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Food security and its determinants: A case study of South Coastal region, Andhra Pradesh

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***Abstract*---**Andhra Pradesh is one of the largest states in India in terms of population. But, food insecurity is of common phenomenon both in developed and developing states. The present paper endeavors to study household food security and its determinants in south coastal region (Guntur district), Andhra Pradesh. A primary survey was conducted with structured schedules to collect data from 200 sample BPL households based on random sampling technique. The data was analyzed through multiple regression technique. The result showed that age, agricultural land, number of earners in the family, caste category, income group and education have a positive relationship with household food security status. Similarly, variables such as family size, marital status and type of ration card are negatively correlated with household food security status. The study found 55.9 percent of the variations in food security index are explained by the explanatory variables in south coastal region (Guntur district), Andhra Pradesh.

***Keywords*---**food insecurity, food security index, determinants, BPL.

Introduction

Food availability is a problem for everyone and especially for the developing world. Food security means the provision and access to nutritionally sufficient and culturally accepted food by each member of the household for healthy life obtained through socially acceptable ways. Food insecurity, on the other hand, is the uncertain or limited access to nutritionally adequate and safe food (Andersen, 1990: FAO, 2006). Food insecurity has become a worldwide concern due to the increasing number of people which remain undernourished amounting to 842 million, approximately 12 percent of the total world's population. Developing

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countries are intensely affected. This is really true in the case of Asia and Africa when more than 92 percent of the worlds under nourished people are living; 552 and 226.4 million respectively. About 294.7 million people are food insecure only in South Asia which is almost 35 percent of the total undernourishment world population (FAO, 2013). Almost one out of ten households is still unable to secure its food despite the considerable efforts put forward by both public and private sectors to assist poor household in getting their food needs (Nord et al..2005). More than three million children live in households classified as "very low food security" (Nord et al.2005). Currently, National Food Security Bill which will confer every Indian the legal right to food. As per the Economic Survey (2018-19), India needs to take big initiatives to improve its food security as it faces supply constraints, water scarcity, small landholdings, low per capita GDP and inadequate irrigation.

Review of literature

Dutta et al. (2011) compared the public distribution of food in two states, namely Andhra Pradesh and Maharashtra, based on 50th round of National Sample Survey, Household Consumption Survey data. The article concludes that there is a problem in utilization of commodities, targeting of population, magnitude of income transfers and cost effectiveness of food subsidies. A significantly higher number of people use PDS in Andhra Pradesh compared to Maharashtra and the coverage is higher by 30%. Based on the regional disparities it is important to study the success stories and incorporate the best practices to improve the scheme. A study made by Dr.K.K.Tripathy and K.C.Mishra (2011) estimated that though India is one of the largest producers of the food in the world, yet nearly 300 million people struggle for meeting two square meals a day and 21 percent of the national population (230 million) are malnourished. This indicates the issues of accessibility to adequate and nutritive food to the poor. A similar study made by Mahendra Dev (1998) states that PDS is not the only answer to food security of the poorest of the poor because it can be of help only to those who have purchasing power. A part from higher economic growth, a mix of policies like effective implementation of anti-poverty programmes, stabilization of prices, improving wealth facilities is needed for food security at the household level. Food insecurity at the household level is related to several factors, including poverty, low income, level of education, household size, employment status, age, the type of household head (gender) and food price. Understanding the characteristics and determinants of household food insecurity is crucial to developing policies that address the challenges associated with household hunger and food insecurity.

Objectives of the study

The main objectives for study are as follows:

- To make a study of total monthly household expenditure of sample households
- This study seeks to examine food security status of the households.
- This paper analyzes the factors influencing food security.

Hypothesis

As family size increases, the chance of food security decreases. As farm land increases, it encourages the farmers to make improvements in agriculture which in turn enhance the food security status of the households. The present study aims at to test the following hypothesis.
H_0 = There is no significant relationship between income and food security.
H_0 = There is no significant relationship between family size and food security status.

