The Evaluation of Food Security Status and Profitability of Farming Households in Atyap Chiefdom, Zangon Kataf Local Government Area of Kaduna State, Nigeria

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Abstract

The study aimed at determining if family farming is profitable and estimates the food security status as well as the determinant factors of food security of the households in Atyap Chiefdom. Five (5) out of the sixteen (16) districts in the chiefdom were selected randomly for the study. Primary data was collected through a structured questionnaire. The following statistical tools were used to analyze the data namely; descriptive statistics, gross margin analysis, food security index and logit regression model. The findings revealed that the gross margins of maize, sorghum and soybean were N129,726.39, N96,631.84 and N559,679.78 per household respectively. The determinant factors of food security were analyzed using the logistic regression model. The results showed that 82 households (55%) and 67 households (45%) were food secure and food insecure respectively. The determinant factors of food security which were found to be significant at 1% level of significance were proportion of food sold (+0.000), disposable income (-0.186), age of household head (+0.026), and farm output (+0.000). At 5% level of significance, number of extension visits (-1.496) and number of male members of the household (+0.047) were significant while those that were significant at 10% level of significance were number of years of farming experience (+0.013), household size (+0.071) and farm income (+0.000). We concluded that family farming in the chiefdom is profitable as the gross margin estimates for some of the selected crops were high. Also, the food security status of some of the households was high as 55% of the households were found to be food secure. The major recommendation is that the Kaduna State Government and Zangon Kataf LGA should support agricultural extension adequately to enable the farmers benefit from it as this will enhance farm productivity, farm profitability thus ensuring that more households become food secure.

Background to the Study
Food consumption can be defined as the amount of food available for human consumption while the per capital food consumption over the world supply means the total food consumption divided by world population. Malnutrition has consequences for health and well being of children and adults as it has been found to disempower individuals by causing or aggravating illness, lowering educational attainment and diminishing the likelihood of skill acquisition (World Bank, 2007).

Food consumption and nutrient intake differ among households and individuals. These depend largely on food preferences, religion, food availability and purchasing power of the people in a given community. There are also different factors affecting the adequate nutrients intake by household members, including socio-economic, environmental and political factors (Abdalla, 2014). Ajala (2006) reported that finding the right balance between eating to maintain body function and eating to satisfy our appetite is a problem for many of us. World food production is presently inadequate to ensure a balanced diet for all people of all lands. Providing food to meet calorie needs is not enough, adequate protein is also required for normal maintenance of body tissues and functions and additionally for growth, maturation, pregnancy, lactation and recovery from disease. Supplies of protein are particularly scarce and costly for the populations of most developing countries. It is reported that malnutrition is the world's number one health problem which adversely affects mental and physical development, productivity, and the span of working years, all of which significantly influence the economic potential of the people (Campbell, 2003). Campbell (2003) also reported that more than 500 million children and perhaps an equal number of adults throughout the world are malnourished. An estimated 20 million people starve to death annually, although there are various degrees of starvation. It is accepted that starvation results in an adult when the daily calorie intake is consequently below 1600 calories. For children, starvation is demonstrated when individuals are below 60% of standard body weight for their age.

Food insecurity provides a unique measure of a household's physical and socio-economic lack of well being (Tarasuk and Vogt, 2009) with implications for public health responses and advocacy. Food insecurity is a significant public health problem globally. However, the prevalence of food insecurity varies from country to country and within countries, it is strongly associated with household's socio-economic status even though the local environment may also play an important role. Household food insecurity is experienced when there is uncertainty regarding, or a disruption in, food intake or eating patterns by at least one member of a household due to financial constraints (Bickel *et al.*, 2000, Coleman-Jensen, 2011). As a condition aligned with insufficient household resources that are necessary to obtain food in socially acceptable ways, it is more common in households with lower education, lower income, reliance on social assistance, or of people of aboriginal status where there are small children and where households are lone-parent led (McIntyre and Rondeau, 2008; Tarasuk and Vogt, 2009). Thus, as a household measure, food insecurity reflects an overall state of food access adequacy as household food insecurity is both of a public concern as well as of mental health concern among household members (Vozoeis and Tarasuk, 2003; Mcleod and Veall, 2006; Muldoon *et al.,* 2013). Therefore, it is as well an indicator of a household stress leading to family dysfunction (Hamelin *et al.,* 2002).

