Household Food Security in Vidarbha Region of Maharashtra, India

N.V. Kumbhare[1], B.S. Hansra[2], L.B.Kalantri[3] and R.N. Padaria[4]

1. In Incharge, Agricultural Technology Information Centre, IARI, New Delhi, India.
2. Professor, School of Agriculture, IGNOU, New Delhi.
3. Former Director, Sericulture, Govt. of Maharashtra
4. Principal Scientist (Agri Extension), IARI, New Delhi, India.

Corresponding author e-mail : n_kumbhare@yahoo.com

ABSTRACT

In the recent years, household food security has been a matter of concern due to rising prices of food and non-food items. The present study examines the household food security in two selected districts, that is, Bhandara and Chandrapur in Vidarbha region of Maharashtra, India. Two blocks each from Bhandara (Sakoli and Pauni) and Chandrapur (Bhadravati and Warora) districts were selected randomly. Furthermore, two villages from each block were selected randomly. Twenty-five (25) respondents were selected randomly from each of the sampled eight villages. Thus, a total of 200 respondents from two districts constituted the sample for the study. The assessment of household food security status revealed that 59 per cent had low household food security, followed by very low (20.00%) and medium (16.50%) level of household food security. The study further revealed that variables such as size of land holding, annual income, social participation, adoption of modern agricultural technology, food availability and food quality had positive and significant influence on food security of the rural households. Annual income and food quality were found to have highly significant ($p<0.01$) influence on households food security.

Key words : *Coping mechanism, Household food security, Socio-economic factors*

Food, being one of the most basic needs for living, has become one of the most important concerns for the world, as more and more people are living in poverty and hungry. According to Gopichandran, et al. (2010), food security has been a matter of concern in recent years due to the global food crisis and rising food prices. In spite of the highest priority accorded to hunger elimination among the UN Millennium Development Goals (UN-MDGs), the Food and Agricultural Organization (FAO) estimates that the number of people going to bed hungry is increasing. When UN-MDGs were adopted in 2000, about 820 million were estimated to be under-nourished. Now, it is over one billion (Swaminathan, 2010). According to Mohammadzadeh et al. (2010) food insecurity is related to household size, birth order, parental education level and occupation, and household economic status. Brinda (2003) observed that household food security remains to be a major concern around the globe with millions of adults and children suffering from malnourishment. Hoddinott and Yohannes (2002) suggested household food security is an important measure of well-being.

In India, despite the presence of many public policies and social protection programmes to tackle household food insecurity, a large percentage of malnourished people exist. Food security has been a major developmental objective since the beginning of planning and it has achieved self-sufficiency in food grains in the 1970's and has sustained it since then. After achieving self-sufficiency and even surplus production at the food front, the next major issue facing our country is the achievement of household food security. According to Srinivasan (2002) food security and poverty are directly related to each other. Chaturvedi (1997) measured food security with the help of three components i.e. availability, stability and access. Arene and Anyaeji (2010) found that about 60 per cent of the households are food insecure, using expenditure method of estimating food security status. Mridula and Alex (2011) studied four important dimensions viz. production dimension; distribution dimension; nutrition dimension and socio-economic dimensions. Kulirani (2003) observed that food and nutritional security are subsets of livelihood security. According to Balgir (2008) the dietary patterns of people also affect the nutritional security of a community.

For tackling the challenge to ensure food for all, currently the Government has been implementing some major social safety programmes like the Public Food Distribution System (PDS), the Integrated Child Development Services (ICDS), and 100 days-employment guarantee scheme under the Mahatma Gandhi National Rural Employment Guaranty Act (MNREGA), and Antodaya Anna Yojana (AAY). Apart from these four major flagship programmes, Government is implementing the Mid-day Meal Scheme for ensuring food security for the school children in particular. Recently Government of India has passed the National Food Security Bill, 2013, the aim of which is to provide subsidized foodgrains to 2/3rd population of India as their right. The bill is expected to benefit 82 crore people of India. National Food Security Bill 2013 will guarantee 5 kg of rice, wheat and coarse cereals per month per person at 3, 2 and 1 Rupees, respectively.

