

Original Research Article

Food Insecurity and its Determinants among Farming Households in Surulere Local Government Area of Oyo State

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Abstract: The study examined the determinants of household food insecurity in Surulere Local Government Area of Oyo State. Multistage random sample technique was used in the selection of the respondents. The result the mean age of the respondents was 50.91 years and that 94.17% were married with an average household size of 9 persons. Also, the respondents had an average of 30.21 farming experience and majority of the farmers in the study area were educated enough to enable them successfully adopt innovations to improve their productivity incomes and welfare. The mean farm size in the study area was 3.53 hectares. The results of the food security status revealed that majority (58.33%) of the respondents described their food security status to be secured while others (41.67%) were of the view that their food security status was not secured. The result of binary Probit regression analysis also indicated that age, sex and education had a significant effects on food security at $p < 0.05$ respectively. This study therefore concluded that since education is significant, farmers will be able to gain adequate knowledge on understanding the best ways of alleviating the problems of food security.

Keywords: Food Insecurity, Determinants, Farming household, Probit Regression.

INTRODUCTION

Household food insecurity is increasingly known to be a global health problem, especially in Sub-Saharan Africa. The Sustainable Development Goals (SDGs) have emphasised the urgent need to tackle food insecurity in achieving human rights by the year 2030. The first goal is to end 'poverty in all its forms everywhere', and the second is to 'end hunger, achieve food security, improved nutrition, and promote sustainable agriculture'; both goals have been clearly stated as the frontline of the SDGs, Drammeh, Hamid, and Rohana [1].

Food security is widely seen as access of all people at all times to enough food for an active life, while food insecurity is the inability of a household or individuals to meet the required consumption levels in the face of fluctuating production, price and income [2]. A household is said to be food secure if it can reliably gain access to food in sufficient quantity and quality for household members to enjoy a healthy and active life [3]. Rural food insecurity is one of the defining features of rural poverty, Agidew, and Singh [4]. They went further to add that food is not only a basic need, it also provides the physiological foundation upon which other considerations and human activities are structured. In Nigeria, food security is both a national objective and a challenge. The subject of food insecurity has attracted attention the world over, given its direct link to malnutrition which leads to poor physical and mental health. According to Drammeh, Hamid, and Rohana [1], food insecurity is linked to acute and chronic physical and mental health conditions such as higher levels of stress, anxiety, irritability, social isolation, heightened emotional responsiveness, eating disorders, depression as well as impaired cognitive abilities.

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Food security defined as access by all people at all times to enough food for an active and healthy life, is one of the major factors necessary for a household members, particularly children, to be healthy and well-nourished [5]. Food insecurity, in turn, refers to limited or uncertain physical and economic access to secure sufficient quantities of nutritionally adequate and safe foods in socially acceptable ways to allow household members to sustain active and healthy living [6, 7]. By this definition, household food insecurity has two broad components: insufficient access to a nutritionally adequate and safe food supply at the household level [7, 8], and inadequate utilization of these foods by household members. Household food insecurity can negatively affect food consumption, including reduced dietary variety, nutrient intake, and nutritional status of household members.

Food security ranks the top most among development problems facing Nigeria. The level of food insecurity has continued to rise steadily since the 1986 to about 41% in 2004 [9]. According to Barrett [3], the lack of food excludes people to practice what other people are doing every time. However, large amount of food production in the world does not ensure any country's food security. Moreover, huge production of food at national level does not guarantee for the household food security. This may be due to unfair distribution of resources, variation in production functions, and motives for productivity. That is why even if the production increases through time; food insecurity, malnutrition and hunger remain the main agenda and much more serious problems in the world today.

Despite much effort by the government of Nigeria to boost food production, food insecurity remains the main problem in our country and the need for food importation become increasing. The government needs to look for a way to reduce this situation. This is because Nigeria is still characterized by high reliance on food imports. Malnutrition is widespread in the entire country and rural areas are especially vulnerable to chronic food shortages, malnutrition, unbalanced nutrition, erratic food supply, poor quality foods, high food costs and even total lack of food. This phenomenon cuts across all age groups and categories of individuals in the rural areas [10]. There is a high level of malnutrition among children in rural Nigeria; the figures differ with geopolitical zones, with 56 percent reported in a rural area of South West and 84.3 percent in three rural communities in the northern part of Nigeria [11, 12].

