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Food security among farming households: A study in coastal Odisha

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Abstract

A total of 350 households were selected for the study from the five coastal districts which had similar agro-climatic zone namely Puri, Khurdha, Jagatsinghpur, Kendrapada and Nayagarh in 2016 to assess the food security status among farming households. Based on land holding size households were categorized as semi-medium farmers (n=82) small farmers (n=87), marginal farmers (n=94) and landless labourers (n=87). Information on the socio-economic status, and food security of the respondents from each category was collected by a structured and pre-tested questionnaire. The mean land holding size of the marginal farmers was 0.34ha. The small farmers and the semi-medium farmers were having mean land of 1.40ha and 3.90 ha respectively. The mean age of the male farmers was 45.94 years and for the female farmers it was 38.58 years. The mean expenditure (Rs. 3219.77±182.00) was very close to the average monthly income (Rs. 3459.74±274.00) of the households. The majority of the households were found to be food insecure in terms of quantitative availability of foods (59.43%), food preference (60.00%), diversification of foods (60.57%), reduction in the frequency of meal consumed (64.85%), choice of foods (65.71%) and reduced quantity of food consumed (68.58%). The mean score for quantitative availability of food (2.68±0.46), food preference (2.44±0.63), diversification of foods (2.38±0.08), reduction in frequency of meal consumed (2.00±0.10), choice of foods (2.33±0.09) and reduced quantity of food consumed (2.12±0.09) was found to be significant higher among the landless labourers compared to other categories of farmers. The majority of the respondents were food insecure both in terms of quality and quantity. It was more prevalent among the landless labourers followed by marginal farmers.

Keywords: Food security, nutrition security, body mass index, nutritional status

Introduction

For every individual in our country food security is important. Improving food security ought to be an issue of great importance for a country like India where one-third of the population is estimated to be absolutely poor and one-half of children malnourished in one way or another (Bhatt 2011). Food security is a complex sustainable development issue, linked to health through malnutrition. The World Food Summit in 1996 defined food security as “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (FAO 1996) [4]. This definition has been identified with the four dimensions of food security: availability, access, stability and utilization. Nutrition security focuses on food consumption by the household or the individual and on how that food is utilized by the body. There is an integral linkage between food security and nutrition security. Food and nutrition security can be achieved when all people at all times have physical, social and economic access to food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care.” (FAO 2011) [5, 11]. Thus, food and non-food factors that is, drinking water, environmental hygiene and primary health care are involved in food security.

Farming households are the most affected in terms of food insecurity and poverty. According to (Cruz 2010; Valdés *et al.* 2010) [2, 10] majority (more than 80 per cent) of the smallholder farmers in the world are food insecure and depend on land as their primary source of livelihood. The coastal part of the state is vulnerable to periodic recurrence of natural calamities giving rise to a situation of chronic food insecurity particularly among the marginal farmers, and landless labourers (Envis Newsletter 2011) [3]. Several studies have evolved the food security status of agricultural workers to be unsatisfactory.

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Hence, the present study is an attempt to assess the poverty and food security of farming households in coastal districts of Odisha with the objective to analyze the socio-economic status and food security status among farming households.

Methodology

Five coastal districts were selected purposefully for the present study which has similar agro-climatic zones. From the selected districts one block was selected which was most affected by extreme floods in recent years (Panchayat Raj Dept, Govt of Odisha 2012) [9]. A list of villages in the 5 selected blocks were obtained from block office and two villages were selected at random. Married couple & who were above the age of 35 years and the women of the house were engaged in agricultural activity. Oral consent was obtained from the head of the household for carrying out the survey. Out of the total 400 families selected for the study, only 350 families were covered in the final study. The reason for non-coverage of the selected families are

- a. Non-cooperation of the few families.
- b. Poor response of the respondents.
- c. Exclusion of large and medium land holders as they were not involved in agriculture directly.

General information of household such as social status, type of family, detail family composition, annual income and other facility available were collected from the women of the family by structured pretested questionnaire through personal interview method. For assessment of food security status Household Food Security/Insecurity Assessment Scale, FAO 2013 was used. The scale consists of nine major questions on availability, quality, quantity, preference and starvation for which score was given. Every negative answer was scored zero and for positive answer score one was given. If there was a positive answer the frequency of occurrence was assessed

by a three-point scale like score 1 for rarely (once /twice in past four weeks, 2 for sometimes (3-10 times) and 3 for often (more than 10 times).

