# Interaction of Income and Food Security Status among Urban Households in Oredo Local Government Area of Edo State

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**Abstract**

The food security status of an individual or household is related to several factors, but to income in particular. The study assessed the nature and direction of this relationship among different income classes in Oredo Local Government Area of Edo State. A multistage sampling technique was used to select a total of 120 households across different income strata in the study area. Primary data were collected using a structured questionnaire. The analytical tools used include descriptive statistics, Food Insecurity Index and discriminant analysis. The results show that most of the respondents were males who had at least primary level education and were employed in non-farm activities. Food security incidence increased with increase in the number of years spent in school and was highest when household heads were within the range of 31 – 40 years and least within the greater than 60 years range. It was also revealed that male-headed households had high food security incidence. The discriminant analysis showed that increases in total household income improved the food security status of a household. The policy implication of these results is that efforts should be made to intensify the human capital development/ entrepreneurship content of development programmes and policies in order to ensure increased income to households.

**Keywords:** Food Security, Nutrition, Income, Human capital, Entrepreneurship

## Introduction

Food security involves the availability of food in the right proportion and quality at all times (Eme et al., 2014). The World Food Summit (2003) defined food security as a condition where 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. Food security remains an integral part of the global development discourse (Omotesho and Muhammad-Lawal, 2010). This is evident in the development of the Millennium Development Goals (MDGs) with respect to eradication of extreme poverty and hunger (Adepoju and Adejare, 2013). There are also indications that food security occupies a central position in the Sustainable Development Goals (SDGs).

The African continent is faced with food crisis and Nigeria is not an exception (Abu, 2012). Nigeria faces food security challenges as a result of its growing population coupled with low agricultural production level. The country is dependent on crude oil as its major source of income; as a result, the importance attached to agriculture is declining (Adewuyi and Hayatu, 2011). Agriculture in Nigeria is practiced mainly by peasant farmers who use traditional technology for production, with inadequate access to inputs (credit and extension services) (Eme et al., 2014). Agricultural activities are carried out in the rural areas where infrastructure is poor. The cost of transportation to markets is high and a significant proportion of the produce is lost in the process. Generally in Nigeria, food availability is seasonal due to reliance on weather (rainfall, temperature and wind) for production.

In spite of these constraints on agriculture in Nigeria, the sector remains the mainstay of the economy. Agriculture employs about 70 percent of the active labour force and accounts for 40 percent of the gross domestic product (Olaolu et al., 2013). However, the population growth rate is higher than the food production level (Girei et al., 2013). This explains why the nation's food import bill is as high as 1.3 trillion naira annually (CBN, 2014). According to Jerome (2012), there is a link between food insecurity and widespread poverty in Nigeria. The poor do not have adequate means or "entitlement" to secure access to food, even when food is available in local

or regional markets (Ayantoye et al., 2011; Ajani, 2010; Vakili et al., 2013). Hunger is a global problem with local dimensions. For example, sub-Saharan Africa and South Asia have consistently witnessed the highest levels of hunger globally (Adepoju and Adejare, 2013). Nigeria occupied the 92nd position among 113 countries in the 2017 Global Hunger Index (EIU, 2017). This attests to the fact that Nigeria is food insecure and this poses a threat to development.

The demand for food in Nigeria clearly outstrips its supply or production level (Idrisa et al., 2008). Against the above background, this research was undertaken to analyse the interaction of income and food security status among urban households in Oredo Local Government Area of Edo State. The study is particularly relevant because there is the need to identify the link between income level and food insecurity of urban households in Oredo LGA in order to proffer policy varieties towards building a food-secure society. This is consistent with Sustainable Development Goal (SDG) 2 which seeks to end hunger, achieve food security and promote sustainable agriculture.

The specific objectives of the study were to examine the socioeconomic characteristics of urban households in the study area; analyse the food security status of the respondents based on their per capita expenditure on food; and identify the relationship between the income and food security status of the respondents.

## Methodology

### *Study Area*

Oredo Local Government Area of Benin City was selected for the study. Benin City is located in Edo State. It lies between latitudes 05' 44˚N and 07' 34˚N, and longitudes 05' 4˚E and 06' 45˚E. It covers 17802 square kilometres. It is bounded on the north and the northeast by Kogi State, on the west by Ondo State and on the south and southeast by Delta State. The main towns in the state are Benin, Ubiaja, Afuze, Auchi, Ekpoma and Uromi. Benin City has a population of 1,147,188 based on the 2006 population census. It is the centre of Nigeria's rubber and oil palm processing industries. There are eighteen local government areas (LGAs) in the state. Tourists and recreation sites in Edo State include Ogba Zoological Garden,

Okomu National Park, Sakponba Holiday Resort, Ososo Tourist Centre, sand beaches, Agenebode, etc.

