



DETERMINANTS OF FOOD SECURITY STATUS OF SESAME FARMING HOUSEHOLD IN BAUCHI STATE OF NIGERIA

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ABSTRACT

This study examined the food security status of sesame (*Sesamun indicum*, L.) farming households in Bauchi State, Nigeria. A multistage sampling technique was used to select 340 sesame farmers from the three agricultural zone of Bauchi State. Both descriptive and inferential statistics were used in the analysis of data. The results revealed that the mean age of sesame farming households was 46 years which implies that they were within their active age and therefore labour supply to their farms was not a problem. Average household size of 9 persons was recorded, indicating relatively large person per household that means there are more mouth to feed in each household. Except all or majority of household members are active, dependency ratio will be high. The results also showed that there was food insecurity in the study area, with 60.6% of the sesame farming households being food insecure. The variables income and household size were significant at $P < 0.01$ with income having positive coefficient while household size had negative coefficient. Farm size, price of major staple food, current level of food consumption and continuous accessibility were significant at $P < 0.05$, Farm size, current level of food consumption and continuous accessibility had positive coefficients but price had negative coefficient. From the result of the study, household income, household size, farm size, price of food, level of food consumption in terms of number of meals per day and continuous accessibility were the determinant of food security status in the study area. Based on the findings the study recommend, among other things, ways to improve the income of farm household via agricultural based poverty alleviation programmes and farmers should be advised to produce food first before any form of cash crop.

Keywords: Security Status, Determinants, Food, Household, Sesame.

INTRODUCTION

Global concern about food security started in the mid-1970s as a result of the international food problems that emerged (Adeogun and Sackey, 2011). The concept of food security was initially focused on availability and price stability of food stuff at the international and national level. The expansion of the focus of food security concept was due to the realization that international food security does not guarantee national food security and national food security does not guarantee household food security to the extent that even household food security does not guarantee individual food security. Food security of subsets in all the cases mentioned is guaranteed by their accessibility to the available food. Against the 1974 conception of food security, the 2001 conceptualization put it as a situation in which all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002 cited in Adeogun and Sackey, 2011).



About 85 per cent of the total agricultural output in Nigeria is produced by small scale farmers who strongly depend on agricultural labour market, little or no forms of saving or storage facilities. These and other problems interact with failure of Government policies to affect the sector resulting to low productivity. The neglect of agricultural sector of Nigeria in 1970s is said to have been the cause of extreme poverty and insufficient food items in the country (Ogen, 2007).

Crop production is widely undertaken by almost every household in Bauchi State on a small scale. The major types of crops grown in the State both rain fed and irrigation include cereal (maize, sorghum, millet and rice), legumes (groundnut, cowpea, and soya beans), vegetable (tomato, pepper and onion), sugarcane, watermelon and fruits. The major constraint to agricultural productivity is the neglect by the State Government both in terms of funding and provision of tools (Bauchi State, 2011 and Update information, 2013).

Sesame is a cash crop produced basically not for family consumption but for sale. This is with the aim of getting more money income to be used for food and other needs. Sesame production is expected to improve the income of farming households. Depending on the use of the increased income, food security status of sesame farming households may change either positively or negatively. If the money realised from the sales of sesame is used to buy enough food for the year then sesame production has improved food security. On the other hand, if the money from the sales of sesame is used for other needs, such may cause shortage of staple food in the household and hence food insecurity. Also, reduction in the supply of staple food may lead to increase in its price thereby making household vulnerable to food security. The increase in the production of sesame at the expense of staple food may lead to shortage of staple food items in the market which will translate in to price increase. Both shortage of food in the market and higher prices of food will lead to food insecurity.

Previous studies done in the country were focused on socio-economic characteristics and food security status or determinants of food security status. This study examines the food security status of sesame farming households in Bauchi State. Consequently, the objectives of this study were to:

- i. determine the food security status of farming households in the study area;
- ii. identify the determinants of food security status in the study area;

The term “food security” came into use to describe a broad range of development issues. Food security simply means people being able to get the food they need to be healthy and active, from wherever and however it is provided or obtained (Hubbard, 1995). This could be through self-production or purchase of the food using income received from other sources. According to World Bank (1986), the term food security means access by all people at all times to enough food for an active and healthy life.

