



DETERMINANTS OF FOOD SECURITY AMONG THE FARMING HOUSEHOLDS IN ZANGO-KATAF LOCAL GOVERNMENT AREA OF KADUNA STATE



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ABSTRACT

This study was carried out to examine the food security level and identify the determinants of food security among farming households in Zango-Kataf Local Government Area of Kaduna State. Data used for this study was collected from a total of 97 farming households using a two-stage random sampling technique. The main tools of analysis for this study include descriptive statistics, food security index and Tobit regression model. The study shows the average farm size of sampled farming households to be 2.09ha while 7.1 was the average household size of farm families. The study further revealed that about one third of the rural farming households sampled were food insecure and that; the education level of household head (0.1869), household size (0.0304), household per capita medical expense (1.679e-06) and consumption credit (-7.714e-06) are the significant determinants of household food security in the study area. Farmers could also significantly tell of their perceived status of food security. The study therefore recommends the need for farmers' education and enlightenment on birth control measures, and government intervention in the provision of healthcare facilities and services.

Keywords: Food Security, Farming Household, Zango-Kataf, Kaduna State.

INTRODUCTION

Global Hunger Index (GHI) ranking of Nigeria as 40th among 79 food deficient countries in 2011, 40th again in 2012, 39th in 2013 and 38th in 2014 remains unacceptably high and has indicated that no remarkable progress has been made from all efforts geared towards hunger reduction in the years past (GHI, 2011, 2012, 2013 and 2014). The GHI Report (2012) further posit that rising food prices, malnutrition and deaths as a result of wide-spread poverty is an indication of the prevalence of food insecurity in the country. It is also a sign of extreme suffering for millions of poor people.

These are matters of grave concern largely because Nigeria was self-sufficient in food production and was indeed a net exporter of food to other regions of the continent in the 1950s and 1960s. Things changed dramatically for the worse following the global economic crisis that hit developing countries beginning from the late 1970's onward. The discovery of crude oil and rising revenue from the country's petroleum sector encouraged official neglect of the agricultural sector and turned Nigeria into a net importer of food (Ojeleye *et al.*, 2014).

Food security is deemed to exist when all people at all times have the food needed for an active and healthy life. Food security is a complex phenomenon attributable to a range of factors that vary in importance across geographic and social boundaries and the concept is multi-dimensional, providing valuable insights into the nature and extent of a population's food situation (Inter-Agency Working Group, National Food Security Programme, 1998). The National Food Security Programme in Nigeria defines food security as the physical availability and ability of individuals to have or afford the food at a reasonable cost (NFSP, 2001). USDA Bureau for Africa sees food security as a situation when all people at all times have access to sufficient food to meet their dietary needs for a productive and healthy life (USDA, 1997), while the FAO committee on world food

security sees it as a situation where all people at all times have both physical and economic access to the basic food they need (FAO, 2002).

It has been well documented that Nigeria has a wealth of potentials to not only feed its populace but be a net exporter of agricultural commodities. Since the country's agricultural base is indigenous contributing over 80% of the food needs of the country and employing about 70 of the labour force (Adegboye, 2004; NBS, 2012), it is becoming imperative to assess the food security indices of these indigenous producers in order to help policy makers in designing policies and programs implemented to improve national food security. The basic determinants of food and nutrition security are grouped as: human resources (for example, people and their knowledge, skills, and time); economic resources (for example, assets, land, and income); and organizational resources (for example, formal and non-formal institutions, extended families, and childcare organizations) (Akinyele, 2009). The need arises to investigate the influence of certain socio-economic determinants and thus inferential deductions can be drawn to help farm households and policy makers. Babatunde *et al.* (2007), has further opined that it is required that the socio-economic conditions of the farming population be known for a guided change to take place.

This study examined the level of food insecurity among farm families and investigate the socio-economic determinants of food security in Zango Kataf Local Government Area of Kaduna State, Nigeria.

MATERIALS AND METHODS

This study was conducted, for budgetary limitations, in two villages namely Fadan Kaje and Ungwan Wakili of Zango Kataf LGA. Zango Kataf is a local government area in Kaduna State, Nigeria. Its headquarters is in the town of Zonkwa. It has an area of 2,668 km² and a population of 316,370 at the 2006 census. The local government is bounded in the north by Kajuru LGA, in the west by

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Kachia LGA, in the east by Kauru LGA and in the south by Jema'a LGA. The people are predominantly Jju (Kaje) and Tyap, with other tribes and Hausa settlers. Agriculture is the main stay of the economy of people, and food crops that are cultivated and produced include: maize, yam, groundnut, cowpea, guinea corn, millet, ginger and cassava. The people also rear animals like cattle, goats and pigs.

A multi-stage sampling technique was used for this study. The first stage involved the random sample of two villages in the LGA, for budgetary limitation as mentioned earlier, and then a random selection of 10% sample size of respondents to acquire data from farm household from the list of farm family figure in the sampled villages. Structured questionnaire were used to obtain required information from the farming households resident in the villages thus, 97 households were sampled for questionnaire administration.