Major Findings
Land ownership

Out of the total 350 HHs based on their land holding size 94 HHs were marginal farmers (26.85%) followed by 87 HHs were land less labourers and small farmers (24.85%) and 82 HHs (23.45%) were semi medium farmers. The data is presented in figure-1.

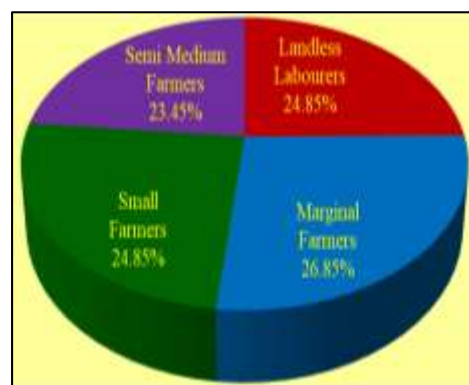


Fig 1: Distribution of households based on landholdings

The findings indicated that 62.86% of the families irrespective of occupation or farm acreage owned were of joint type and only 37.14% were of nuclear family. Out of the total 350 HHs 97 HHs (27.7%) were in general category followed by 93 HHs in SC (26.57%), 92 HHs (26.28%) in OBC and 68 HHs (19.44%) in ST categories. The mean family size was 5.04. The mean age of the male farmers was 45.94 years and for the female it was 38.58 years. (Table-1)

Table 1: General Information of the households (n=87 for LL, n=94 for MF, n=87 for SF, n=82 for SMF & OAF=350)

Particulars	Category	Landless Labourer (LL)		Marginal farmers(MF)		Small farmers(SF)		Semi medium farmers(SMF)		Over all farmers(OAF)	
		F	%	F	%	F	%	F	%	F	%
Social Status	a) GEN	21	6	29	8.28	19	5.43	28	8	97	27.71
	b) OBC	20	5.7	16	4.57	22	6.28	34	9.75	92	26.28
	c) SC	27	7.75	28	8	26	7.43	12	3.42	93	26.57
	d) ST	19	5.4	21	6	20	5.71	8	2.28	68	19.44
Type of Family	a) Nuclear	38	10.85	34	9.71	32	9.14	26	7.44	130	37.14
	b) Joint	40	11.44	46	13.14	56	16	78	22.28	220	62.86
Mean Size of the family	a) < 4 Small	21	6	36	10.28	31	8.85	29	8.28	125	33.44
	b) 4-9 Medium	53	15.14	49	14	45	12.85	45	12.85	192	54.85
	c) > 9 Large	13	3.71	9	2.57	11	3.14	8	2.28	41	11.71
	d) Average (Mean ± SD)	5.09±1.25		4.99±1.44		5.01±1.19		5.09±1.48		5.04±1.34	
Age Mean ±SD	a) Male	46.1±8.01		46.13±7.98		45.91 ±7.67		45.57 ± 7.49		45.94 ± 7.87	
	b) Female	39.8± 7.49		40.14±7.36		37.7 ± 7.12		36.43 ± 6.52		38.58 ± 7.27	

F= Frequency % = Percentage

Average monthly income of the households

The average monthly income was categorized under agricultural work, non-agricultural labourer (construction

work of road & houses, traditional family business etc.), selling of livestock products and business/services and discussed in Table-2

Table 2: Average monthly income (Rs.) of the households (n=87 for LL, n=94 for MF, n=87 for SF, n=82 for SMF & OAF=350)

Parameters	Landless labourer (LL)	Marginal farmers (MF)	Small farmers (SF)	Semi medium farmers (SMF)	Over all farmers (OAF)	F
	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	
Agriculture	959.61±81.00	1119.60±175.25	1218.26±174.27	1311.72±274.61	1152.29±168.85	3.12*
Non-Agriculture work	1056.54±18.05	950.07±100.60	946.76±42.85	749.20±29.33	949.40±47.70	5.42*
Selling of Livestock	661.58±32.23	945.53±44.70	1108.57±69.19	1112.48±55.67	957.03±58.50	6.43**
Business/ Service	249.85±22.96	233.74±26.13	323.92±16.69	891.55±15.80	424.76±20.39	8.71*

**= Significant at $p < 0.05$ *= Significant at $p < 0.01$ NS= Not Significant

The mean monthly total income of the households from agriculture was Rs.1152.29 and it was statistically significant ($F=3.12^*$, $p < 0.05$) for the four groups. The mean monthly total income from non-agriculture for the households was Rs. 949.40 and it was statistically significant ($F=5.42^*$, $p < 0.05$) for all the groups. Mean income from the sale of livestock product for the households was Rs. 957.03. During off season farmers were engaged in some sort of business or services. The mean income of households from business or services was Rs.427.76. Mean income from all sources was higher for semi medium farmers compared to other three groups.