According to Hoddinott (1991) as reported by Aidoo *et al.* (2013), there are approximately 200 definitions and 450 indicators for food security. Food security exists when people have access to safe and nutritious food to maintain a healthy and active life at all time (World Food Summit, 1996). Food security is a multi-dimensional situation involving different levels; Individual food security, National food security and Global food security (Ingco *et al.*, 2004). The central point of food security is the individual or household who should be able to obtain adequate and nutritious food needed at all times (Obamiro *et al.*, 2003). According to Obamiro *et al.* (2003) food security depends on three major pillars these include, availability of food through production, accessibility of food through purchasing and utilization of food to ensure nutritional outcome. Most of the definitions of food security identified food availability, food accessibility, food utilization and stability.



In this study, the concept of food security implies having continuous supply of enough quantity and qualitative food to entire members of a given household. It is measured in terms of quantity consumed and number of meals per day by a given household.

- a. Food availability refers to the existence of food at the disposal of household either from own production or markets. At the national or regional level food availability depends on local/domestic food production, food imports and food aids. Food availability can be affected by the agro-ecological zone's cultural practice, Family structure and farming system (Adeogun and Sackey, 2011).
- b. Food accessibility refers to the ability and the enough resources required to obtaining enough food for a nutritious diet. Many factors determine how individual or household can have access to available food. Aidoo *et al.* (2013) explained accessibility as depending on home production, income of household, distribution of income within the household, the price of food and individual access to market, and social and institutional entitlement. This implies that food can be available but not accessible to household or individual. According to Adeogun and Sackey (2011) food accessibility can be economic, physical or social access. The economic access depends on income disparity, price differences and access to credit. The Physical access involves household access to infrastructure, road and market availability. While the social access refers to social capital representing the social network available to household.
- c. Food utilization has to do with socio-economic and biological explanation. Food can be available and accessible to household, but the choice of food to be consumed and food distribution within the household sometimes create problems. On the other hand, problem may emanate from within the body system such that the available food cannot be consumed or properly absorbed into the body due to certain illness. Utilization depends on the awareness, educational level; value addition i.e. tested preference of the consumer and quality and safety of food (Adeogun and Sackey, 2011).
- d. Stability refers to continuous availability and accessibility of food. That is household should be able to sustain the access to the available food in the community. This can be in terms of climatic change, policy environment and shocks due to flood, drought, disease etc. (Adeogun and Sackey, 2011).

According to Langat *et al.* (2010), household food security requires adequate home production of food and also adequate economic and physical access to food. The economic access refers to having purchasing power by the household while the physical access refers to the proximity to markets or any other distribution channel from which household gets food.

The ultimate goal of food security policy is to provide enough and adequate dietary intake through availability and accessibility of food to individuals. Sufficient food is a basic human right (Von Braun *et al.*, 1992). Socio-economic and demographic variables such as real wage rates, prices and populations can serve as proxies to indicate food security status of household. The major components of food security are the food availability, food accessibility and risks related to availability or accessibility. Therefore, issues which affect the availability of food or accessibility of available food by individual and any other situation that put the individual to lose his power of accessing that available food are said to determine food security.

It should be noted that national, regional or local food availability is determined by food production, stockholding and trade. Changes in any of the variables mentioned can contribute to food insecurity. Availability of food to household requires that food is available in the local or community markets. The accessibility component of food security is determined by many factors. At country level access to food depends on food prices and foreign exchange. But for



the food deficit and foreign exchange deficit, food aid is as important determinants of access to food (Von Braun *et al.* 1992).