Furthermore, the available historical series show that, about 852 million people world-wide were chronically undernourished between 1980-2005. About 800 million of this people live in developing countries [13]. Most of the studies that have been done so far on the issues of food security are very general and consider the problem from national, regional, and district points of view, Agidew, and Singh [4]. While aggregate data are generally available at the national level, little work has been done to understand the food security problems at the household level. Having national food balance data is not sufficient to understand determinants of food insecurity in rural farm households in the country. Most agricultural production comes from millions of rural households. Despite the increasing global concern of improving food security, the nature and extent of food security at the household level in rural areas are not well documented.

Moreover, available statistics show that at least 41 percent of the Nigerian populations are food insecure with 16% being severely undernourished [10]. The incidence of household food insecurity in Nigeria rose from 18 percent in 1986 to over 40 percent in 2005 [9]. It is essential therefore, to have the analysis of food insecurity done in the household level to understand the actual demand for food and thus its effect on the food security situation on households. This will be of immense help to understand the different household characteristics that are specific to food security and their implication on the food related issues. This study therefore, examined the determinant of household food insecurity in the study area.

METHODOLOGY

The study was conducted in Surulere Local Government Area in Ogbomoso Agricultural Zone of Oyo State. This Local Government area comprises of different villages which are rural in nature. The village is located approximately on the intersection of latitude $8^{\circ}08'$ North and longitude $4^{\circ}15'$ East. It is about 105km North East of Ibadan (state capital), 58km North West of Oyo town. The population was approximately 166,034 as of 2006 census, an area of 23km² with about 30% civil servant who as well engaged in farming, and the other 60% are into full time farming (both crops and animal production). Primary data was used for the study area. Data were collected with the use of well-structured questionnaire which was developed based on the objectives of the study to collect information from the selected respondents through one on one interview approach.

Multistage random sample technique was used in the selection of the respondents. The first stage involved the purposive selection of Surulere Local Government. This is necessitated because of the rurality of the local government area. The second stage involved random selection of 5 wards out of the 10 wards in the local government. The third stage involved random selection of 2 villages from each wards selected making a total of 10 villages. The last stage involved random and proportional selection of 12 respondents from each village making a total of 120 respondents.

ANALYTICAL FRAMEWORK

The household food security can be modeled in the framework of consumer demand and production analysis following the Agricultural Household Models (AHMs) [4]. In AHM models an agricultural household is both a consumer and a producer. Given the assumption of “separability” of consumption variables and production variables, the AHM model household can separate production decisions from the consumption preferences—first it solves the production decisions (independent of consumption preferences) and then it solves the consumption decisions (based on optimal production decisions). The household utility function is specified as

$$U = U(F_i, F_m, I; D_h)$$

Where U is a utility function that is assumed to be well behaved (twice differentiable, increasing in its arguments and strictly quasi-concave); F_i is a vector of home-produced goods consumed by the household; F_m is a vector of market purchased goods consumed by the household; and I is leisure. Here D_h is the demographic characteristics of the household.

The household, as both producer and consumer, is assumed to maximize its utility from the consumption of the goods subject to farm production, income and time constraint such as

$$G(FQ_i, L, A^o, K^o) = 0$$

$$P_i(PQ_i - F_i) - P_m P_m - W(L - L_f) + N = 0$$

$$T = L_f + 1$$

where $G(\cdot)$ is an implicit production function that is assumed to be well-behaved (twice differentiable, increasing in outputs, decreasing in inputs and strictly convex); Q_i is a vector of quantities of goods produced on-farm; L is total labour input to the farm; A^o is the household’s fixed quantity of land; K^o is the fixed stock of capital; P_i is the price of good i; P_m is the price of market-purchased good; $(Q_i - F_i)$ is the marketed surplus of good i; w is the wage rate; L_f is the household labor supply for on-farm use; N is non-farm income that adjusts to ensure that equation(3) is zero; T is the total time available to the household to allocate between work and leisure.