*Sample Design and Data Collection*

Information for this research was obtained using primary data. The sampling technique employed is the multi-stage sampling method. The selection of the local government was done using purposive sampling because it has distinct areas that are identified with the rich and the poor. Stratified sampling was used in dividing the study areas into groups using streets. The streets are the stratum. Respondents from each stratum were selected using the simple random sampling approach. A structured questionnaire was used in the collection of primary data with the household being the unit of analysis. The questionnaires were administered according to the 3 basic areas: Government Residential Area (GRA), Sapele Road, and Ogwola, chosen to represent the rich class, middle class and the poor class areas respectively.

**Analytical Technique**

The analytical methods used in this study are descriptive statistics, the Food Security Index and discriminant analysis.

*Descriptive Statistics*

Descriptive statistics were used to analyse the socio-economic characteristics using tables, frequencies, range percentages, etc. Percentage was used to represent the proportion of food secure and food insecure household population within socio-economic classes. Tables, frequency and percentages were used to represent all information about respondents, food insecurity and the different results of analysis.

*Food Security Index*

The Food Security Index was used to establish the food security status of households as either food secure or food insecure. The formula for the index is given as:

$$Fi = \frac{\text{Per capita food expenditure for the } ith \text{ household}}{2/3 \text{ Mean per capita food expenditure of all households}}$$

where Fi = Food security index

when : Fi ≥ 1 = Food secure household

Fi < 1 = Food insecure household

A food secure household is therefore one whose per capita monthly food expenditure falls above or is equal to two-thirds 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-thirds of the monthly per capita food expenditure. To compute the food insecurity index, households were profiled into food secure and food insecure groups based on their per capita expenditure on food items. The food security line was defined as two-thirds of the mean per capita food expenditure of the total household studied (Omonona et al., 2007). Therefore, this study considered households with per capita expenditure below ₦21,607.46 as food insecure and households with mean per capita food expenditure equal to or greater than ₦21 607.46 as food secure.

*Discriminant Analysis*

The method of discriminant analysis seeks to discriminate between two or more populations on the basis of multivariate measurements made on samples drawn from these populations. The discriminant model used in this study is dichotomous, seeking to discriminate between two classes of households designated as food secure and food insecure. Four discriminant functions were estimated in the study for Ogwola, Sapele Road and Government Residential Area (GRA) in order to reflect broad income class differences among the households' food security status. The functional form of the model is given as:

$$f_{km} = \mu_0 + \mu_1 X_{1km} + \mu_1 X_{2km} + \ldots + \mu_p X_{pkm} \quad (1)$$

where:

$f_{km}$= the value (score) on the canonical discriminant function for case $m$ in the group $k$.

$X_{ikm}$ = the value on discriminant variable $X_i$ for case $m$ in group $k$; and

$u_i$ = coefficients which produce the desired characteristics in the function.

The model specification is given as:

$X_1$ = Status area (indicating various income class areas)

$X_2$ = Sex of household head (male=1, female=0)

$X_3$ = Age of household head (years)

$X_4$ = Marital status of household head

$X_5$ = Years of schooling of household head (years)

$X_6$ = Total household income (naira value)

$X_7$ = Formal/informal employment source of income (Yes=1, No=0)

$X_8$ = Own business source of income (Yes=1, No=0)

$X_9$ = Expenditure on non-food items (naira value)

$X_{10}$ = Value of household assets (naira value)

$X_{11}$ = Household size

**Results and Discussion**

*Socio-Economic Characteristics of the Different Income Groups*

The household characteristics examined include the sex, age, main economic activity and number of years of formal education of household head, and household size (Table 1). These characteristics may or may not be factors affecting the demand for food items by households, which in return determines their food security status. The data collected show that among the poor class, 50 percent of the respondents were male while 50 percent were female. Among the middle class, 80 percent were male and 20 percent were female, whereas among the rich, 77.5 percent were male with only 22.5 percent as females. The male accounted for 69.17 percent of the study population while 30.83 percent were female. The high percentage of males is because the respondents were solely household heads. The mean ages were 38 years for Ogwola, 43 years for Sapele Road, 44 years for GRA and the average age for the entire local government was 41 years.

