



## Determinants of Household Food Security Status among Farmers in Kaura Local Government Area of Kaduna State

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### Abstract

The study analysed the determinants of household food security among farmers in Kaura Local government Area of Kaduna State. Primary data were used for the study and were collected using structured questionnaire with household heads as the sampling unit. A total sample size of 100 farmer households were selected through simple random sampling, representing 20% of the sample frame of 502. Logit regression model was used to analyse the determinants of farm household food security status. Results of the logit regression revealed that farming experience and quantity of food produced both had a positive coefficient and were significant at 1% level of probability while household income had a positive coefficient and was significant at 10% level of probability. The constraints faced by the farmers to achieving food security in their households are low income, lack of access to credit, high cost of improved technology, and low productivity. It is recommended that farmers should be linked with financial institutions through extension agents in order to secure loans from the banks. Also, farmers should be encouraged to form cooperative groups so that they can share ideas and disseminate information among them, as this could improve their production. Similarly, improved technologies such as seeds should be made available to the farmers at a subsidized price by the Local Government. This could also help to boost their productivity and income generation as well.

**Keywords:** Food security, Farmers, Households, Status, Kaura, Kaduna State.

### Introduction

Nigeria is an agrarian country with about 70 percent of the population engaged in agriculture production most of which are engage in small scale farming using traditional methods and local tools, despite the rapidly growing oil industry in Nigeria, agriculture still accounts for 40 percent of the GDP (Ugwu, 2011). The major agricultural commodities, by production quantity, are cassava, yams, maize, sorghum, vegetables, rice, citrus, fruit, groundnuts, and sweet potatoes (FAO, 2011). Agricultural productivity is showing signs of recovery, after decades of decline, but it is happening too slowly to meet the demands of a rapidly growing urban population (IFPRI, 2011).

A critical issue in the development of a nation is the availability of food for the populace. Hence food becomes important in any consideration of the sustainability of the wealth of a nation and therefore the need for food security (Osundare, 2009). Being a critical factor of economic growth and development of a nation, food security has evolve a global concern that calls for the need to evolve strategies that are workable and sustainable for or possibly eliminating the obstacle against full realization of universal food security (Osundare, 2009).

World Bank (2006) looked at food security as access by all people at all times to enough food for an active, healthy life. Food security is thus people oriented and it implies a situation in which all households have both physical and economic access to adequate food for all members and households are not at risk of losing such. Food security exists when all people at all- time 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 (Nwaniki, 2007; FAO, 2009). Food security comprises of different component including availability, access, utilization and stability. Food availability means the supply of food through production, distribution and exchange, food access refers to affordability and allocation of food, as well as the preferences of individuals and households, utilization has to do with consumption pattern by individuals while stability of food refers to the ability to obtain food over time (FAO, 2009).

According to the Food and Agriculture Organization (FAO, 2012), food security "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". Household food security exists when all members, at all times, have access to enough food for an active, healthy life (USDA, 2005). Food security incorporates a measure of resilience to future disruption or unavailability of critical food supply due to various risk factors including droughts, shipping disruptions, fuel shortages, economic instability, and wars.

Eme *et al.* (2014) indicated that for food security to be attained, appropriate adaptation measures to climate change need to be taken within the global agricultural environment. They further stated that food security has to do with the absence of threats of hunger or malnutrition people face in their lives. In a broad sense, it entails safety from basic physiological needs. The lack of safety will be manifested in chronic hunger or starvation and malnutrition. For the achievement and realization of any goals and objectives aimed at improving the food security status of any region, a requirement of solid planning and setting of realistic targets is essential. Therefore the study specifically assessed the food security status of farm households; examined the determinants of farm household food security status and identified the constraints to food security among farmers in the study area.

## **Methodology**

### **The Study Area**

The study was conducted in Kaura Local government Area (L.G.A) of Kaduna State. Kaura is situated between longitudes 9<sup>0</sup> and 30' East and latitude 9<sup>0</sup> and 11' North. The area lies on average altitude 640m (Kaura L.G.A Official Report, 2006). Kaura L.G.A lies in the Northern Guinea Savannah characterised with savannah woodland vegetation and underlying grass species (Abaje and Giwa, 2007). The area has two seasons that is., the wet and dry seasons with an average annual rainfall of 1800mm. The farming systems practiced in this area are crop and livestock production. Kaura L.G.A has an estimated population of 222, 579 and land mass of 485 km<sup>2</sup> (Kaura L.G.A Official Report, 2006). There are 10 wards in Kaura L.G.A comprising of Aban, Bondon, Fada, Kaura, Kukum, Kadarko, Mallagum, Monchok, Kpark and Zankan.

### **Sampling Procedure and Sample Size**

Simple random sampling was used to select four wards namely; Kaura, Mallagum, Monchok and Fada for the study. The population farm households obtained from the ward (*Maianguwa*) heads was 501. This constitutes 140 households from Kaura ward, 126 from Mallagum, 131 from Manchok, and 104 from Fada. Random sampling was used to select 100 respondents from these wards representing 20% of the population of farm households in the four wards.