Methodology

This study is based on field survey. It has been conducted on the basis of primary data. The study adopted random sampling method. A multiple regression technique was used by taking food security index as the dependent variable and driving forces of food security as independent variables. A sample of 200 households randomly selected from south coastal region (Guntur district) Andhra Pradesh. Later, the data was drawn from four villages namely Atmakur, Chinnakakani, (Guntur revenue division) Burripalem and China Ravuru (Tenali revenue division) in south coastal region of Guntur District, Andhra Pradesh. From each village 50 samples are randomly selected. The collected data is processed, tabulated and analyzed in detail in the following manner.

Measurement of household food security index

The household was classified into food secure and food insecure households using food security index, which is used to establish the food status of various households.

It is given by, $F_i = \frac{\text{Percapita food expenditure for the } i^{th} \text{ household}}{{}^{2}/_{3} \text{ mean percapita food expenditure of all households}}$

Where, F = Food security Index,
F > 1= Food secured household,
F < 1= Food insecure household

A food secure household is therefore that, whose per capita monthly food expenditure fall above or is equal to ${}^{2}/_{3rd}$ of the mean per capita food expenditure.

Results

Consumption expenditure pattern of the households

Consumption is an important activity performed by the household sector. Whatever personal income households obtain, from one source or the other, is spent either on food items or non food items and the leftover income is saved. The consumption pattern of the households is explained by studying the differences in the expenditure on different items in the consumption baskets. The researcher divides the expenditure in 24 items which includes 13 food items and 11 non food

items. Average monthly expenditure of the households both on food and non food items as shown in the table 1.1

Table 1
Average monthly expenditure details of the households in south coastal region

Items	Expenditure in Rs	Percentage
1.Cereals	982	13.55 %
2. Wheat	20	0.27 %
3. Pulses	195	2.69 %
4. Oils	224	3.09 %
5. Milk Products	743	10.26 %
6. Eggs	57	0.79 %
7. Non Veg	228	3.14 %
8. Vegetables	259	3.57 %
9. Fruits	173	2.39 %
10. Spices and other ingredients	190	2.62 %
11. Sugar	55	0.76 %
12. Flour	198	2.73 %
13. Other Food	535	7.38 %
Total Food Expenditure	3857	53.23 %
1.Medicines	381	5.25 %
2. Education	433	5.97 %
3. Liquor	305	4.20 %
4. Pan and Tobacco	74	1.02 %
5. Cloth and Slippers	403	5.56 %
6. Soaps, tooth paste and other cosmetics	385	5.31 %
7. Electricity	284	3.92 %
8. Petrol	24	0.32 %
9. Telephone charges	227	3.14 %
10. Other non food expenses	391	5.39 %
11. Rent and Taxes	484	6.68 %
Total Non Food Expenditure	3389	46.77 %
Total monthly household Expenditure	7246	100.00 %

Source: Primary Survey

Table 1 depicts that, the average monthly consumption expenditure of the households has been estimated at Rs. 7,246. Out of which, Rs. 3,857 spent on food items (53.23 percent) and Rs. 3,389 was incurred on non food items (46.77 percent). Under food consumption basket, cereal consumption has major share with 13.55 percent followed by milk products 10.26 percent and other food expenditure accounted 7.38 percent. Due to the diversified food habits of the households the expenditure on other food is showing an upward trend. The amount incurred on eggs, fruits, meat etc are very minor in percentage terms. On other hand, non food consumption expenditure was highest on rent and taxes with 6.68 percent next education 5.97 percent, clothes and slippers 5.56 percent, other non food expenses 5.39 percent, soaps, toothpaste and other cosmetics

constituted 5.31 percent, and medicines with 5.25 percent to the total consumption expenditure. The percentage of income spent on pan and tobacco, electricity, petrol etc are very meager in the total non food expenditure. After going through the deliberation, it is concluded that cereals, milk products and other food expenses has a larger share in total food expenditure. Subsequently, non food consumption expenditure on rent and taxes, education, clothes and slippers, soaps, tooth pastes and other cosmetics, medicines was high.

Per-capita food expenditure

The per-capita food expenditure is explained, based on the expenditure made by the households on different food items. There is an association between consumption expenditure and food security of the households. The details of per capita food expenditure of the households, is furnished in the table 2.