According to the Food and Agricultural Organization of the United Nations, food security is achieved when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1998; 2006). The lack of real data on food consumption is one of the limitations to realize the level of food sufficiency and security. This should encourage the study of food consumption and the carrying out of nutrition surveys in order to assess the real level of food consumption and nutrition intake in households. Where the per capita energy intake is below the FAO minimum energy requirements of 2,600Kcal, such situation causes widespread diseases, malnutrition, unavailability of food, inaccessibility to enough food and /or bad quantity of food intake (Abdalla, 2014). For the emergence of a meaningful national nutritional policy, a deliberate attempt to understanding issues of food security (status and determinants) of the Nigerian households is necessary and it is on this basis that the food security and determinants of calories and protein intake among households in Atyap Chiefdom of Zangon Kataf LGA, Kaduna State, Nigeria motivated the researchers to undertake this study.

Objectives of the Study
The objectives of the study are to:
  i. Determine the gross margin and returns per naira for some crops and livestock enterprises in the area.
  ii. Estimate the food security status of the households; and
  iii. Assess the determinant factors of food security in Atyap Chiefdom

Conceptual Framework
About 20% of the world population suffers from malnutrition due to lack of healthy living (World Bank, 2007). It is reported that the countries with the maximum food intake which is 3500 calories per person are the United States of America (USA), Portugal, France, Turkey, and so on while Canada, Mexico, Argentina, Australia have an intake of 3000 to 3500 calories per person. The countries with the minimum food intake are Afghanistan, Mongolia, Chad and Ethiopia, among others. The FAO recommended threshold (minimum) nutrient intake is 2440 Kcal and 65g of protein per day (FAO, 1992). The estimated daily food nutrient intake in Nigeria is 2148 calories and 58g of protein (Olayemi, 1998). The intake recommended for the study of poverty by the World Bank is still higher than what is obtainable in many countries (World Bank, 1986). The low figures of calories and protein intake indicate food nutrient deficiency which results in malnutrition and acute nutritional imbalance in diets for most people in developing countries.

One of the major problems facing Nigeria today is her inability to adequately provide enough or sufficient calories and protein to meet the nutritional requirement within manageable proportion. Also, another problem confronting the socio-economic development in Nigeria to present date is that of nutritional imbalance resulting from inadequate food supply and inadequate food nutrient consumption among the majority of the citizens, especially the rural dwellers. This problem which cannot be separated from the general developmental issues affecting our country has resulted in a wide range of diseases in humans and low productivity of goods and services, hence, leaving any country to be ranked as underdeveloped

(Ezeanyika, 2003). Available statistics have shown that more than 60% of the Nigerian citizens live below the poverty level with a per capita income of less than N160 which results in food shortages in terms of the quality and quantity of food to provide balanced diets (Durojaiye and Olubanjo, 1987).

Methodology

The Study Area

The study was conducted in Atyap land which is located between Latitude 9º40' and 10º0' North and Longitude 8º15' and 8º40' East in Zangon Kataf LGA of Kaduna State. It lies in the South-Eastern part of Kaduna State, Nigeria and surrounded by its neighbours. For example, in the East are the Chawai, to the South-East are the Maroa and Attakar, to the South are the Kagoro, to the North-West and to the West are the Bajju. The Ikulu also occupy part of the West but they predominate in the North-West. The far north is occupied by the Surubu of Lere LGA of the State (Achi, 2008).

The area lies completely within the tropics and therefore has a tropical climate. This area is alternated by two seasons – the dry season and the wet season. The dry season last for about 5 months from November to March while the rainy season last for 7 months from April to October with rainfall averaging 1600mm per annum. This relatively high amount of rainfall in this part of Kaduna State is a contributing factor in determining farm production. Also, the climate in Atyap land is influenced by its proximity to both the Kagoro hills and Jos Plateau. Atyap land falls within the Southern Guinea Savannah Zone (Achi, 2008).

Sampling Frame and Procedure

The Atyap chiefdom consist of 16 districts namely; Bafai District, Gora Gan District, Gora Gida (Kanai Mali) District, Gidan Zaki District, Jankasa District, Kibori District, Mabushi District, Magamiya District, Manchong District, Mayi-agwui District, Ruhogo District, Takanai District, Ungwar Gaiya District, Zaman Dabo District, Zango Urban District and Zonzon District.. A multi-stage sampling technique was adopted for the selection of respondents for this study. Five districts were selected out of the 16 districts of the chiefdom. These districts were Bafai District, Gidan Zaki District, Zonzon District, Jankasa District and Ungwar Gaiya District. In each district, 29 – 31 households were selected across the village areas based on the relative population of each of the districts. In all, 149 family households were selected for this study.