### **Data Collection and Analytical Techniques**

Primary data was be used for this study. Data were collected using structured interview schedule. The information collected include: the food security status of farm households, the determinants of farm households food security status and the constraint to food security among farmers. The household heads were the sampling units of this study.

Data for this study were analyzed using descriptive and inferential statistics. Descriptive statistics and logit regression model was used to achieve the objectives of the study.

### **Logit Regression Model**

The logit regression model is a technique that is used in estimating the probability of an event that can take one or two values. In other words, it is a predictive model that can be used when the target variable is a categorical variable with two categories (binary or dichotomous variable), for example yes or no.

The logit model is based on the cumulative logistic distribution function as expressed by Gujarati (2004). The formula is expressed as follows:

$$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_9 X_9$$

Where Z is a theoretical or an observable variable in the sense that although, X's are generated from the field, the B's are not observable. In order to obtain the value of Z, the likelihood of observing the sample needs to be formed by introducing a dichotomous response variable  $Y_i$  such that:

$$Y_i = \alpha + B_1 X_1 + B_2 X_2 + \dots + B_9 X_9$$

Where;  $Y_i$  = Household food security status

$$Y_i = \begin{cases} 1 & \text{if households are food secured} \\ 0 & \text{if households are food insecure} \end{cases}$$

$X_1 - X_9$  = independent variables     $\alpha$  = constant     $\beta_1 - \beta_9$  = coefficients

$X_1$  = household income (Naira)     $X_2$  = household farm size (Hectare, (Ha))

$X_3$  = age of household head (Years)     $X_4$  = marital status (married = 1, single = 0)

$X_5$  = educational status of household's head (Years)     $X_6$  = household size (Number)

$X_7$  = access to consumable credit (Yes = 1 or No = 0)     $X_8$  = farming experience (Years)

$X_9$  = quantity of food produced from own production (Kg)

### Measurement and Definition of Variables

**Independent Variables:** These are the socio-economic characteristics of the farm households and they are defined as follows;

Household income ( $X_1$ ): This refers to the sum total of the earnings of a household in a year from farm and off-farm sources. The income is expected to boost household's food production and also access to more quantity and quality food. It was measured in naira domination.

Household farm size ( $X_2$ ): It is the total farm land cultivated by the household. It is thus expected that farm household with larger farmland are more likely to be food secure than those with smaller farm land (i.e. the larger the farm land the higher the production level). It is measured in hectares.

Age of household head ( $X_3$ ): This is measured in years, and it is defined as the number of years from birth date to the present. The age of household's head is expected to have an impact on his labour supply and food production and also in his ability to seek and obtain off-farm jobs and income which will increase household income.

Marital status ( $X_4$ ): This entails the marriage status of the household's head i.e. whether the household is married to a wife or wives or not married at all. Individual who are married have a sense of responsibility in taking care of their families more than unmarried individuals. This was measured as married = 1, single = 0.

Educational status of household's head ( $X_5$ ): Education is a social capital which could impact positively on the household ability to take good and well informed production and nutritional decision. It is the number of years spent in schooling and it was measured in years.

Household size ( $X_6$ ): It is defined as the number of persons living in a given household including relatives and adopted individuals. It is expected to have a negative effect on food security since food requirement will increase as household size is increased. This was measured by summing up the number of people in the household.

Access to credit ( $X_7$ ): This is the ability of the household to obtain credit for household consumption either from cooperatives, government, friends and relatives and money lenders. Credit could increase household income in the short run and allow it to possess and consume more food. It was measured by assigning yes = 1 and no = 0

Farmers experience ( $X_8$ ): It is the number of years the farmer is engaged in farm production. It is expected that a farmer who have been in the farming business for long will possess the

technical know-how to deal with uncertainties and also to have a more efficient coping strategies during long and short periods of scarcity.

Quantity of food produced from own production ( $X_9$ ): This is the total quantity of food crop produced by the farmer. It was measured in kilogram.

#### **Dependent Variable**

Food security status (Y): Food security status for the purpose of this study will be defined based on the availability of food that is, the ability to provide food for the family from one cropping season to the next. If a farmer is able to provide sufficient (3 square meals) for the family without buying in the market for one year (12 months); the household is regarded as food secured. While those that cannot take up to one year without buying in the market was regarded as food insecure.

Therefore food security status will be measured based on the number of months that the household is food secured.

### **Results and Discussion**

#### **Food Security Status of Household**

The research revealed that 18% of the respondents were food secured, that is, they were able to feed their family from what they produced for 12 months without buying from the market while 82% of the respondents were food insecure (Table 1). That is, they were unable to feed their family for 12 months from what they produced without sourcing for food elsewhere. The result could however be said to have conformed with the works of Babatunde *et al.* (2007), Melissa (2010) and Kuwornu *et al.* (2011) who found a majority of the respondents in their study location to be food insecure with fewer people been food secured.

#### **The Determinants of Farm Household Food Security Status**

The socio-economic determinants of household food security status considered in this study are household income ( $X_1$ ), household farm size ( $X_2$ ), age of household head ( $X_3$ ), marital status of household head ( $X_4$ ), educational status of household head ( $X_5$ ), household size ( $X_6$ ), access to credit ( $X_7$ ), farmers experience ( $X_8$ ) and quantity of food produced from own production ( $X_9$ ).