Descriptive statistics was used to analyze the socio-economic characteristics of the farm families. Food Security Index (FSI) was used to obtain the food security status of respondents. The approach taken in this study for the determination of food security index is to follow the identification and aggregation procedures. Identification is the process of defining a minimum level of nutrition necessary to maintain healthy living. This is referred to as the 'Food Security Line', below which people are classified as food insecure and subsisting on inadequate nutrition. The food security line was used in this study based on the daily-recommended level of calories and protein, which are 2260 Kcal and 65g respectively (Olayemi, 1998). In order to generate food security indices, the nutrient content of the food items consumed were used to derive calorie availability.

$$\text{Food Security Index (Zi)} = \frac{\text{HDPCC/PC (x)}}{\text{HDPCC/PR (y)}} \dots\dots\dots(\text{Eq.1})$$

Where;

HDPCC/PC = Household Daily per Capita Calorie/Protein Consumed (x)

HDPCC/PR= Household Daily per Capita Calorie/Protein Required (y)

For a household to be food secured, Zi must be greater than or equal to 1 ($Z_i \geq 1$). If Zi is less than 1 ($Z_i < 1$), the household is food insecure. The quantities of crops produced, purchased and those received as gift were converted to kilogram and further to calorie consumed per day per household and then compared with the standard (2260kcal). Nutrient composition of commonly eaten foods in Nigeria—raw, processed and prepared table as supplied by Babatunde *et al.* (2007) was used.

Tobit model was used to identify the determinants of food security status of farming household, two stages of analyses were involved; one, we constructed a food security index (FSI) and secondly, used the Tobit regression model, as a lead model, to estimate the food security index of household as a function of a set of independent determinants. Tobit regression model takes into consideration, the cumulative effect on the dependent variable as explained by the independent variables.

The Tobit Regression Model is particularly a hybrid of the discrete and continuous dependent variables. It measures the parameter of the conditional probability of being food secure and the effects of the marginal changes in the

explanatory variables on the food security status of the households. According to McDonald and Moffit (1980), Omonona (2001) and Agboola (2004), the model can be implicit expressed as:

$$Z_i = \alpha x_i + U_i \dots\dots\dots(\text{Eq. 2})$$

Where;

Zi = the food security index of ith household

xi = vector of explanatory variables

Ui = the error term

α = vector of the parameter estimates

The explanatory/independent variables are:

X1 = Food Security Status Perception (0 is insecure and 1 is secured)

X2 = Age of Household Head in years

X3 = Education Level of Household Head (from informal to levels of formal education)

X4 = Adjusted Household Size

X5 = Household Medical Expense /year in naira

X6 = Consumer Credit access in naira per annum

X7 = Household Farm Income in naira per annum

X8 = Household Non- Farm Income in naira per annum

X9 = Household Annual Crop Production in Grain Equivalent

X10 = Dependency Ratio

RESULTS AND DISCUSSION

The results presented in Table 1 showed that 87.6% of the respondents are in the range of 21-50 years which is the active age range. The mean age of respondents was 38.6 years. The age of the household heads is expected to have effect on his level of activities. It determines the quality and quantity of work he can do on the farm. This is an important measure of farm productivity and consequently influences food security. It was revealed that 81.44% of the respondents are male. The gender of the household head is expected to have effect on the level of involvement in farming activities and so food security. This also determines the kind of activities involved in on the farm and the type of crop cultivated. As shown from Table 1, about 67% of the respondents have household size ranging between 6-10 people. This seems to be the predominant range of the family sizes. Household size ranging between 10 and above amounted to 18% of the respondents, and this could possibly mean more family labour contributing to the farm family economy or more mouth to feed thereby reducing food security level. The average farm size was found to be 2.09 hectares while average annual farm and non-farm incomes were ₦162,038.10k and ₦149,251.20k respectively. The income from farming is a major determinants of per capital household expenditure and food security status as it is expected that with higher income, the farm household will be able to procure more food needed. This income level is however low, for further breakdown of these annual income estimates shows daily average farm and non-income of households. With average household size found to be 7.1, a further breakdown will reveal per capita income of ₦62.53k of farm income and ₦57.59k of non-farm incomes per day. The average total crop production in grain equivalent was found to be 1990.31kg.

Table 1: Socio-Economic Characteristics of the Farmers in the Study Area

Variables	Frequency	Percentage	Mean	Standard Dev.
Age (Years)				
0-20	2	2.06		
21-30	14	14.43		
31-40	50	51.55		
41-50	21	21.65		
51-60	9	9.28		
>60	1	1.03	38.6	9.151
Gender				
Male	18	18.56		
Female	79	81.44		0.391
Education Level				
No formal Education	8	8.25		
Arabic Education	1	1.03		
Adult Education	7	7.22		
Primary Education	26	26.80		
Secondary Education	47	48.45		
Post-Secondary Education	8	8.25		1.261
Household Size				
<5	14	14.43		
6-10	65	67.01		
>10	17	17.53	7.1	2.633
Farmland Size (Ha)				
<1	12	12.37		
2-3	61	62.89		
>3	24	24.74	2.09	1.78
Farm Income (₦)				
<100,000	27	27.84		
100,000-200,000	45	46.39		
200,001-300,000	17	17.53		
>300,000	8	8.25	162,038.1	93234.45
Non-Farm Income (₦)				
<100000	30	41.10		
100,000-200,000	23	31.51		
200,001-300,000	15	20.55		
>300,000	5	6.85	149,251.2	102088.6
Crop Production (Grain Equiv.)				
<1,000	15	15.46		
1,001-2,000	48	49.48		
2001-3,000	26	26.80		
3,001-4,000	1	1.03		
>4,000	7	7.22	1990.31	1164.97