Table 2
2/3 rd per capita Food Expenditure (in mean figures)

Region	Per capita food Expenditure	2/3 rd Per capita food expenditure	2* Per capita food expenditure
South coastal	1087	724.7528	2174.3

Note: 2* Per capita food expenditure (PCFE) × 2

Table 2 signifies the status of per capita food expenditure of the households. Average monthly per capita food expenditure of total sample households (200) in south coastal region is rupees 1087. Based on the above formula of 2/3rd per capita food expenditure of total sampled households is rupees 724. Two times (double) per capita monthly food expenditure of total sampled households is rupees 2174.

Food security Index ranges

The households whose per capita monthly food expenditure is below 737 rupees are treated as food in secured household. A moderately food secure household is therefore that, whose per capita monthly food expenditure lies between 737 to 1106 rupees. Households are said to be food secured when their per capita monthly food expenditure falls between 1106 to 2211 rupees. A highly food secured household is one whose per capita monthly food expenditure is more than 2211 rupees. The particulars relating to the household food security index limits are presented in table 3.

Table 3
Food Security Index limits

Region	Insecured	Moderately secured	Secured	Highly secured	Total
South coastal	21 (10.5)	89 (44.5)	72 (36.0)	18 (9.0)	200 (100.0)

Source: Primary Survey
Note: 2/3 PCFE: Per capita food expenditure

A cross tabulation analysis of food security among 200 households in table 1.3 demonstrates, about 10.5 percent of the households are food insecure while, 44.5 percent of the households were moderately secured. On the other hand, 36 percent of the households are food secured and only, 9 percent of the households are highly food secured. From the foregoing description it is noticed that, food insecure households are highest in south coastal region, Andhra Pradesh.

Factors governing food security index in south coastal region

In order to find out the factors that determine food security index in south coastal region, multiple regression model has been prepared by taking food security index as the dependent variable and the selected nine explanatory variables as the independent variables.

Multicolinearity testing of variables in south coastal region

Table 4 provides the test for multicolinearity among the variables in the model. Result shows that there is no linearity or perfect correlation between food security index and independent variables in south coastal region. The estimated Pearson correlation co-efficient values are ranged between -0.589 and 0.378, which clearly shows that, there is no approximate or linear relationship existed between food security index and explanatory variables in south coastal region.

Table 4
Multicolinearity testing of variables in south coastal region

Region: South coastal region (Guntur disttirct)		**Correlations[a]**									
		Food security Index	Age	Agricultural land	Family size	Number of earners in the family	Caste Category	Income group	Education	Marital status	Ration card type
Food security Index	Pearson Correlation	1	.030	.378**	-.589**	-.304**	.351**	.370**	.156*	-.162*	-.098
	Sig. (2-tailed)		.671	.000	.000	.000	.000	.000	.028	.022	.168
	N	200	200	200	200	200	200	200	200	200	200
Age	Pearson Correlation		1	.222**	.008	.083	-.079	-.086	-.284**	.282**	-.001
	Sig. (2-tailed)			.002	.909	.243	.263	.227	.000	.000	.991
	N		200	200	200	200	200	200	200	200	200
Agricultural land	Pearson Correlation			1	-.067	-.048	.137	.112	-.009	-.026	-.035
	Sig. (2-tailed)				.347	.504	.052	.114	.895	.715	.622
	N			200	200	200	200	200	200	200	200
Family size	Pearson Correlation				1	.720**	-.281**	-.287**	-.080	.095	.088
	Sig. (2-tailed)					.000	.000	.000	.259	.179	.214
	N				200	200	200	200	200	200	200
Number of earners	Pearson Correlation					1	-.234**	-.280**	-.095	.079	.059
	Sig. (2-						.001	.000	.181	.265	.406

in the family	tailed)										
	N					200	200	200	200	200	200
Caste Category	Pearson Correlation						1	.174*	.125	-.089	-.219**
	Sig. (2-tailed)							.013	.077	.210	.002
	N						200	200	200	200	200
Income group	Pearson Correlation							1	.210**	-.315**	.034
	Sig. (2-tailed)								.003	.000	.636
	N							200	200	200	200
Educatio n	Pearson Correlation								1	-.273**	.101
	Sig. (2-tailed)									.000	.153
	N								200	200	200
Marital status	Pearson Correlation									1	-.077
	Sig. (2-tailed)										.277
	N									200	200
Ration card type (poverty status)	Pearson Correlation										1
	Sig. (2-tailed)										
	N										200
**. Correlation is significant at the 0.01 level (2-tailed)., *. Correlation is significant at the 0.05 level (2-tailed).											
a. Region = South coastal region (Guntur District) **Source:** Primary Survey											