Average monthly households consumer expenditure

The household consumer expenditure was categorized under two broad headings namely food expenditure and non-food expenditure. The food expenditure included amount on money spent on food items like cereals, pulses, oils, sugar, spices and condiments, fruits and vegetables and flesh foods etc. Similarly the non-food expenditure included personal belongings, grocery items, electricity, fuel, education, transportation, mobile phone, medicine, cattle feeds & agricultural inputs, tobacco, intoxicants and repayment towards loan etc. The data is presented in Table-3

Table 3: Average monthly expenditure pattern of households on food and nonfood items (n=87 for LL, n=94 for MF, n=87 for SF, n=82 for SMF & OAF=350)

Particulars	Landless laborer (LL)	Marginal farmers (MF)	Small farmers (SF)	Semi medium farmers (SMF)	Over all farmers (OAF)	F
	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	Mean± SD (Rs.)	
Food items	540.19± 51.29	548.12± 55.18	613.81± 46.58	719.08± 69.27	605.30± 55.58	6.18*
Non-food items	2136.5± 92.09	2477.18± 130.00	2532.13± 137.11	3312.08± 146.48	2614.47± 126.42	5.07*
Total	2676.69± 143.38	3025.30± 185.51	3145.31± 183.69	4031.16± 213.78	3219.77± 182.00	8.76**

**= Significant at $p < 0.01$ *= Significant at $p < 0.05$

The result suggested that the mean consumer expenditure of households on food items was Rs.605.30. It was higher for semi medium farmers (Rs.719.08±69.27), followed by small farmers (Rs. 613.81±46.58) and nearly Rs.540.00 for both marginal farmers and landless labourer. The mean non-food consumer expenditure was Rs.2614.47. It was highest (Rs. 3312.08±146.48) in semi medium farmers and lowest in landless labourer (Rs. 2136.5±92.09). The mean total consumer expenditure was Rs.3219.77. The

ANOVA value ($F=8.76^{**}$, $p < 0.01$) suggested a significant statistical difference between all the four groups.

Food security status of the households

Information on food security status of the respondents is represented in Table-4. The table contained answers of nine questions related to food security status of the household. The responses were recorded from the women respondents for the reference period of past one month or last four weeks.

Table 4: Frequency distribution of the households for assessing food security (=87 for LL, n=94 for MF, n=87 for SF, n=82 for SMF & OAF=350)

Parameters	Details	Landless labourer (LL)		Marginal farmers (MF)		Small farmers (SF)		Semi medium farmers (SMF)		Over all farmers (OAF)	
		F	%	F	%	F	%	F	%	F	%
		How often did you worry that the household not have enough food to eat?	a) Never	18	5.14	32	9.14	42	12.0	48	13.72
b) Once in a month	0		0	2	0.57	5	1.42	14	4.0	21	6.0
c) Once in fortnight	23		6.57	23	6.57	21	6.0	20	5.71	87	24.85
d) 1-2 times a week	46		13.14	39	11.14	15	4.28	0	0	100	28.57
e) Total (b +c +d)	69		19.71	64	18.28	41	11.71	34	9.71	208	59.43
How often you or any household members did not able to eat the kind of foods you prefer because of a lack of resources?	a) Never	22	6.28	30	8.57	39	11.14	49	14.0	140	40.0
	b) Once in a month	5	1.42	15	4.28	23	6.57	20	5.71	63	18.0
	c) Once in fortnight	27	7.71	29	8.28	11	3.14	10	2.85	77	22.0
	d) 1-2 times a week	33	9.42	20	5.71	14	4.0	3	0.85	70	20.0
	e) Total (b +c +d)	65	18.57	64	18.28	48	13.71	33	9.42	210	60
How often you or any household members did eat a limited variety of foods due to lack of resources?	a) Never	9	2.57	38	10.85	44	12.57	47	13.42	138	39.42
	b) Once in a month	13	3.71	26	7.42	31	8.85	28	8.0	98	28.0
	c) Once in fortnight	26	7.42	9	2.57	8	2.28	5	1.42	48	13.71
	d) 1-2 times a week	39	11.14	21	6.0	4	1.14	2	0.57	66	18.85
	e) Total (b +c +d)	78	22.28	56	16.0	43	12.28	35	10.0	212	60.57
How often you or any household members have	a) Never	22	6.28	27	7.71	32	9.14	39	11.14	120	34.28
	b) Once in a month	15	4.28	22	6.28	24	6.85	23	6.57	84	24.0