Below Poverty Line (BPL) is an economic benchmark and poverty threshold used by the Government of India to indicate economic disadvantage and to identify individuals and households in need of Government assistance and aid. In Bhandara district, out of 1,198,810 population (2011), 1,16,000 households were under BPL category

whereas in Chandrapur district out of 2,194,262 population (2011), 2,00,000 households were under BPL (source: http://mahaagri.gov.in).

In recent years, there have been tremendous changes taking place in Indian agriculture and its socio-economic environment. The significant changes pertinent to Indian agriculture and its socio-economic environment are: degrading natural resource base, increasing fragmentation and marginalization of land holdings, increasing demand of technical support, emphasis on spending on luxurious and comfortable life styles, widening ratio between food and non-food spending, declining social support system in villages, changing value system due to intensive media exposure particularly television in rural areas, increasing tobacco and liquor consumption and increasing trends towards nuclear family. The need of household food security arises primarily due to the fluctuation in food production and rising prices of food and non-food items and changes in agricultural and socio-economic environment. Considering the above problems in mind, the study was conducted to investigate the status of household food security and awareness level of rural households regarding food security issues and the coping mechanism followed by rural households in the management of household food security in selected districts of Vidarbha region.

METHODOLOGY

The study was conducted in two selected districts i.e. Bhandara and Chandrapur in Vidarbha region of Maharashtra, India during 2011-12. The Vidarbha region of Maharashtra has eleven districts, of which Bhandara (Latitude 21.170N and Longitude 79.650E) and Chandrapur (Latitude 19.300N and 20.450N, and Longitude 78.460E) were selected to study the status of household food security. The Vidarbha region is known to be the most agrarian distressed regions in India where a majority of the farmers are dependent on agriculture. A preponderance of the rural households are facing the problems like poor irrigation facilities, poor economic base, low market price for agricultural produce, while the agriculture is dependent on vagaries of monsoon (drought/torrential rain). Low agricultural production, less income source, indebtedness, high prices of food and non-food items and inadequate purchasing power among the rural poor are contributing to the problem of food insecurity. There has been more than 32,000 cases of farmers who committed suicides in Maharashtra in the last decade, of which 70 per cent were reported from 11 districts of Vidarbha region (www.govtofmaha.gov.in).

Considering the above scenario, two blocks each from Bhandara (Sakoli and Pauni) and Chandrapur (Bhadravati and Warora) districts were selected randomly. Furthermore, two villages from each block were selected randomly. Twenty five respondents were selected randomly from each of the sampled eight villages. Thus, a total of 200 respondents from two districts constituted the sample for the study. Interview schedule based field survey was employed for data collection for seeking information on household food security under changing socio-economic environment.

Awareness level of rural households

The level of awareness was operationalized as the degree to which the farm families have information related to various issues of food security. The responses of the rural households on awareness parameters and awareness on household food security were collected, measured and categorized in to BPL and APL based on the frequency and per cent analysis.

Development of Household Food Security Index

Household food security index for rural household was calculated. Initially, it was decided to give specific weights (scale value) to each indicator of household food security index (HHFSI) based on their perceived significance. The normalized rank method suggested by Guilford (1954) was used for determining the scale value. Baby (2005) used this method to compute the scale values for the components of livelihood security index. As per the method, four different indicators of household food security index (HHFSI) were ranked by a group of judges according to their perceived significance in determining the food security of the rural households. Rankings were obtained from 20 judges who were experts in the fields of social science. The total score of each indicator was divided into 20 to obtain weighted score.

Computing the composite Index of Household Food Security

Each indicator of household food security consisted of different number of items and hence their range of scores was different. Therefore, the scores of all the four indicators were converted into unit score by using simple range and variance as given below.

$$Uij = \frac{Yij - Min\ yi}{Max.yj - Min.yj}$$

Where,

Uij = Unit score of the ith indicator
Yij = Value of the ith respondent on the jth indicator
Max.yj = Maximum score on the jth indicator
Min.yj = Minimum score on the jth indicator

The score of each indicator ranged from 0 to 1 i.e. when yij is minimum, the score is 0 and when yij is maximum, the score is 1.