Data Collection

Primary data were collected through a field survey using a structured questionnaire. The field survey was conducted in February, 2015. The heads of the households provided the data on behalf of each household. The structured questionnaire was used to collect data on the socio-economic characteristics of each of the household heads, household farm assets types (number and cost), contribution of female members on the farm, farm constraints, crop production and household demographic parameters such as age, household size, education, land size and so on. The questionnaire was administered by enumerators trained for this purpose.

Tools of Analysis

Gross Margin Analysis

Gross Margin by definition is the difference between total revenue and total variable cost expressed on per hectare basis (Adebayo, 2006). This is usually based on the assumption that the fixed cost component is negligible as is the case with subsistence farming (Olukosi and Erhabor, 1988). For evaluating the profitability of farm production activities, budgetary analysis involving the computation of Gross Margin (GM) and Return Per Naira (RPN) was used. The monetized values of variable inputs and incidental production costs were subtracted from Gross Revenue (GR) to arrive at the GM. The RPN was calculated by finding the ratio of the GM to the Total Variable Cost (TVC) (Manza and Damisa, 2014). This was used to determine the profitability of food crop enterprises and livestock enterprises among the sampled farmers in Atyap Chiefdom. Algebraically, it is expressed thus,

$$GM = \sum P_i Q_i - \sum K_j X_j \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$
$$RPN = GM/TVC \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

Where GM = Gross Margin (? /ha), P_i = Unit Price of output (? /ha), Q_i = Quantity of output (Kg/ha), K_j = Unit cost of variable input j (? /ha), X_j = Quantity of variable input j (? /ha), $P_i Q_i$ = Total revenue (? /ha), $K_j X_j$ = Total cost associated with variable input j (? /ha), $\sum$ = Summation sign, RPN = Returns per Naira and TVC = Total variable cost.

Food Security Index

According to Olayemi (1998), 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 used was based on the FAO daily recommended level of calories and protein, which are 2260 Kcal and 65g respectively. To generate food security indices, the nutrient content of the food consumed was used to derive both calorie and protein availability.

$$\text{Food Security Index } (Z_i) = \frac{\text{Household daily per capita calorie \& protein consumed } (x)}{\text{Household daily per capita calorie \& protein required } (y)} \quad \dots\dots(3)$$

For a household to be food secure, Z_i must be greater than or equal to 1. The nutrient composition of commonly eaten foods in Nigeria was used to estimate the calorie and protein intake of households (Manza, 2014). This was carried out to achieve research objective (ii).

Model Specification for Calorie and Protein Intake (Logit Regression Model)

The binary logistic regression model intensively uses the dependent variable in the form of a dummy variable (discrete). The logistic regression model is expressed in terms of the probability of Y occurring which means the probability that the households belong in a certain category (Nyaga and Doppler, 2009). In this case, the binary logistic model is used to determine factors on the adequate levels of both calorie and protein intake.

The formulation of the quantitative relationship between the adequate levels of calorie and protein intake and the factors influencing these levels was established to predict whether the farm households had adequate levels of calorie and protein intake or not. This relationship was estimated by using the binary logistic regression model in order to estimate the probability (p_i) of the adequate levels of calorie and protein intake, given certain conditions. The following model gives the estimation of the probability of the combine adequate levels of calorie and protein intake (p_i):

$$P_i = \text{prob}(Y_i = 1) = \frac{1}{1 + e^{-(b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i)}} \quad \ldots\ldots\ldots\ldots (4)$$

$$\frac{e^{-(b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i)}}{1 + e^{-(b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i)}}$$

Similarly, the probability that the households consumed inadequate levels of calories and protein intake takes a 0 value if $(1 - P_i)$:

$$P_i = \text{prob}(Y_i = 0) = 1 - \text{Prob}(Y_i = 1) = \frac{1}{1 + e^{-(b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i)}} \quad \ldots\ldots (5)$$

The likelihood of being food secure is given by the odds ratio in support of the consumption of combine levels of caloric and protein intake by dividing (4) by (5) as follows:

$$\frac{P_i}{1 - P_i} = e^{-(b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i)} \quad \ldots\ldots\ldots\ldots\ldots (6)$$