Given the assumption of “separability,” the production side can be solved first. The first-order conditions for input demand (L^*) and output supply (Q^*) in terms of all prices, wage rate, fixed land and capital as,

$$L^* = L^*(P_i, W, A^o, K^o)$$

$$Q^* = Q^*(P_i, W, A^o, K^o)$$

And Rearranging equations (3) and (4) and putting L^* and Q^* into the rearranged equation,

$$Y^* = P_i Q_i^* + WT - WL^* + N$$

And

$$Y^* = WT + \pi^*(P_i, W, A^o, K^o) + N$$

Where Y^* is “full” income under the assumption of maximized profit π^* . Now, the first-order conditions for consumption demand can be solved for in terms of prices, wage rate and income as—

$$F_k = F_k(P_i, P_m, W, Y^*)$$

(Here $k=i,m$). Incorporating the household characteristics (D_i), the demand for food can be rewritten as,

$$F_k = F_k[P_i, P_m, W, Y^*(W, A^o, K^o, N), D_h]$$

For the purpose of this study, food security index will be use to analyze household food security status. In food security index, food security line will be estimated from household monthly expenditure on food items. Any household spending above 2/3 of food security line will be classified as food insecure while those below the 2/3 of food security line will be classified as food secure.

The food security index is given as:

$$F_i = \frac{\text{per capita food expenditure for the } i\text{th households}}{2/3 \text{ mean per capita food expenditure in all households}}$$

Where

$$F_i = \text{Food security index}$$

When $F_i \geq 1 = \text{food secure } i\text{th household}$

$$F_i \leq 1 = \text{food insecure } i\text{th household.}$$

A food secure household is therefore that whose per capita monthly food expenditure falls above or is equal to two-third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure

Probit Regression Model was used to analyse the determinant factors of household food security status in the study area.

$$P(Y = 1) = F(XB) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{XB} e^{-\frac{(XB)^2}{2}} dx$$

Equation 2

$$X = (1, x_{1i}, x_{2i}, \dots, x_{ki})$$

$$\beta' = \beta_0, \beta_1, \dots, \beta_k$$

The dependent variable is: Food security Status (secured = 1 and insecure = 0)

And the independent variables are:

Y_i = Dependent variable

X_i = Vector of explanatory variables

β = Vector of respective parameters

ℓ = Independently distributed error term

Thus, the explanatory variables in the regression analysis were and measured as;

X_1 = Age (in years)

X_2 = Marital status (Married = 1, Single, Divorced or Widowed = 0)

X_3 = Gender (Female = 1, Male = 0)

X_4 = Education

X_5 = Household size

X_6 = Extension Visit

X_7 = Family Labour

X_8 = Hired Labour

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

The result in Table 1 showed that 9.17% of the respondents were in the age range of 20-40 years, 85.00% were in the age bracket of 41-60 years, the mean age of the respondents in the study area was 50.91 years, which was in agreement with some studies [15, 16]. About 56.67% of the respondents were male while 43.33% of them were female. This was an indication that male farmers are more involved in farming business than female counterparts which could be attributed to the energy/effort required for efficient management practices. This result disagrees with the work of Matsane and Oyekale [17] where 59.6% of the respondents were female, and agrees with the work of Oladiran *et al.*, [18] where 82.9% of the respondents were male. The result on of the marital status revealed that shows that 1.67% of the respondents were single, 94.17% were married and 4.17% of them were divorced. This implication of this is that most of the respondents in the study area were married. This will give them additional opportunity of having some assistance in their farming business. A large family size is important in the supply of farm labor in farming communities especially in Nigeria where farmers depend on human manual labour. Although, in a situation where the members of a family are

mainly young children of school age and old family members, a large family size may not contribute much to farm production because they may be unable to contribute the much needed labour for farm operations. This study indicated that the mean household size of the respondents in the study area was 9 persons and this study corroborates with the work of Global Hunger [19] where the average family size was 6.2 and Oladiran *et al.*, [18] where the mean household size was 6. The mean farming experience of the respondents was 30.21 years and this is in support of the work of Onyekuru [5]. Finally, analysis of the educational levels of respondents in the study area showed that 41.67% of the farmers had primary education, 44.17% had secondary education while 14.17% had tertiary education. Thus one can also conclude that majority of the farmers in the study area were educated enough to enable them successfully adopt innovations to improve their productivity incomes and welfare. This corroborates with the findings of Rios *et al.* [20] where majority of respondents had primary and secondary education in their community.