The unit scores of each respondent were multiplied by respective indicator scale values and

summed up. The scores thus obtained were divided by the total scale value and multiplied by 100 to get the household food security index for each respondent.

$$HHFSIi = \frac{\sum Uij.Sj}{\sum Sj} \times 100$$

Where,

HHFSIi = Household Food Security Index of ith respondent

Uij= Unit score of the ith respondent on jth indicator

Sj= Scale vale of the jth indicator

In this way, mean household food security index for the rural household was calculated. Reliability of the index was tested using 'R2' The value 0.710 was found to be highly significant.

The status of household food security of rural households was calculated based on the total index score of all the four indicators i.e. food availability, food accessibility, food quality and food affordability. The classification of respondents into the categories of very low, low, medium, high and very high food security was based on the range of total food security index scores. Logistic regression analysis was employed to identify the factors associated with household food security.

Coping mechanisms

The concept of coping mechanisms and/or strategies is closely related to the idea of survival, and threat. It is a key concept of emergency management. The coping mechanism of the rural families in the management of household food security was analyzed. Different coping strategies were listed out for households' responses. Based on the response, total mean score was calculated and the coping strategies were ranked accordingly and categorized into BPL and APL with their adoption of coping strategies.

Poverty line

Below Poverty Line (BPL) is an economic benchmark and poverty threshold used by the Government of India to indicate economic disadvantage and to identify individuals and households in need of government assistance and aid. The Government of India (GOI) has been using a minimum dietary energy requirement norm of 2400 kcal per person per day for rural sector and 2100 Kcal per person per day for urban sector while the Food and Agricultural Organization norm for India as a whole for 2003-2005 is 1770 Kcal. Based on this, income criterion has been adopted in India to determine poverty line.

The expert group has actually lowered the calorie intake requirement from 2100 Kcal per day for urban areas and 2400 Kcal per day for rural areas to a single norm of 1800 Kcal per day. On calorie requirement, the Report says: "...the revised minimum calorie norm for India recommended by the Food and Agricultural Organization (FAO) is currently around 1800 calories per capita per day, which is very close to the average calorie intake of those near the poverty line in urban areas (1776 calories per capita)".

RESULTS AND DISCUSSION

The summary of significant findings of the study is presented below

I. Socio-economic status of the rural households

The details of socio-economic status of the rural households (figure 1) revealed that a vast majority of them (78.00%) had education below graduate level (primary 23.00%, high school 25.00%, higher secondary 28.00% and can read and write 2.00%). Barely 8 per cent respondents had graduation and above education. The findings suggest that intensive education efforts are needed for the illiterate farmers. Majority of the rural households (63.00%) belonged to old age category; while 32 per cent households belonged to middle age category and only 5 per cent households belonged to young age category. Most of the youngsters were not willing to take up agriculture as their occupation since farming was considered to be a non-profitable business. Young people in the study area were more interested in non-farm activities.

As per the Government of India guideline, farmers were classified according to the size of land holding as depicted in Figure 1. It is revealed that about 30 per cent of the farmers had marginal (<1ha) land holdings and nearly same percentage (29%) had small (1-2 ha) holdings. A little less than one-fourth of them (24 %) had semi-medium (2.1 - 4 ha) land holdings. Only three per cent of the farmers had large size (>10 ha) land holding. Social trend of nuclear family was the reason for fragmentation of land holding in the study area. There were about 44 per cent of the farmers in the study area with nuclear family system, which may be attributed for the above findings.

The caste affiliation of the selected households showed that a majority (76.00%) of the respondents belonged to Other Backward Classes (OBCs) followed by Scheduled caste/tribes (16.00%) and General (8.00%) categories of households. More than three-fourth (77.00%) of the households were above poverty line (APL) while 23 per cent households were below poverty line (BPL). It suggests the need for effective implementation of poverty eradication programme in the study area.