Across the different income groups, the majority of respondents were within the age range of 31-40 years. This suggests that the majority of the household heads were still within the active age and therefore could work to earn more income, which can affect their decision on food item

purchases since they would have more income to do their purchases, which ultimately affects their food security.

**Table 1: Socioeconomic characteristics of household head respondents**

| | Ogwola (n=40) | | Sapele Road (n=40) | | GRA (n=40) | | Oredo (n=40) | |
|---|---|---|---|---|---|---|---|---|
| | **Freq.** | **%** | **Freq.** | **%** | **Freq.** | **%** | **Freq.** | **%** |
| **Sex** | | | | | | | | |
| Male | 20 | 50.0 | 32 | 80.0 | 31 | 77.5 | 83 | 69.2 |
| Female | 20 | 50.0 | 8 | 20.0 | 9 | 22.5 | 37 | 30.8 |
| **Age** | | | | | | | | |
| 20-30 | 11 | 27.5 | 3 | 7.5 | 4 | 10.0 | 18 | 15.0 |
| 31-40 | 19 | 47.5 | 16 | 40.0 | 17 | 42.5 | 52 | 43.3 |
| 41-50 | 7 | 17.5 | 13 | 32.5 | 8 | 20.0 | 28 | 23.3 |
| 51-60 | 1 | 2.5 | 6 | 15.0 | 5 | 12.5 | 12 | 10.0 |
| >60 | 2 | 5.0 | 2 | 5.0 | 6 | 15.0 | 10 | 8.3 |
| **Marital Status** | | | | | | | | |
| Married | 37 | 92.5 | 38 | 95.0 | 37 | 92.5 | 112 | 93.3 |
| Divorced | 1 | 2.5 | 1 | 2.5 | 0 | 0 | 2 | 1.7 |
| Widowed | 2 | 5.0 | 1 | 2.5 | 3 | 7.5 | 6 | 5.0 |
| **Years of Formal Education** | | | | | | | | |
| 0 | 1 | 2.5 | 0 | 0 | 0 | 0 | 1 | 0.8 |
| 1-6 | 7 | 17.5 | 3 | 7.5 | 3 | 7.5 | 13 | 10.8 |
| 7-12 | 26 | 65 | 6 | 15 | 7 | 17.5 | 39 | 32.5 |
| 13-18 | 6 | 15 | 30 | 75 | 24 | 60 | 60 | 50 |
| >18 | 0 | 0 | 1 | 2.5 | 6 | 15 | 7 | 5.8 |
| **Economic Activity** | | | | | | | | |
| Trading | 14 | 35.0 | 11 | 27.5 | 8 | 20.0 | 33 | 27.5 |
| Civil servants | 5 | 12.5 | 17 | 42.5 | 15 | 37.5 | 37 | 30.8 |
| Artisans | 17 | 42.5 | 11 | 27.5 | 14 | 35.0 | 42 | 35.0 |
| Farmer | 2 | 5.0 | 0 | 0 | 0 | 0 | 2 | 1.7 |
| Others | 2 | 5 | 1 | 2.5 | 3 | 7.5 | 6 | 4.7 |
| **Household Size** | | | | | | | | |
| 1-4 | 24 | 60.0 | 16 | 40.0 | 16 | 40 | 56 | 46.7 |
| 5-8 | 14 | 35.0 | 23 | 57.5 | 24 | 60 | 61 | 50.8 |
| 9-12 | 2 | 5.0 | 1 | 2.5 | 0 | 0 | 3 | 2.5 |
| Total | 40 | 100 | 40 | 100 | 40 | 100 | 120 | 100 |

*Source:* Field Survey, 2013.

The proportion of the married respondents in the study area was 93.33 percent, which may encourage the purchase of food items, especially for households with children. This is consistent with the findings of Ibok et al (2014) who reported that about 91 percent of urban food crop farming households were led by married individuals.

The mean number of years that the household heads had spent in school was 11 years for Ogwola, 15 years for both Sapele Road and GRA, while the total mean for these three areas within Oredo Local Government was 14 years. This indicates that the poor class respondents were on the average less educated compared with the other classes; 2.5 percent had no formal education and none had university education. Contrary to this, over 50 percent of the rich class respondents had at least university education. Almost 50 percent of the poor class were artisans. In the middle income class, almost half the sample were civil servants while the rich class had a fair mix of traders, civil servants and artisans. This could be a reflection of the level of education attained and since there is a difference in income, the scale or level of employment would probably also be different. Contrary to expectation, the middle and rich classes had relatively large families but the poor and the middle income classes had households as large as between 9 to 12 people (table 1).