Taking the normal log in both sides of equation (6) we get:

$$\text{Log}\frac{P_i}{1 - P_i} = (b_0 + b_i X_i \ldots \ldots + b_j X_j + e_i) \quad \ldots\ldots\ldots\ldots\ldots (7)$$

Where:
P_i = means the vector of probabilities of the adequate level of nutrient intake, which is measured as the dummy variable and takes a value 0 and 1.
X_i = represents the explanatory variable of specific factors including the socio-economic and farming characteristics of the farm households.
$_0$ = is the constant (intercept)
$_{i-j}$ = is vector of parameters to be estimated
e = is the standard base of the systems of natural logarithms (e = 2.71828)
$_i$ = means the stochastic disturbance term and is estimated to be normal distribution (Greene, 2003).

The binary logistic regression model was fitted to obtain the estimates of the odds ratio for each of the coefficients (Exp ($_{i_j}$), which is equal to $\text{Log}\dfrac{P_i}{1-P_i}$. The specification model of the adequate level of combine calorie and protein intake is given as:

$$P_i = \text{prob} (E1_i = 1) = \frac{1}{1+e^{-(b_0 + b_i + e_i)}} \quad\quad \text{...................... (8)}$$

If L, the logit, is positive, it means that when the value of the regressor(s) increases, the odds that the regressands equal 1 increases. If L on the other hand is negative, the odds that the regressands equal 1 decreases the value as X increases (Gujarati and Sangeetha, 2008).

The dependent variable is food security while the vector of explanatory (independent) variables include X_1 = farming experience in years, X_2 = proportion of food sold in Kg, X_3 = male members of the household, X_4 = disposable income in Naira, X_5 = gender (1 = male and 0 = female), X_6 = age in years, X_7 = family size, X_8 = farm size in Ha, X_9 = distance to source of farm input in Km, X_{10} = use of modern farm inputs (Yes =1, No = 0), X_{11} = marital status of the household head (married = 1, single/widow = 0), X_{12} = number of extension visits, X_{13} = membership of cooperative society (yes = 1, no = 0), X_{14} = access to agricultural credit (yes = 1, no = 0), X_{15} = education (educated = 1, not educated = 0), X_{16} = farm income in Naira, X_{17} = other incomes in Naira, X_{18} = occupation (agriculture = 1, other profession = 0), X_{19} = farm output in Kg and X_{20} = participation in communal farming (yes = 1, no = 0). This was carried out to achieve objective (iii).

Results and Discussion
Farm Profitability
The gross margin analysis result for farming households in Atyap Chiefdom is shown in Table 1. The total variable costs (TVC) per hectare for maize, soybeans and sorghum were found to be ? 17,720.43, ? 21,623.98, ? 18,599.70 respectively. The TVC for the three crops were relatively higher than the TVC of ? 36,125.50/ha estimated by Ayuba and Adebayo (2014). Also, the gross revenue of ? 66,703.86/ha and gross margin of ? 30,578.36/ha estimated by them were lower than for each of the three crops studied which were ? 147,446.18 and ? 129,726.38 for maize; ? 581.303.76 and ? 559,679.78 for soybean; and ? 115,231.54 and ? 96,631.84 for sorghum. Similarly, the findings by Manza and Damisa (2014) showed that the TVC for PROSAB farmers and non-PROSAB farmers were ? 57,371.30 and ? 48,109.54 respectively which were also lower than our findings. Also, the gross margins for the PROSAB farmers as well as for the non -PROSAB farmers were ? 111,495.63 and ? 88,006.96 respectively which were also lower. Soybean was found to give the highest gross margin followed by maize and then sorghum. The return per Naira outlay was also highest for soybeans followed by maize and then sorghum. Generally, the gross margins for the crop enterprises showed that farming in the area is profitable. Similarly, the results of the study in Table 1 also shows estimates of gross margins for four major livestock enterprises in the area.

Cattle had a gross margin of ? 109,298.46 followed by goats with a gross margin of ? 51,660.87. Local chickens gave the lowest gross margin of ? 7,815.23 per household. Again like the crop enterprises, the gross margin for livestock enterprises showed that the livestock enterprises were profitable. The finding by Manza and Damisa (2014) found the total variable costs for livestock enterprises to be much smaller than the present finding. However, with regard to the gross margin, except for cattle which was found to be ? 109,298.46, the gross margin for PROSAB farmers (? 81,108.89) and non PROSAB farmers (? 91,736.76) were higher than the finding in Table 1.