Outcomes of regression model in south coastal region

Table 5 shows outcomes of regression model in south coastal region which were drawn from 200 sample households. It could be noted from table 1.5 the specified regression model is significant at 1 percent level of probability. The level of count egested R^2 obtained is 0.559; which shown that 55.9 percent of the variations in the Food Security Index are explained by the changes in the explanatory variables in south coastal region. On the other hand, about 44.1 percent of variations in food security status among the households in south coastal region are influenced by the other factors which are not included in this model. In south coastal region, it is noticed from the egested regression model among all exploratory variables Agricultural land, number of earners in the family, Income group and caste category have a significant positive effect on the food security index.

Agricultural land is also a chief determinant of household food security in this model a unit increase in agricultural land would result in about 0.383 units of increase in the food security index at one percent level of significance in south coastal region. Similarly, income is also found to be positive and significant at one percent level. The estimates shows that a unit increase in the number of earners in the family would result 0.201 units of food security index value at one percent level of significance in south coastal region. The chances of a household becoming food secure is possible when number of earners in a family increases. This clearly indicates that agricultural land would have more positive impact on food security index than all other exploratory variables followed by number of earners in south coastal region. The present study hypothesizes that higher monthly income group

is more food secure. Further, caste category (0.120) and income group (0.162) also shows significant positive impact on food security index in south coastal region. This illustrates that, an increase in income level caste category of the household provides a greater access to food. The variable education (0.064) was found to be statistically insignificant and it was positively associated with the household food security index in south coastal region.

On the other side, a unit increase in the family size results in decrease of -0.367 units in food security index at 1 percent level of significance. This demonstrates that, there exists an inverse relationship between family size and food security index in south coastal region. Even though, Marital status (-0.027) and type of the ration card (-0.090) shows negative impact on food security index but be statistically it is insignificant in south coastal region with a negative coefficient. It implies that, households with single, divorced and widowed were significantly more prone to being food insecure as compared married households. It can be concluded from the above analysis agricultural land, number of earners in the family, caste category and income group has shown a positive relationship with household food security status in south coastal region. On the other hand, family size, marital status and type of ration card have shown a negative relationship with food security status. Variables such as age, education, marital status and type of ration card were not statistically significant in this model.

Table 5
Outcomes of Regression model (for 200 samples) – south coastal region

Model	Coefficients (B)
(Constant) Food security Index	2.490
X_1 Age	0.000***
X_2 Agricultural Land	0.383*
X_3 Family size	-0.367*
X_4 Number of earners in the family	0.201*
X_5 Caste category	0.120*
X_6 Income Group	0.162*
X_7 Education	0.064***
X_8 Marital status	-0.027***
X_9 Ration card type (Poverty status)	-0.090***
R	0.748
R Square	0.559
Adjusted R Square	0.538
Std. error of the Estimate	0.54313
Sig. F change	0.000

*Significant at the 1% level. **Significant at the 5% level. ***Significance at the 10% level

Conclusion

The main objective of this study was to identify the factors influencing food security of the households in south coastal region (Guntur district), Andhra Pradesh. The result of regression model indicates that the variations in the food

security Index are explained by the changes in the explanatory variables is 55.9 percent in south coastal region (based on the level of count egested R^2). Based on the above analysis, researcher framed two null hypotheses which were rejected at one percent level of significance. Hence, it can be concluded there is a direct and positive association between income and food security index at 1% level of significance. Further it can be stated that, there is a significant negative association is existed between family size and food security index at 1% level of significance. From the above observations it is noted that, an increase in income level has a greater access to food. Similarly, large sized households are highly food insecure than the small sized households.

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