Poverty is considered as the major determinant of chronic household food insecurity as the poor have inadequate entitlements to secure their access to food even when food is available in the local market. Therefore, higher income households are food secure with improved nutritional wellbeing. But, however, non-food expenditures rise more rapidly with income than do food expenditure. This implies that the income elasticity of food expenditure is less than unity (Von Braun *et al.*, 1992). Otunaiya and Ibidunni (2014) in their study found seven (7) out of the thirteen (13) variables analysed as significant determinants of food security status among households in their study area. These include dependency ratio, household size, educational status of household head, farm size, membership of cooperative society, amount of food purchased on credit.

According to Adebayo (2010), factors that limit the supply and demand for food invariably affect food security. It was observed that the major factors hampering supply of food in Nigeria include ownership of productive assets and other resources, nature of farm organization and technology and lack of marketing infrastructure. The demand for food in Nigeria is affected by the structure of income distribution, high prices, preference to foreign products and various socio-cultural factors relating to poor state of nutritional education, intra household food distribution decisions, poor cooking technologies and low access to adequate health care (Adebayo, 2010). In a study by Irohabe and Agwu (2014) revealed that educational level, sex, household size and access to credit were the significant determinants of food security status of the rural farming households. It was also observed that four out of the eight variables used, to study the socio-economic characteristics and food security status of farming household in Kwara state, were significant in explaining variation in the food security status of the household in the study area (Babatunde *et al.*, 2007). Idrisa *et al.* (2008) in their study observed that age, educational level of household head, household size, primary occupation and income of the respondents influenced the food security status of farming household in Jere Local Government of Borno state, Nigeria.

Theoretical Framework

According to FAO (2010) estimate, about 925 million people were food insecure in the World. Therefore the need for theoretical explanation of food security both from the academic and international organisations, this will help in the implementation of strategies to control food insecurity. The approaches to food security include; food availability approach, income-based approach, basic need approach, entitlement approach, sustainable livelihood approach and capability approach.

This study is pinned or connected to the entitlement, income - base and basic need approaches. Studying the food security status of sesame farming household is best fit in the entitlement approach via personal endowment and access to commodity. Income – base approach explained the issue of accessibility to food. The farm households consider themselves food secure when they have enough food available or access to food without regard to sanitation, education, health and medical facilities. Therefore, food security is a matter of having access by all at all time to enough food for an active life.

MATERIALS AND METHODS

The Study Area

Bauchi State is located between latitudes 9° 3' and 12° 3' north and longitudes 8° 50' and 11° east. It occupies a total land area of 49, 119km² which is about 15% of Nigeria's total land mass. The State has two distinct vegetation zones; The Sudan Savannah and the Sahel



Savannah. The southern part of the State is covered by Sudan Savannah type of vegetation while the Sahel Savannah or the Semi-desert vegetation type covered northern part. Two third of the total land area in Bauchi State is cultivable. Rain fall in the State ranges from 700mm per annum in the north to about 1300mm per annum in the south (B I C, 2011 and Update information, 2013).

Sampling Procedure and Sample Size

The sampling technique used for this study was multi-stage random sampling, involving three stages. The first stage is the selections Bauchi State out of 36 States of Nigeria. The second stage is the selections of two Local Government Areas from each of the three agricultural zone of the State were purposively selected on the bases of having Sesame Farmers Association. At the third stage, the list of household members of Sesame farmers Association in each of the selected Local Government area were be obtained from BSADP, and a random selection was made of 340 respondents for the study.

The sample size for this study was determined using the formula of Okeke *et al.* (2008). This formula is used to determine the sample size of a finite population and is expressed as follows:

$$n = \frac{N}{1-N(e)^2} \quad \dots (1)$$

where;

n = Sample size

N = Population figure

e = Error margin which is at 5% or 0.05

The sample size was determined from the population of study which was the entire members of Sesame Farmers Association of all the selected Local Government Areas. For the purpose of justifying the number of respondents selected from each Local Government Area, a proportionality factor was used such that each local government will have a number of respondents proportioned to household membership of Sesame Farmer Association (i.e. size). The proportionality factor as found in Obamiro *et al.* (2003) is given as follows:

$$P = \frac{n}{N.K} \quad \dots (2)$$

where;

P= the number of household to be sampled from the Local Government Area

n = the size (i.e. number) of membership of the Sesame Farmers Association in the Local Government Area

N= the total number of household membership of Sesame Farmers Association in the six Local Government Areas selected.