to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of foods?	c) Once in fortnight	18	5.14	26	7.42	29	8.28	20	5.71	93	26.57
	d) 1-2 times a week	32	9.14	19	5.42	9	2.57	0	0	60	17.14
	e) Total (b +c +d)	65	18.57	67	19.14	62	17.71	43	12.28	230	65.71
How often you or any household members eat smaller meals that are needed for you because there were not enough foods?	a) Never	11	3.14	24	6.85	31	8.85	43	12.28	109	31.14
	Once in a month	23	6.57	28	8.0	19	5.42	12	3.42	82	23.42
	Once in fortnight	21	6.0	22	6.28	26	7.42	19	5.42	88	25.14
	1-2 times a week	32	9.14	20	5.71	11	3.14	8	2.28	71	20.28
	b) Total (b +c +d)	76	21.71	70	2.0.	56	16.0	39	11.14	241	68.85
How often did you or any members eat fewer meals because there was not enough foods?	a) Never	21	6.0	27	7.71	33	9.42	42	12.0	123	35.14
	Once in a month	27	7.71	21	6.0	29	8.28	23	6.57	100	28.57
	Once in fortnight	13	3.71	32	9.14	25	7.14	10	2.85	80	24.28
	1-2 times a week	26	7.42	14	4.0	0	0	7	2.0	47	13.42
	b) Total (b +c +d)	66	18.85	67	19.14	54	15.42	40	11.42	227	64.85
How often there was no food to eat due to lack of resources?	a) Never	87	24.85	94	26.85	87	24.85	82	23.42	350	100
How often did you or any of your family members go to sleep at night hungry as there were no foods?	a) Never	65	18.57	71	20.28	79	22.57	82	23.42	297	84.85
	b) Once in a month	24	6.85	21	6.0	8	2.28	0	0	53	15.14
How often did you or any of your family members go to sleep whole day and night without eating anything as there were no foods?	a) Never	87	24.85	94	26.85	87	24.85	82	23.42	350	100

F= Frequency % = Percentage

Table 5: Mean score for assessing food security of the households

Parameters	Landless labourer (LL)	Marginal farmers (MF)	Small farmers (SF)	Semi medium farmers (SMF)	Over all farmers (OAF)	F
	Mean ±SD	Mean ± SD	Mean ±SD	Mean ±SD	Mean ±SD	
How often did you worry that the household not have enough food to eat?	2.68±0.46	2.57±0.52	2.15±.56	1.61±0.49	2.14±0.50	32.92**
How often you or any household members did not able to eat the kind of foods you prefer because of a lack of resources?	2.44±0.63	2.07±0.73	1.84±0.86	1.5±0.66	1.96±0.72	14.21**
How often you or any household members did eat a limited variety of foods due to lack of resources?	2.38±0.08	1.93±0.12	1.38±0.09	1.25±0.09	1.73±0.08	20.51**
How often you or any household members have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of foods?	2.33±0.09	1.97±0.09	1.78±0.08	1.47±0.07	1.88±0.08	14.39**
How often you or any household members eat smaller meals that are needed for you because there were not enough foods?	2.12±0.09	1.96±0.09	1.90±0.09	1.9±0.11	1.97±0.09	1.25 ^{NS}
How often did you or any members eat fewer meals because there were not enough foods?	2.00±0.10	1.91±0.08	1.47±0.06	1.53±0.10	1.72±0.08	7.60*
How often did you or any of your family members go to sleep at night hungry as there were no foods?	1.18±0.08	1.08±0.06	1.03±0.02	1.12±0.12	1.10±0.07	1.46 ^{NS}