Food Security Index
The result of the study in Table 2 shows the indices of food security status of the households studied. Of the 149 households studied, 82 (55%) were found to be food secure while 67 households (45%) were found to be food insecure. According to Health Canada (2008), in 2007-2008 for example, 7.7% of Canadian households were food insecure, and the prevalence of food insecurity among households led by female lone parents was 25%; twice that of households led by male lone parents (11.2%) and four times that of households led by couples (6.3%). The food security index for the secure households was estimated to be 1.27 while the food insecurity index was estimated to be 0.89 for food insecure households. The average daily calorie consumption was found to be 21,526.50 Kcal and 15,085.50 for the food secure and food insecure households respectively. The finding agrees with the work of Yahaya (2009) in Manza and Abdulsalam (2014) who found that 58.3% and 41.7% of the rural households in Soba LGA of Kaduna State were food secure and food insecure. 24,397.14 Kcal and 18730Kcal respectively were found to be the household daily calorie consumption for the food secure and food insecure households respectively. Yahaya (2009) also estimated the food security index (Z_i) as 1.47 and 0.69 for the food secure and food insecure households respectively.

Abdalla (2014) found that 18.5% and 66% of the rural households had adequate levels of energy and protein intake (i.e a situation where the actual level is greater than or equal to the required level for the total household members). Thus, about 81.5% of the rural households were found to be undernourished due to the inadequate energy intake. However, different outcomes were obtained from the study of Hashim (2008) who found that the adequate energy and protein intake for rural households were approximately 71.8% and 73.3% respectively. Also a study among the elderly in Botswana using a 24-hour food recall method found that none of the elderly had an adequate energy intake, although they had an adequate amount of protein intake (Maruapula and CK-Novakofski, 2010).

Determinant Factors of Food Security
The result of the study in Table 3 shows the determinant factors of food security in the area. Proportion of food sold (X_2), disposable income (X_4), age (X_6), and farm output (X_{19}) were found to be significant at 1% level of probability. Male members of the households (X_3) and extension contact with the households (X_{12}) were found to be significant at 5% level of significance while years of farming experience (X_1), family size (X_7) and farm income (X_{16}) were found to be significant at 10% level of significance. Proportion of food sold (X_2) had a

regression coefficient of 0.000 which implies that the less the food sold, the lower the probability of the household becoming food insecure. Conversely, the higher the proportion of the food sold the higher the probability of the food becoming food insecure.

Disposable income (X_4) had a regression coefficient of -0.186. The negative coefficient of disposable income (X_4) implies that the lower the disposable income the higher the probability of a household becoming food insecure. Access to agricultural credit (X_{14}) with a positive coefficient of 0.166 was not significant because very few households had access to agricultural credit in 2014.

Adebayo (2011) found farm size, educational status and access to market as the determinants of food security while Yahaya (2009) found household annual income, household size, quantity of food from own production, farm size, educational status of household head and access to market as determinants of food security. In the study by Abdalla (2014), it clearly showed that the socioeconomic factors consisting of the total household income, household size, education, and gender were the important factors that shaped the situation of energy intake among the farm households. Based on this, he concluded that the overall model was highly significant. This could be explained by the significant value of chi-square being about 69.59 at level p < 0.01 and the low level of log likelihood (-60.986). The total household income (SDG/year) was positively and highly significant with regards to the adequate level of energy intake (p < 0.01). The interpretation of the odds ratio was that the predicted change in odds for a unit increase in the predictor if the variables remain unchanged. The odds ratio of the total household income (SDG/year) was about 1.00101. This meant that with an increase of the total household income (SDG/year) by one SDG per year, this would lead to a 1.00101-fold increase in the odds that the household will consume an adequate level of caloric intake, all other variables remaining constant. This outcome was expected because an increase in household income meant an increase in access to food. Similar findings concerning the impact of the household's income on caloric intake was obtained from the study of Babatunde et al. (2007) who found that the higher the household income the higher the probability that the household would be food secure. The effect of income on energy intake was inconsistent with the outcome from the study of Omotesho et al. (2006); Babatunde and Martinetti (2010) and Babatunde and Qaim (2010) in rural Nigeria.