K= the desired number of respondents selected for the entire study.

Method of Data Collection

The instrument used for the collection of primary data was a structured questionnaire adopted and modified from U.S food security module with household being the unit of analysis. The use of U.S. food security module was based on the wide acceptability of the module by many researchers (Adeogun and Sackey, 2011). The questionnaire was administered to the various respondents in the Local Government Areas selected to obtain information on both their socio-economic characteristics and food security/insecurity indicators.

Logistic regression model

The dependent variable was food security status as a categorical response variable which can be food secure or food insecure. While the independent variables were household income, household size, farm size, major staple food price, current level of food consumption, level of education, continuous accessibility, access to market, nutritional content of food



consumed, secondary occupation and age of household head. The explicit function was stated as;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + e \quad \dots (3)$$

where;

Y = Food security status (1 = food secure, 0 = food insecure)

X₁ = household income (₦)

X₂ = Household size (No. of people)

X₃ = Farm Size (ha)

X₄ = Major staple food price (₦)

X₅ = Current level of food consumption (No. of meal per day)

X₆ = Level of Education (primary, secondary, tertiary or others)

X₇ = Continuous accessibility (wariness that food will finish = 1 otherwise = 0)

X₈ = Access to market (km)

X₉ = Nutritional content of food consumed (not eating balanced diet = 1 otherwise = 0)

X₁₀ = Secondary occupation (ownership = 1, otherwise = 0)

X₁₁ = Age of household head (years)

e = Error term

β₀ = Intercept representing food security level not depending on any factor, such as autonomous consumption.

β₁.....β₁₁ = Coefficients of regression

RESULTS AND DISCUSSION

Household Food Security Status

Table 1 provides the perception of household on their food security status that is whether the household considers itself as food secure or insecure during the period under study. Results from Table 2 revealed that, 60.6% of household considered themselves as food insecure. While 39.4% of the total respondents were food secure.

Table 1: Distribution of Respondents by Food Security Status

Food Security Status	Frequency	Percentage (%)
Food insecure	206	60.6
Food Secure	134	39.4
Total	340	100.0

Source: Field Survey; 2014

Result of the Binary Logistic Regression

To explain the effects of the predictor variable on the dichotomous dependent variable, the logistic regression result is reported with the odd ratio as presented in Table 2. The Table presented the odd ratio in the column Exp (β) which gives the values at which the variable brings about changes in the dependent variable. From the Table 2, a unit change in income will probably cause 1.1% positive change in the food security status keeping all other variables constant. But a unit change in household size will probably cause 67.4% negative change in food security status keeping all other variables constant. Similarly, a unit change in farm size will probably cause 27.2% increase in food security all other variables kept constant. The variable X₄ (i.e. price of major staple food) shows that a unit changes in price will probably



cause a negative change in food security by 32.6%. Also, a unit change in the level of current food consumption, measured in terms of number of meals per day, may bring about 176.3% probabilities of positive changes in food security status. In a similar way, a unit change (increase) in level of accessibility to food will probably increase food security by 63.7%. The variables X_6 , X_8 , X_9 , X_{10} and X_{11} which were not significant in the study area.

Table 2: Logistic Regression Estimate of Food Security Status

Variables		B	S.E	P- Value	Exp(B)
Household income	X_1	.011	.002***	.000	1.011
Household size	X_2	-.394	.075***	.000	.674
Farm size	X_3	.240	.090**	.008	1.272
Price of major staple	X_4	-1.122	.395**	.005	.326
Current level of food consumption	X_5	1.016	.361**	.005	2.763
Level of education	X_6	.237	.281ns	.398	1.268
Continuous accessibility	X_7	.493	.210**	.019	1.637
Access to market	X_8	-.074	.063ns	.240	.929
Nutritional content	X_9	.703	.516ns	.173	2.020
Secondary occupation	X_{10}	-.600	.547ns	.273	.549
Age of household head	X_{11}	.153	.311ns	.622	1.165
	Constant	-2.987	1.451	.040	.050