Social participation of the rural households in social organizations like panchayat, cooperative society, self help groups (SHGs), rural youth clubs, mahila mandal etc. is very crucial for the social empowerment. A glance at the data in figure 1 revealed that a majority of the household (60.50%) had medium level of social participation followed by high (25.50 %) and low (14.00 %) level of social participation.

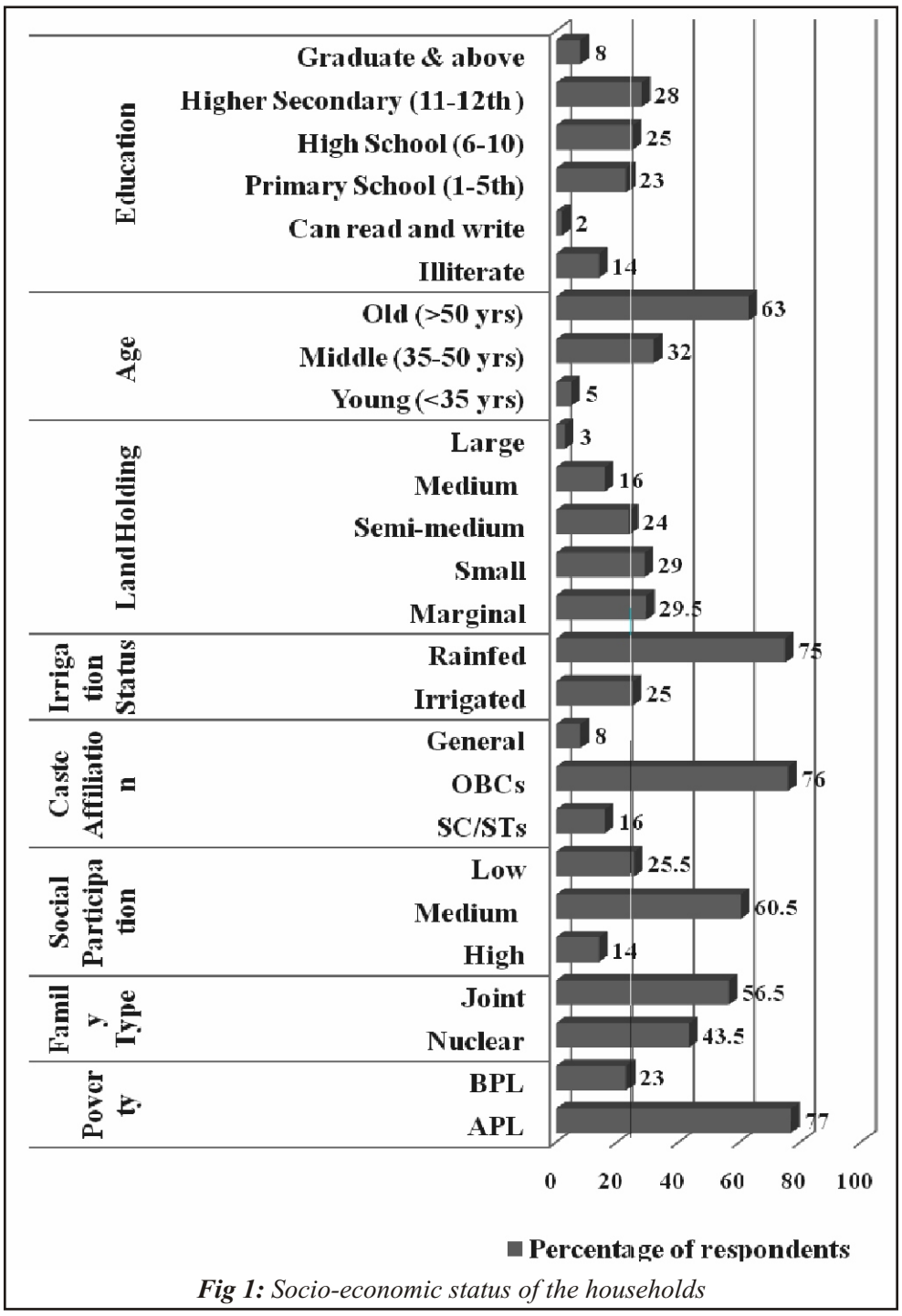

Fig 1: *Socio-economic status of the households*

When the irrigation scenario of selected households was analyzed, it was found that about 25 per cent of the respondents had irrigation facility at farm and the common sources of irrigation were canal, ponds and wells. A majority (75%) of the respondents had no irrigation facility and they were mostly dependent on the monsoon. It suggests the need for increasing irrigation potential of the region for construction of well and water harvest structures.