** =Significant at $p < 0.01$ * = Significant at $p < 0.01$ NS= Not Significant

With respect to the quantitative availability of food 142 respondents (40.57%) reported never facing any food crises on availability whereas the majority of the households (59.43%) were found to be food insecure. Regarding preference of food on the basis of availability of money 140 households (40.00%) never found any difficulty in availing their preferred food. But 210 respondents (60.00%) gave positive answer for not able to purchase food as per choice. Results regarding diversification of food consumed it was found that 138 households (39.24%) were able to eat different varieties of food. Remaining 212 households (60.57%) had difficulty in purchasing foods from diversified sources due to lack of money. One hundred and twenty households (34.28%) were

purchasing foods as per their choice. The remaining 230 (65.71%) households responded that they were eating some foods that they really did not want to eat because of a lack of resources. One hundred and nine households (31.14%) never ate small quantity of meals whereas 241 households (68.85%) were food insecure and ate smaller quantity of meals. One twenty-three households (35.14%) reported that they never experienced reduction of total number of foods to be consumed and 227(64.85%) households reported to eat fewer meals due to lack of food. In response to the question regarding no food to eat due to lack of resources all the households reported not experiencing that situation in the past four weeks. Two ninety seven households (84.85%) stated that neither

they nor any of the household members ever slept at night without having any food. Lastly, 100% (350hhs) opined neither they nor any of their family members ever slept whole day and night without eating anything.

Mean score for assessing food security among the respondents

Out of the 9 statements used to assess the food security status 7 statements were analyzed based on the scores. The reason for deleting the two statements was that all the respondents answered never for those two. The score was calculated by taking the average of frequency of occurrence and all the four groups were compared based on these mean values. Frequency of occurrence was assessed by a three point scale like score 1 for rarely (once in past four weeks), 2 for sometimes (once in 15 days) and 3 for often (1-2 times a week). The data are presented in Table-5

The mean score regarding quantitative availability of food was statistically significant between the four groups. It was lowest (1.61 ± 0.49) for semi medium farmer and highest for landless labourer (2.68 ± 0.46). The average score of these groups clearly indicated that they suffer from food insecurity more frequently than others.

Regarding food preferences the mean score was (1.96 ± 0.72) significant statistically between the four groups ($F=14.21^{**}$). Again the score was highest for landless labourer (2.44 ± 0.63) followed by marginal farmers (2.07 ± 0.73), small farmers (1.84 ± 0.86) and semi medium farmers (1.50 ± 0.66).

Body Mass Index (BMI)

The nutritional status of farm women was assessed using Body Mass Index (BMI). BMI values were recorded based on the height and weight of the respondents and they were classified into various categories of Chronic Energy Deficiency (James *et al.* 1988). The mean value calculated was 18.58. The lowest BMI was recorded in landless labourer 17.13. For marginal farmers it was also 18.01. These BMI values indicated that there was prevalence of chronic malnutrition among these two categories. For small farmers and semi medium farmers it was 19.20 and 19.98 respectively. The F value ($F=6.43^*$) further reported statistically significant difference between the BMI for all the four groups of farm women ($p < 0.05$). The findings in Figure 2 suggest that prevalence of Chronic Energy Deficiency was higher among farm women.

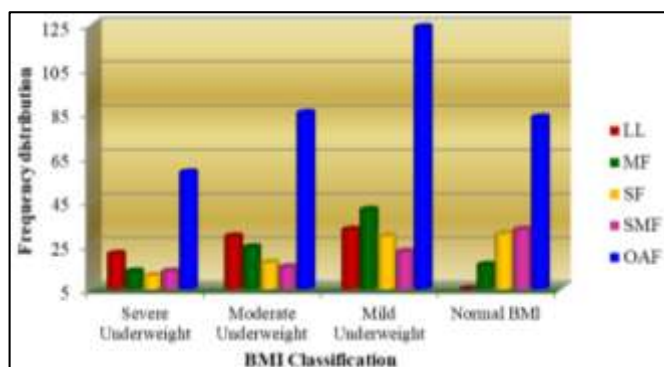


Fig 2: BMI classifications of the respondents

Conclusion

From Table-4 and 5, it was clear that food insecurity was a predominant problem among farming households. The

majority of the landless labourer and marginal farmers were severely food insecure in terms of quantity, quality, diversity and choice of food. Small and semi-medium farmers were found to be less food insecure compared to marginal and landless labourer. The respondents also revealed that at the time of crises it was the women of the households who sacrifice their food for other members of the family and children. It might be concluded based on their responds and BMI women of the households was not food secure. In Indian society, the best portion of food goes to the male. (Camara 2011) ^[1] also found similar food security status of farm women in the Kindia region of Guinea. It was clear from his study that the people most vulnerable were those living in rural areas, specifically women and children. Gorton *et al.* (2009) opined that a low level of education is associated with reduced food security. The study by (Kuwornu *et al.* 2011) ^[8] revealed that the majority of the farming households (60.00%) were found to be food insecure.

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