NB: ns= Not significant, ***Significant at 1%, **Significant at 5%

Source: Field survey, 2014

The analysis of data showed that household income had positive coefficient and is significant at $P < 0.01$. And from the odd ratio reported in Table 2, a unit increase in household income has the probability of improving food security status by 1%. This means, the probability of change in income affecting food security status is very small. The result implied that food security status of household in the study area is not seriously depending on household income. The contribution of income to food security situation in the study area was little. The variable household size was significant at $P < 0.01$, with negative coefficient. This means increase in household size will bring about decrease in food security situation or precisely lead to food insecurity. From the odd ratio reported in Table 2, a unit increase in household size has 32.6% probability of causing food insecurity (i.e., decreasing food security status). This could be one of the major causes of food insecurity in the study area, considering average household size of 9 which is relatively large. Farm size was significant at $P < 0.01$ with positive coefficient



indicating direct relationship between household farm size and food security. The odd ratio reported showed that a unit increase in farm size has 27.2% probability of increasing food security. On the other hand a unit decrease in household farm size has 27.2% probability of causing food insecurity. The price of major staple food consumed by household was significant at $P < 0.01$ with coefficient negatively related to food security status. This means a unit increase in price, leads to increase in food insecurity. The reported odd ratio revealed that there is 67.4% probability of food insecurity in the study area with a unit increase in price of major staple food. This indicates that most of the sesame farmers buy their staple food from market. Therefore, increase in price; holding other variables constant, will probably cause food insecurity. Price of food is the major determinant of accessibility to food. If the price of staple food increases due to shortage in supply or any other factor, then food may be un-accessible to households. Higher price leads to food insecurity while lower price will lead to food security. This is in line with entitlement approach to the study of food security.

The current level of food consumption was significant in determining food security status of household. It was significant at $P < 0.01$ with positive coefficient. This means the higher the level of current food consumption by household the more food secure it will be. A unit increase in current level of food consumption has 176.3% probability of increasing household food security situation. This is very relevant because the level of current consumption was measured in terms of number of meals per day eaten in the household. Any household that eats three square meals is considered food secure. This involves breakfast, lunch and dinner for normal daily meals. If household skip any of the meals in a day, the household is considered food insecure. Because skipping meal is a food insecurity coping strategy.

Household continuous accessibility to food was significant at $P < 0.05$ with positive coefficient. The odd ratio revealed 63.7% probability of improving food security for a unit increase in food accessibility and availability, if households have no access to the available food, there will be food insecurity. Because food security has four major elements; food availability, food accessibility, food utilization and not losing such access (Omonona *et al.*, 2007). Individual have access to food via ability to pay its price or through production. These are the two ways by which a person can have entitlement. As explained by the entitlement theory. The result was positive because the more access individual has to food the more food secure he will be.

However, according to Akarue and Bakporhe (2013), only the income of the head of household is important in explaining the food security status of the household. This is different from the result of Arene and Anyaeyi (2010) as reported by Akarue and Bakporhe where income and age of household head were shown to be important. In Babatunde *et al.* (2007), the variables of household income, educational status, and household size were significant in explaining variation in the food security status of farm household in their study area. But in this study it was revealed that level of education was not significant though some of the variables significant in this study were not used by Babatunde *et al.* (2007) the age of household head which was negative and significant at 10% in Babatunde *et al.* (2007) was positive and not significant in this study possibly due to the composition of the study population as most were within the active age.

CONCLUSION AND RECOMMENDATIONS

From the result of the study, household income, household size, farm size, price of food, level of food consumption in terms of number of meals per day and continuous accessibility were the determinant of food security status in the study area. The result also revealed that 60.6% of the sesame farmers were food insecure. Finally the study recommends policy to



improve income because income play significant role in food security. And farmers should be made to cultivate food crop first before any cash crop.

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