II. Level of awareness of food nutrition and household food security

The level of awareness about food nutrition and household food security of the rural households is depicted in Table 1. The findings revealed that a majority of the households (both BPL & APL) i.e.63.50 per cent were aware of the fortification of common salt with iodine to prevent iodine deficiency related syndrome followed by special nutritional programme implemented by the Government (51.00%) and small family norms is essential for household food security (49.50%). Household food security is directly correlated with its ability to generate sufficient income (46.50%) and enough income is essential for household food security (44.00%), respectively. Hence, it is clear

Table 1
Distribution of households according to their level of awareness about food nutrition and household food security

S. No	Awareness criteria	Level of awareness		
		BPL (n=46)	APL (n=154)	Total (N=200)
		f	*f*	*f*
1.	Balanced nutrition is pre -condition for healthy and productive life	14 (30.40)	50 (32.40)	64 (32.00)
2.	Components of balanced food (Carbohydrates, Protein, Fats, Vitamins)	13 (28.20)	47 (30.50)	60 (30.00)
3.	Common nutritional deficiency diseases	16 (34.80)	55 (35.70)	71 (35.50)
4.	Household food security is directly correlated with its ability to generate sufficient income	20 (43.50)	73 (47.40)	93 (46.50)
5.	Women and children face more risk of malnutrition	13 (28.20)	41 (26.60)	54 (27.00)
6.	Priority should be given in food distribution within household to infants, pregnant and lactating women	10 (21.70)	51 (33.10)	61 (30.50)
7.	Fortification of common salt with iodine to prevent iodine deficiency related syndrome.	31 (67.40)	96 (62.30)	127 (63.50)
8.	Special nutritional programme implemented by the Govt. i) Integrated Child Development Services ii) Midday Meal Schemes	22 (47.80)	80 (51.90)	102 (51.00)
9.	Enough income is essential for household food security	17 (37.00)	67 (43.50)	84 (44.00)
10.	Small family norms is essential for household food security	20 (43.50)	79 (51.30)	99 (49.50)

Figures in parentheses indicates percentage

III. Status of household food security

Table 2 Status of household food security

S. No.	Levels of household food security	Index score range	Status of household food security					
			BPL (n=46)		APL (n=154)		Total (N=200)	
			f	%	*f*	%	*f*	%
1.	Very low	0.53 - 0.59	28	60.87	12	07.80	40	20.00
2	Low	0.60 - 0.66	16	34.78	102	66.22	118	59.00
3.	Medium	0.67 – 0.73	2	04.35	31	20.13	33	16.50
4.	High	0.74 – 0.80	00	00	5	3.25	5	02.50
5.	Very high	0.81 – 0.87	00	00	4	2.60	4	02.00

that special awareness campaign on nutritional food intake through extension interventions is required in rural areas. This finding is in line with the results of Palak et al. (2008).

The status of household food security of rural household was analysed based on the total index score of all the four indicators i.e. food availability, food accessibility, food quality and food affordability. The relevant findings are given in Table 2.

