level of education of the head of the household. Education is a categorical variable with – 0 = illiterate; 1 = below primary; 2 = primary to high school; 3 = matriculate and undergraduate; 4 = graduate; 5 = postgraduate; 6 = professional degree. Education creates awareness about proper diet and nutrition and also educated people can earn more. Hence, higher is the level of education, better will be the level of food security. So, we expect the coefficient of the variable to bear a positive sign.

Family Size (FS): Generally, among large family, the ratio of dependency is high with compared to small family. Hence, size of the family has adverse impact on the level of household food security. So, we expect the coefficient of the variable to bear a negative sign.

Percentage Contribution of Foodgrains of Own Sources (PCFOWN): At the time of field survey it has been found that majority of households without farming as primary occupation often go for farming. Since, food availability is a major determinant of food security and hence, higher is the level of own contribution of foodgrain, better will be the level of food security. So, we expect the coefficient of the variable to bear a positive sign.

Occupational Dummies (OPD₁, OPD₂ & OPD₃): Taking occupation as reference category, four occupational dummies have been used, viz., OPD₁, OPD₂ and OPD₃, where,

$$\begin{aligned} \text{OPD}_1 &= 1, \text{ for cultivator} \\ &= 0, \text{ otherwise} \end{aligned}$$

$$\begin{aligned} \text{OPD}_2 &= 1, \text{ for agricultural labour} \\ &= 0, \text{ otherwise} \end{aligned}$$

$$\begin{aligned} \text{OPD}_3 &= 1, \text{ other daily wage labour} \\ &= 0, \text{ otherwise} \end{aligned}$$

Community Dummies (COMD₁ & COMD₂): Taking community as reference category, three dummies have been used, viz., COMD₁ and COMD₂, where,

$$\begin{aligned} \text{COMD}_1 &= 1, \text{ schedule tribe} \\ &= 0, \text{ otherwise} \end{aligned}$$

$$\begin{aligned} \text{COMD}_2 &= 1, \text{ schedule caste} \\ &= 0, \text{ otherwise} \end{aligned}$$

$$\begin{aligned} \text{Family Type Dummy (FTD)} &= 1, \text{ for nuclear family} \\ &= 0, \text{ for otherwise} \end{aligned}$$

$$\begin{aligned} \text{Beneficiary of PDS Dummy (BPDS)} &= 1, \text{ for beneficiary of PDS} \\ &= 0, \text{ for otherwise} \end{aligned}$$

The coefficient of COMD₁ and COMD₂ may bear either positive or negative sign. The coefficient of FTD and BPDS are expected to be positive.

Regression has been run by taking Household Food Security (HFS) as dependent variable. It is the level of food security of the household, measured as per the value of index calculated from per consumer unit calorie intake. The results of the regression analysis have been summarized in table 4.5.

The results of the regression analysis indicate that the coefficient of the variables PCHI, SCL, EA, FS, PCFOWN and FTD have been found statistically significant. Coefficient of variables PCHI, SCL, EA, PCFOWN and FTD are significant with a positive sign. This implies that household with high per capita income, large size of cultivable land, higher level of educational attainment of the household head, higher percentage of foodgrain consumption from own sources and nuclear family system have better food security level and vice-versa.

The negative sign of the coefficient of variable indicates that as the household become larger, the level of household food security become lower. From field survey it has been found that majority of the large families are joint family and among joint family dependency ratio is high. Hence, bigger the size of the family, lower the level of food security.

The other variables have been found statistically insignificant and hence play no role in determining the level of household food security.

Table 4.5 Results of Regression Analysis Taking HFS as Dependent Variable in terms of PCCI.