Table-1: Socioeconomic Characteristic of the Respondents, n = 120

Variable	Frequency	Percentage
Age		
21-40	11	9.17
41-60	102	85
>60	7	5.83
Sex		
Female	52	43.33
Male	68	56.67
Marital Status		
Single	2	1.67
Married	113	94.17
Divorced	5	4.17
Household Size		
<=5	38	31.67
6-10	55	45.83
>10	27	22.5
Farming Experience		
<=10	1	0.83
11-20	13	10.83
21-30	56	46.67
31-40	48	40
>40	2	1.67
Education		
1 - 6	50	41.67
7 - 12	53	44.17
>12	17	14.17

Source: Field Survey, 2018

Food Security Status of the Respondents

The results of the food security status as stated in Table 2 revealed that majority 58.33% of the respondents were food security while others (41.67%) were not secured.

Table-2: Distribution of the Respondents according to Food security Status

Food security status	Frequency	Percentage
Non-Food secure	50	41.7
Food secure	70	58.3
Total	120	100.0

Source: Field Survey, 2018

Probit Regression Result: Determinant of Food Security

The results of the Probit likelihood regression model indicated that the overall predictive power of the model (34.51%) is quite high, (Table 3) while the significant Chi square ($p < 0.01$) is indicative of compatible with access to credit.

As anticipated, farming experience had a positive and significant relationship at ($p < 0.1$). This implies that the probability of being food secured increases by the number of years of experience in farming of a farmer in the study area as compared with those who have the lower years of experience in farming which are likely to be food insecure. This

may be due to relatively farmers who have longer years of experience may develop the confidence in handling the risk, skills in technology application. Different studies have agreed with this argument. For instance, Legesse [21], Kidane [22] and Melaku [23] have described the positive relationship of farming experience with food security as perhaps the single most important resource, as it is a base for any economic activity especially in rural and agricultural sector. Farmer's age influences farmers' decision to be more food secured or not. The result further indicated that age of the farmer had influenced on food security significantly and negatively at ($p < 0.05$). The result in Table 3 also shows that as age of the farmers increased by one unit the probability of being food secured increases but at a decreasing rate (likelihood of being food insecure). This is because the older the farmer becomes the less likelihood he takes risk. A younger farmer who has relatively large size of farmland will not hesitate to try new ways of doing agricultural activities. This will motivate ones innovativeness. The result of the study also revealed that gender of the farmer (sex) increases the probability of being food secured and this implies that male farmers are likely able to be more food secured than their female counterpart. Education was found to influence farmer's ability to be more food secured positively and significantly at ($p < 0.05$). This result was found to be in conformity to the hypothesis set earlier. In addition, family labour was found to influence food security status household head positively and significantly at ($p < 0.05$) and reduce the probability of being food insecure. Moreover, hired labour was found to influence the food security status of the household head negatively and significantly at ($p < 0.05$).

Table-3: Determinant of Food Security

Food Security	Coefficients	Std. Err.	z	P-value	Mfx
Age	-0.96989	0.488061	-1.99**	0.047	0.045
Age2	0.009238	0.004742	1.95	0.051	0.049
Sex	3.064874	0.769514	3.98	0.000	0.000
Primary occupation	-0.14702	0.668704	-0.22	0.826	0.826
Education	0.060893	0.076054	0.8**	0.023	0.020
Household size	-0.29251	0.383935	-0.76	0.446	0.439
Extension visit	-1.10528	0.984409	-1.12	0.262	0.241
Number of family labour	0.180564	0.087887	2.05**	0.004	0.045
Number of hired labour	-0.26513	0.135201	-1.96**	0.005	0.031
Constant	25.61079	12.26592	2.09	0.037	
Number of Observation	118				
LR ² (10)	51.18				
Prob > chi ²	0.000				
Pseudo R ²	0.3451				

Source: Field Survey, 2018

*** Significant at 1%, ** significant at 5%, * significant at 10%

Mfx = Marginal Effect

CONCLUSION

This study concluded that since farming experience, age of the farmers and family labour was found to influence food security status of household head positively and significantly at farmers should engage more of the service of hired labour according to the size of the farm and in addition, Farmers should form cooperative society in order to boost their finance while government should subsidized input for the farmers

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