The household food security status of respondents depicted in Table 2 revealed that a majority of the BPL household (60.87%) had very low level of food security followed by low (34.78%) and medium (4.35%) level of food security, respectively. In case of APL household, a majority (66.22 %) had low level of food security followed by medium (20.13%) and very

low (7.80%) level of household food security, respectively. The overall household food security status of the respondents found that 59 per cent had low household food security followed by very low (20.00%) and medium (16.50%) level of household food security. The low food security status of the rural household may be due to small and marginal land holding, low agricultural production caused by changes in agricultural environment, lack of involvement of rural households in subsidiary occupation and changes in socio-economic environment because of rising food and non-food prices. It is also clear from the Table that, the overall household food security status is low among BPL household as compared to APL households this could be due to, a majority of the BPL households were marginal land holders. According to Rukhsana (2011) food security is positively correlated to food availability, stability and accessibility. Similar findings have been stated by Rahim, et al. (2011). Study conducted by Dast, et al. (2006) found that the prevalence of food insecurity was 36.3 per cent. Food insecurity increased with family size and declined with income, education and job status of the head of the family ($p<0.01$). Rahim et al. (2011) indicated that household food insecurity was prevalent in the northwest of Iran of food insecure households 970 (39.7%) had LFS (Low food security) and 488 (20%) households had VLFS (Very low food security).

IV. Food shortage coping strategies

Table 3
Ranking of coping strategies adopted by BPL and APL

(N = 200)

S. No.	Coping strategies	BPL (n=46)			APL (n=154)			't' Value
		Mean Score X_1 (SD)	C.V.	Rank	Mean Score X_2 (SD)	C.V.	Rank	
1.	Borrow money from relatives, friends, neighbors and merchants.	0.91 (0.28)	0.30	II	0.91 (0.27)	0.29	II	44.85***
2.	Rely on less prefe rred & less expensive food	0.95 (0.20)	0.21	I	0.96 (0.19)	0.19	I	64.98***
3.	Reduce size of meals per day	0.10 (0.31)	3.1	VIII	0.08 (0.27)	3.37	VI	4.16***
4.	Restrict quantity of food consumption by adults in order to feed children	0.30 (0.46)	1.53	VI	0.34 (0.47)	1.38	IV	9.90***
5.	Try to earn more to get more food	0.13 (0.34)	2.61	VII	0.12 (0.33)	2.75	V	5.33***
6.	Sell livestock	0.65 (0.24)	0.36	V	0.03 (0.19)	6.33	X	2.68***
7.	Sell household items	0.65 (0.23)	0.35	IV	0.04 (0.19)	4.47	VIII	2.88***
8.	Seasonal migration	0.65 (0.24)	0.36	V	0.03 (0.17)	5.66	IX	2.68***
9.	Reduce expenditure on other household items	0.22 (0.64)	0.34	III	0.85 (0.35)	0.41	III	34.96***
10.	Support from government in terms of subsidy, relief package etc.	0.08 (0.28)	3.5	VIII	0.07 (0.25)	3.57	VII	3.87***

[3]*P < 0.01 significant at 0.01 level of significance*

A glance at the data in Table 3 suggested the coping strategies adopted by the households (BPL and APL) during food shortage. The coping strategies adopted by the rural households according to their rank preference were "relied on less preferred and less expensive food (0.95 MS, 0.96 MS)" followed by "borrow money from relatives, friends, neighbors and merchants (0.91MS,0.91 MS)", "reduce expenditure on other household items (0.22 MS, 0.85 MS)" and "sell household items (0.65 MS, 0.04 MS)", respectively. The't' value of BPL and APL households in respect of coping strategies found highly significant at 0.01 level of significance. However, the ranking of coping strategies adopted by the BPL and APL households were observed similar. Hence, the Government intervention is required to coordinate and monitor the regular and timely availability of quality food to the rural households through targeted public distribution system. Similar findings were reported by Beaumier and Ford (2010).

Table 4
Result of logistic regression model

S. No.	Characteristics	'B' Value	S.E.	Wald	DF	Exp (B)	Significance P-value
1.	Constant	11.873	15.470	0.589	1	143384.0	0.443
2.	Awareness	-705	0.780	0.817	1	0.494	0.366
3.	Age	-0.21	0.030	0.478	1	0.980	0.489
4.	Education	0.184	0.184	1.002	1	1.202	0.317
5.	Size of landholding	0.012	0.108	0.012	1	1.012	0.037*
6.	Annual Income	0.000	0.000	8.491	1	1.000	0.004**
7.	Social participation	1.253	0.522	5.769	1	3.500	0.016*
8.	Value Orientation	-0.689	3.874	0.032	1	0.502	0.859
9.	Adoption of modern agricultural	-63.424	32.584	3.789	1	0.000	0.050*
10.	technology	-3.064	2.869	1.140	1	0.047	0.286
11.	Economic motivation	10.973	4.466	6.037	1	58260.852	0.014*
12.	Food availability	0.464	4.888	0.009	1	1.590	0.924
13.	Food accessibility	28.332	7.235	15.333	1	2.000	0.000**
14.	Food quality	1.798	3.002	0.359	1	6.036	0.549
	Food affordability						