Abdalla (2014) also found that gender was negative and significant with regards to the adequate caloric intake at level p < 0.10. The odds ratio of gender was about 0.24430, meaning that being a male headed household would lead to a 0.24430 decrease in food security, implying that male headed households consume an adequate amount of caloric intake, all other variables remaining constant. This indicated that the female headed households contributed positively to food security. A dissimilar result was obtained by Babatunde and Qaim (2010) who reported an insignificant impact of being a male headed household on the food security status of the households. This outcome also disagreed with the findings from the study of Babatunde and Martinetti (2010) and Babatunde and Qaim (2010). They argued that being a male headed household positively influenced the household caloric supply per adult equivalent. Another study reflecting the impact of female-headed households on the adequacy of caloric consumption was obtained by Mauro et al., (2006). They pointed out that

female headed households positively influenced caloric consumption adequacy in Albania, but had no significant impact on the caloric consumption adequacy in Madagascar.

Conclusion

It was concluded that on the basis of the high gross margins for the three crop enterprises and the four livestock enterprises, farming in the area is profitable. 82 households (55%) out of the 149 households studied were found to be food secure. On the basis of these findings, the farmers could be encouraged to sustain their production capacity. The proportion of food sold, number of male members of the family, years of farming experience, family size, age, farm income and farm output all had positive coefficients and were significant at 1% and 10% probability implying that an increase in any of these will increase the possibility of achieving food security in the household.

Recommendations:

The following recommendations, among others, have been proffered:

1. The use of modern farm inputs should be increased by the farmers in order to enhance their food security. The Atyap Community Development Association (ACDA) should along with the Nenzit Microfinance Bank and the Kaduna State Agricultural Development Project ensure that farmers in the area have access to such inputs.
2. The cooperative groups and other farmer groups should work to ensure that farmers gain access to farm credit.
3. The ACDA should work closely with the State Basic Education Board (SUBEB) to provide basic education (adult literacy) to the farmers who currently lack basic education.

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Table 1: Estimated Gross Margin for Crop and Livestock Enterprises

Variable	Crop Enterprises			Livestock Enterprises			
	Maize	Soybean	Sorghum	Cattle	Goats	Pigs	Chicken
Mean Gross Revenue (₦)	147,446.81	581,303.76	115,231.54	160,387.29	75,270.07	71,600.00	28,201.49
Mean Total Variable Cost (₦)	17,720.43	21,623.98	18,599.70	51,088.83	23,609.20	29,080.07	7,815.23
Mean Gross Margin (₦)	129,726.38	559,679.78	96,631.84	109,298.46	51,660.87	42,519.93	20,386.60
Return Per Naira Outlay (₦)	7.32	25.88	5.20	2.14	2.19	1.46	2.61

Table 2: Indices of Food Security Status

Variable Households	Secured Households	In-secured Households
Food Security	82.00	67.00
Percent (%)	55.00	45.00
Index	1.27	0.89
Mean Household Size	7.50	7.50
Household Average Daily Calorie Consumption (Kcal)	21,526.50	15,085.50

Table 3: Logit Regression Analysis of the Determinants of Household Food Security

Variable	Coefficient	Standard Error	Significance
Farming Experience in years (X_1)	0.013	0.013	0.075***
Proportion of Food Sold (X_2)	0.000	0.000	0.000*
Male Members of the Household (X_3)	0.047	0.182	0.047**
Disposable Income in Naira (X_4)	-0.186	0.150	0.009*
Gender (X_5)	-0.981	1.452	0.269
Age in years (X_6)	0.026	0.039	0.010*
Household Size (X_7)	0.071	0.099	0.068***
Farm Size in Ha (X_8)	0.012	0.016	0.133
Use of Modern Inputs (X_9)	0.395	0.637	0.104
Distance to Source of Farm Input (X_{10})	0.036	0.159	0.671
Marital Status (X_{11})	-1.053	2.658	0.975
Extension Contact with Farmers (X_{12})	-1.496	0.776	0.037**
Membership of Cooperative Society (X_{13})	-0.362	0.709	0.270
Access to Credit (X_{14})	0.166	0.748	0.377
Education of Household Head (X_{15})	0.249	0.856	0.120
Farm Income (X_{16})	0.000	0.000	0.095***
Other Incomes (X_{17})	0.000	0.000	0.198
Occupation (X_{18})	-1.256	0.716	0.684

- 2 Log Likelihood   =   106.575
                R^2 =   61.6

*Significant at 1% level of probability; **Significant at 5% level of probability; ***Significant at 10% level of probability