Food Security Level of Farm Households

The food insecure households constituted about 32% of the sample as shown in Table 2. Further breakdown of farm income and non-farm income of food secured and non-secured farm households are presented in Table 2. The table further revealed that the adjusted household size of the food-secure was found to be 6.4 and that of the non-secured, 8.7. The average total crop production in grain equivalent of the secured household was also observed to be 2,077.61kg, 273.16kg greater than the average non-food secured households' figure of 1,804.45kg. Following the identification and aggregation procedures, food security index, and the shortfall/surplus index are equally presented in Table 2 for both the food secure and food insecure households. These multiple indices were used to provide a basis for examining the extent and difference of food insecurity among farming households from different perspectives.

Even though the aggregate household daily calorie availability exceeded the minimum requirement in the study area, it is only on the threshold of food adequacy

(Table 2). Besides, the study revealed that about one- third of the households are food-insecure with an average food security index of 0.886, which is about 11.4% less than the minimum requirement while about two-third of the entire households that are food secure exceeded the minimum calorie requirement by 42.8%. This is as presented in the shortfall/surplus index (P) which measures the extent of deviation from the food security line by the households.

The Determinants of Food Security Status of Households

By the 1% level of significance of farmers' perception of their food security status, it is safe to conclude that farmers, who do not have the knowledge and expertise of analyzing FSI, can ascertain their food security status. Also at 1% level, age of household head, education level of household head, adjusted household size and household medical expense variables were found to significantly determine household food security level in the study area. Consumption credit and dependency ration were however found to significantly determine food security level at 5 and 10% levels, respectively.

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Table 2: Indices of Farming Household Food Security

Variables	Food Secured	Non Food Secured	Pooled
Food Security level	68.04	31.96	100
Adjusted Household Size	6.4 [2.548]	8.7 [1.937]	7.1 [2.593]
Total farm Income	169,109.8 [92661.65]	146,982.3 [94174.69]	162,038.1 [93234.45]
Total Non-farm Income	162,861.2 [105478.7]	123,120 [91632.56]	149,251.2 [102088.6]
Total Crop production	2,077.61 [1208.24]	1,804.45 [1061.807]	1,990.31 [1164.97]
Food Security Index	1.428 [0.546]	0.886 [0.086]	1.255 [0.518]
Surplus Index	0.428	-	
Shortfall Index	-	0.114	

Figures in the parentheses are the standard deviations.

Table 3: Parameter Estimate for the Tobit Regression Model.

Food Security Index (FSI).	Reg. Coef.	Std. Err.	t-Value	P> t
Food Security Status Perception (X ₁)	0.4713*	0.08365	5.635	0.000
Age of Household Head (X ₂)	0.0304*	0.00478	6.349	0.000
Education Level of Household Head (X ₃)	0.1869*	0.02714	6.891	0.000
Adjusted Household Size(X ₄)	-.14164*	0.02389	-5.930	0.000
Household Medical Expense (X ₅)	-1.679e-06*	2.739e-06	-2.816	0.005
Consumption Credit (X ₆)	-7.714e-06**	1.181e-06	-2.552	0.011
Household Farm Income (X ₇)	9.303e-07	10142e-06	0.814	0.415
Household Non- Farm Income (X ₈)	5.365e-07	3.913e-07	1.371	0.170
Total Crop Production in Grain Equiv. (X ₉)	1.340e-05	9.656e-05	0.139	0.890
Dependency Ratio (X ₁₀)	-1.225e-01***	6.489e-02	-1.888	0.059
/sigma	0.37495156*	0.0269199	13.928	0.000

Log likelihood = -42.48407 Note *, **, *** t-significance at 1%, 5% & 10% levels respectively

CONCLUSION AND RECOMMENDATIONS

This study showed that in spite of the overall food security index of the households in the study area indicating calorie consumption just at the threshold of adequacy, about one-third of the households are not food secure. Considering the fact that education level of household heads, adjusted household size, dependency ratio and per capita household medical expense, were found to significantly determine household food security level in the study area, farmers should be encouraged to acquire relevant education as adaptable for agricultural production. Also, government intervention in community healthcare facilities should provide, at least, basic primary health care for farm households so as not to allow ill-health impede production activities of farmers. Public enlightenment on birth control measures should also be pursued and directed at farm households to cushion the effect of large family sizes as it determines food security status of households. This will reduce the risk of overpopulation and the attendant food crisis risk particularly in view of the negative impact of large family size on the food security situation of rural households.

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