The result of the Logit regression model (Table 2) shows that farming experience ( $X_8$ ) and quantity of food produced ( $X_9$ ) were significant at 1% level of probability while household income ( $X_1$ ) was significant at 10% level of probability. Hence only three variables out of nine were significant.

Farming experience ( $X_8$ ) had a positive coefficient (0.055). This implies that an increase in years of experience of the respondents is likely to increase the food security status of the household. This could be because; with more experience the farmer is likely to manage the farm better. This result correlates with the study of Nmadu *et al.* (2012) and Babatunde *et al.* (2007) who find a positive relationship between food security status and years of farmers experience in farming.

Quantity of food produced ( $X_9$ ) showed a positive coefficient (0.090) indicating that as the quantity of food produced increases, there is likelihood for the food security status of the household to increase. This result agrees with the work of Otu *et al.* (2014) and Liverpool-Tasie *et al.* (2011) as the authors found out that agricultural productivity affects food security directly by increasing the available supply of food.

Household income had a positive coefficient (0.017) too, meaning that increase in household income could lead to increase in the food security status of the household. This could be because, the more the income of the farmer, the more food he is able to produce. This is in support with the study of Omotesho *et al.* (2007) and Babatunde *et al.* (2007) who both stated a positive relationship between household income and food security status of household.

The Chi-square value was 41% and it was significant at 1% level of probability. This implies

that a reasonable percentage of the variable fit into the model. The percentage accurate prediction was 61% and the log likelihood function indicated that 92% of the total variation in the dependent variable was explained by the independent variables

#### **Constraint to food security in the study area**

The constraint faced by the respondents to the food security of their households as shown in Table 3 showed that 95% of the respondents lack access to credit, 94% of the respondents indicated high cost of technology as constraint to their food security. In addition, 71% of the respondents viewed low income as constraint to their food security, 66% indicated low productivity while only 16% of the respondents saw inadequate farm land and high cost of labour respectively as their constraint to food security. These findings differ from those of Omotosho *et al.* (2007), Umar (2011) and Akinsanmi and Doppler (2005) who discovered constraints such as family size, educational level, farm size, lack of access to consumable loans, low financial power to acquire farm inputs, gender inequality towards women, poor returns to land, non-agricultural uses of land competing with agricultural uses, abandonment of land to the elderly as youth move to the urban areas in search of better living standards and irrelevant off-farm jobs which have been proven not to adequately meet household needs. This difference could be as a result of locations.

#### **Conclusion and Recommendation**

The study revealed the food security status of the farm households in the study area that 18% of the respondents were food secured (i.e. they were able to feed their family from what they produced for 12 months without buying food from the market) while 82% were food insecure (i.e. they were unable to feed their family from what they produced for 12 months without sourcing for food elsewhere).

The result from the logit regression model revealed that farming experience ( $X_8$ ), quantity of food produced ( $X_9$ ) and household income ( $X_{10}$ ) variables statistically influenced farm households food security while household farm size, age of household head, marital status, educational status, household size and access to credit variables were found to be insignificant. The major constraints faced by the farmers to achieving food security in their households are low income, lack of access to credit, high cost of improved technology, and low productivity. Based on these findings, it is recommended that farmers should be linked with financial institutions through extension agents in order to secure loans from the bank. This could help to increase their production and income as well. Also, farmers should be encouraged to form cooperative groups so that they can share ideas and disseminate information among them, as this could improve their production. Similarly, improved technologies such as seeds should be made available to the farmers at a subsidized price by the Local Government. This could also help to boost their productivity and income as well.

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**Table 1: Distribution of respondents according to their food security status**

Status	Frequency	Percentage (%)
Food secured ( $\geq 12$ months)	18	18
Food insecure (< 12 months)	82	82
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 2: Logit regression for determinants of household food security status**

Variables	Coefficient	Standard Error	t Value
Constant ( $\alpha$ )	-8.663	2.308	-3.753***
Household income ( $X_1$ )	.017	.010	1.7*
Household farm size ( $X_2$ )	.052	.088	5.909
Age of household head ( $X_3$ )	.022	.037	0.595
Marital status ( $X_4$ )	-.485	.980	-0.495
Educational status ( $X_5$ )	.182	.146	1.247
Household size ( $X_6$ )	.145	.103	1.408
Access to credit ( $X_7$ )	17.250	1.73E4	9.971
Farmers experience ( $X_8$ )	.055	.021	2.619***
Quantity of food produced ( $X_9$ )	.090	.022	4.091***
Sample size	100		
Log likelihood function	92.291		
Chi – square value	41.458***		
Degree of freedom	9		
Percentage predicted correct	61%		

NB: Significant at 1% = \*\*\* Significant at 5% = \*\*

**Table 3: Distribution according to constraints to food security of the respondents**

Constraints	Frequency*	Percentage
Low income	71	71
Lack of access to credit	95	95
Inadequate farm land	16	16
High cost of improved technology	94	94
High cost of labour	16	16
Low productivity	66	66

\*Multiple responses