Chi square = 126.425 (P<0.0001);- 2Loglikelihood=89.286;
R2= 0.710 (Negelkerke); Level of significance: ** (P<0.01); * (P<0.05)

IV. Factors associated with household food security

Logistic regression analysis was employed to identify the factors associated with household food security. The regression results of Logit model are given in Table 4, which shows the coefficients (B), their standard errors, the Wald chi-square statistics, odd ratio (Exp (B) and associated p-values. The significant chi-square value and Nagelkerke R2 value (0.710) shows that the overall fit of the model was better.

The positively significant coefficients of exploratory variables indicated their positive influence on household food security and poverty status of the rural households. As expected, the variables such as size of land holding, social participation, adoption of modern agricultural technology and food availability had positive and significant ($p<0.05$) influence on food security of the rural households. Annual income and food quality were found to have highly significant ($p<0.01$) influence on food security. Similar findings have been reported by Safia, et al. (2010).

In contrary to the prior expectation; variables like age, education, value orientation, economic motivation, rationality in decision making , level of aspiration, change proneness, mass media exposure, extension agency contact, availability of resources, market orientation, food accessibility and food affordability were not having significant influence on poverty and food security status of the rural household. It suggests that emphasis has to be laid upon promotion of modern technologies for higher productivity and income.

Table 4.
Result of logistic regression model

S. No.	Characteristics	'B' Value	S.E.	Wald	DF	Exp (B)	Significance P-value
1.	Constant	11.873	15.470	0.589	1	143384.0	0.443
2.	Awareness	-705	0.780	0.817	1	0.494	0.366
3.	Age	-0.21	0.030	0.478	1	0.980	0.489
4.	Education	0.184	0.184	1.002	1	1.202	0.317
5.	Size of landholding	0.012	0.108	0.012	1	1.012	0.037*
6.	Annual Income	0.000	0.000	8.491	1	1.000	0.004**
7.	Social participation	1.253	0.522	5.769	1	3.500	0.016*
8.	Value Orientation	-0.689	3.874	0.032	1	0.502	0.859
9.	Adoption of modern agricultural	-63.424	32.584	3.789	1	0.000	0.050*
10.	technology	-3.064	2.869	1.140	1	0.047	0.286
11.	Economic motivation	10.973	4.466	6.037	1	58260.852	0.014*
12.	Food availability	0.464	4.888	0.009	1	1.590	0.924
13.	Food accessibility	28.332	7.235	15.333	1	2.000	0.000**
14.	Food quality	1.798	3.002	0.359	1	6.036	0.549
	Food affordability						

CONCLUSION

The study examined the household food security in Vidarbha region of Maharashtra, India. The study revealed that overall household food security status of the respondents in Bhandara and Chandrapur districts of Vidarbha was found low for about 59 per cent followed by very low (20%) and medium (16.50%) status of food security. The overall household food security status was found low among BPL household as compared to APL households. The factors like annual income, food quality, adoption of modern technology, social participation positively and significantly influenced household food security.