Variables/Constant	Estimates of the Coefficients	t - value
PCHI	0.000082 (0.000012)	5.82226***
SCL	0.002213 (0.003133)	3.12462**
EA	0.010577 (0.004214)	2.874937*
FS	- 0.07893 (0.005361)	-3.57332***
PCFOWN	0.002133 (0.001031)	4.130215***
OPD ₁	0.053217 (0.030768)	0.991633
OPD ₂	- 0.000131 (0.000122)	-0.007436
OPD ₃	0.007542 (0.005328)	0.009773
COMD ₁	- 0.007632 (0.005985)	-0.130713
COMD ₂	- 0.0084421 (0.007421)	-0.112722
FTD	0.311722 (0.100438)	3.572181***
BPDS	0.089221 (0.066594)	0.758323
Constant	0.630517 (0.296773)	2.501321***
R ²	0.875	
F [12, 495]	57.82***	

Figures in () and [] indicates Standard Error of coefficients and degrees of freedom respectively.

***, **, * indicates significant at 1,5 and 10 percent respectively.

4.6 Computation of Food Insecurity Gap:

For computing the extent of food security gap, food insecurity gap of the households has been calculated, i.e. total food insecurity gap and squared food insecurity gap has been calculated separately.

Food insecurity gap (FIG_i): Food insecurity gap of ith food insecure households is define as

$$FIG_i = \frac{(TCR_i - TCC_i)}{TCR_i} \quad (\text{Guja, 2012})$$

Where TCR_i= Total per capita calorie requirement for ith food insecure household

TCC_i= Total per capita calorie consumption by ith food insecure household

Total Food Insecurity Gap (TFIG), which indicates the depth of food insecurity among the food insecure households, is expressed as-

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

Here, m=total number of food insecure households.

In this study, $\Sigma FIG_i = 56.12$;

m=244

TFIG=0.23

Or, TFIG= 23%

Squared Food Insecurity Gap (SFIG), which indicates severity of food insecurity among the food insecure households, is given as-

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

In this study, $\Sigma (FIG_i)^2 = 12.91$;

m=244

SFIG=0.0529

Or, SFIG=5.29%

V. CONCLUSION

The findings of the present study confers that the level of food security of the households of Lakhimpur district is not good. It has found that only 52.25 percent household are food secure and another 47.75 percent are food insecure. It shows that almost half of the sample households have been found to be food insecure. The result of the study indicated that food insecure households are 23 percent far off from the

minimum level of calorie requirement. Again, it has found that the severity of the food insecurity of the study area is about 5.29 percent. Although, central government as well as state government formulating various policies and launching several schemes for reducing the level of food insecurity, the achievement is far away from the satisfactory level. It is only because of improper implementation of government policies and lack of awareness about adequate diet of the general people. Hence, proper implementation of the government policies and nutritional knowledge of the people is very much necessary for reducing the level of food insecurity.

REFERENCES

- [1] Basu, K. 2011. "India's Foodgrain Policy: An Economic Theory Perspective", *Economy & Political Weekly*, Vol. XLVI, No. 5.
- [2] FAO 1983. "World Food Security: A Reappraisal of the Concept and Approaches", Director General's Report, Rome.
- [3] FAO 1996. "Rome Declaration on World Food Security, World Food Summit", Rome, Food and Agriculture Organization.
- [4] FAO 2001, "Expert Consultation on Energy in Human Nutrition; Interim Report" Food and Agriculture Organization of the United Nation, Rome.
- [5] Gopalan, et. al. 2012. "*Nutritive Value of Indian Foods*", (Revised & updated by B.S. Narasinga Rao, Y.G. Deosthale and K.C. Pant), National Institute of Nutrition, Indian Council of Medical Research, Hyderabad.
- [6] Guja, M.M. 2012. Household Food Security Status and Coping Strategies in Humbo Wereda, Snnprs, Ethiopia, *International Journal of Sciences: Basic and Applied Research*, VI. 6, No. 1, pp 64-82.
- [7] ICMR 2010. "Nutrient Requirements and Recommended Dietary Allowances for Indias", A Report of the Expert Group of the Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
- [8] Sing, P.S. 2013. "Supply-Side Challenges of the National Food Security Bill", *Kurukshetra*, VI. 62, No. 1.
- [9] Smith, L. & A. Subandoro 2007. "Measuring Food Security Using Household Expenditure Surveys", International Food Policy Research Institute, Washington DC.
- [10] World Bank 1986. "Poverty and Hunger and Options for Food Security in Developing Countries", World Bank Policy Study, Washington DC.