Paper received on : October 20, 2014
Accepted on : November 27, 2014

REFERENCES

1. Arene, C.J and R.C. Anyaeji 2010. Determinants of Food Security among Households in Nsukka Metropolis of Enugu State, Nigeria. ***Pakistan J. of Social Sciences (PJSS), 30(1):9-16.***
2. Baby, S. 2005. Livelihood security of rural community- A critical analysis. ***Ph. D. Thesis,*** IARI, New Delhi.
3. Balgir R. S. 2008. A Cross-Sectional Study of Growth and Physical Development in Fifteen Major Scheduled Tribe Communities of Orissa, ***India. International J. of Child and Adolescent Health. 1(3):243-252.***
4. Beaumier, M. C.; Ford, J. D. 2010. Food insecurity among Inuit women exacerbated by socio-economic stresses and climate change. ***Canadian J. of Public Health. 101(3):196-201.***
5. Brinda Viswanathan 2003. Household Food Security and Integrated Child Development Services in India. ***Background paper for IFPRI-MTID-DP#68, February, 2003.***
6. Chaturvedi, R. 1997. Food security and Panchayati Raj, ***Pub. Concept, New Delhi: 5-7.***
7. Dast Giri S., Mahboub S.A.,Toutounchi H.,OstadRahimi A.R. 2006. Determinants of Food Insecurity: A Cross – Sectional Study in Tabriz. ***J. of Ardabil University of Medical Sciences (JAUMS). 3(21)):233-239.***
8. Gopichandran V, Claudius P, Baby LS, Felinda A., Mohan V.R. 2010. Household food security in urban Tamil Nadu: a survey in Vellore. ***National Medical J. India. 23 (5) : 278-80.***
9. Government of India (GoI) 2009. Report of the Expert Group to Review the Methodology for Estimation of Poverty, Planning Commission, New Delhi, November, Available at www. Planningcommission.nic.in/rep_pov.pdf, accessed on 2 April, 2010.
10. Guilford, J.P. 1954. Psychometric Methods. ***Tata McGraw Hill Publishing Co. Ltd.*** Hoddinott, John and Yohannes, Yisehac 2002. Dietary Diversity as a Food Security Indicator. ***International Food Policy Research Institute (IFPRI), publication.***
11. Kulirani B. Francis 2003. The Shrinking Livelihood Strategies of the Paniyar. Contextual analysis of local livelihood strategies among forest-related tribal groups of south India: Swedish South Asian Studies Network. ***Interdisciplinary Conference at the Centre for Indian Studies, Mysore, India, 17-19 October, 2003.***
12. Madhura Swaminathan 2010. The New Poverty Line: A Methodology Deeply Flawed ***Indian J. of Human Development, Vol. 4 (1), 2010.***
13. Mohammadzadeh, A., Motlagh, A. R. D.and Eshraghian, M. R. 2010. The association of food security with socio-economic factors and weight status among adolescents. ***Iranian J. of Nutrition Sciences & Food Technology. 5 (1) : 55-62.***
14. Mridula, N. andAlex, J. P. 2011. Accomplishing food security through community action. ***Indian Res. J. of Exten. Educ. 11(3) : 63-66.***
15. Palak Gupta, M.Jha, A. Agnihotri, S.Kaushik, P.Patra, V.Sethi and S. Agrawal. 2008. Levels and Determinants of Household Food Insecurity in Delhi Slums. ***A paper presented in 40th Annual Conference of Nutrition Society of India.***
16. Rahim Sharafkhani, Dastgiri Saeed, Gharaaghaji Asl Rasool and Ghavamzadeh Saeed 2011. Factors Influencing Household Food Security Status. ***Food and Nutrition Sciences, 2011,2,31-34.***
17. Rukhsana 2011. Dimension of Food Security in a selected state- Uttar Pradesh. ***J. of Agric. Exten. and Rural Development. 3 (2):29-4.***
18. Safia Begum; Muhammad Farooq; Munir Khan; Nasiha Begum; Aslam Khan 2010. Influence of socio-economic factors on food consumption pattern in district Nowshera. ***Sarhad J. of Agric. 26(3):405-408.***
19. Srinivasan, P.V. 2002. Poverty in Agricultural Research, (ed.) by Parikh, K. S. and Radhakrishna, R., India development Report, ***Oxford University Press: 234-238.***
20. Swaminathan, M.S. 2010. Achieving Food Security in Times of Crisis. ***New Biotechnology, 27(5):453-460.***
21. www.mahaagri.gov.in
22. www.govtofmaha.gov.in