*Income and Food Security Indicator*

The income level of the poor was relatively low. Table 2 shows that 87.5 percent of the poor households earned below ₦150,000 per month while 22 percent of the middle class earned about ₦250,000 a month; the highest earners were among the rich class with 17.5 percent earning above ₦500,000. As expected, the highest spenders on both food and non-food items were in the high income class; the poor spent about the same amount on both food and non-food items. However, about 16 percent of the rich class spent more on non-food items than they spent on food.

Mean food security indexes were established for the various classes: poor, middle and rich, to ascertain the variance of food security across the classes. Included are monthly mean food expenditure and the mean food security index of all the households. Two-thirds mean is the line of food security, thus households below ₦21,607.46 are food insecure and households whose monthly food expenditure equals or is above ₦21,607.46 are food secure. The mean food security index of 1.4998 tells that averagely,

all the households in the study were food secure. The food security situation increases from the poor class to the rich class. On the average, the food security indexes show that all the households are food secure, however, this does not translate to food security for all households (Table 3).

**Table 2: Total income and monthly expenditure on food and non-food items**

| Value (₦'000) | Ogwola (n=40) | | Sapele Road (n=40) | | G.R.A (n=40) | | Oredo (n=40) | |
|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq | % |
| **Total Income** | | | | | | | | |
| <50 | 18 | 45 | 2 | 5 | 0 | 0 | 20 | 16.9 |
| 51-150 | 17 | 42.5 | 20 | 50 | 11 | 27.5 | 48 | 40.7 |
| 151-250 | 5 | 12.5 | 6 | 15.0 | 6 | 15.0 | 17 | 14.4 |
| 251-350 | 0 | 0 | 7 | 7.5 | 10 | 25.0 | 17 | 14.4 |
| 351-450 | 0 | 0 | 0 | 0 | 5 | 12.5 | 5 | 4.2 |
| 451-550 | 0 | 0 | 5 | 12.5 | 8 | 20.0 | 13 | 11.0 |
| **Monthly Exp. Food** | | | | | | | | |
| < 20 | 20 | 50.0 | 7 | 17.5 | 2 | 5.0 | 29 | 24.2 |
| 21-40 | 17 | 42.5 | 25 | 62.5 | 22 | 55 | 64 | 53.3 |
| 41-60 | 3 | 7.5 | 6 | 15 | 10 | 25 | 19 | 15.8 |
| 61-80 | 0 | 0 | 1 | 2.5 | 4 | 10 | 5 | 4.2 |
| 81-100 | 0 | 0 | 1 | 2.5 | 2 | 5 | 3 | 2.5 |
| **Monthly Exp. NonFood** | | | | | | | | |
| < 20 | 24 | 60 | 8 | 20 | 6 | 15 | 38 | 31.7 |
| 21-40 | 15 | 37.5 | 20 | 50 | 14 | 35 | 49 | 40.8 |
| 41-60 | 0 | 0 | 6 | 15 | 7 | 17.5 | 13 | 10.8 |
| 61-80 | 1 | 2.5 | 5 | 12.5 | 4 | 10 | 10 | 8.3 |
| 81-100 | 0 | 0 | 1 | 2.5 | 5 | 12.5 | 6 | 5.0 |
| >100 | 0 | 0 | 0 | 0 | 4 | 10 | 4 | 3.3 |

*Source:* Field Survey, 2013.

**Table 3: Food security index**

| Item | Value |
|---|---|
| Total exp. on food | ₦3,889,343 |
| Mean | ₦32,411.19 |
| 2/3 Mean | ₦21,607.46 |
| **Mean Food Security Index** | |
| Poor class | 1.07025 |
| Middle class | 1.5445 |
| Rich class | 1.88475 |
| All | 1.4998 |

*Source:* Field Survey, 2013.

**Table 4: Food security status by socio-economic variables**

| Item | Ogwola (n=40) | | | | Sapele Road (n=40) | | | | GRA (n=40) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Secure | | Insecure | | Secure | | Insecure | | Secure | | Insecure | |
| | Freq | % | Freq | % | Freq. | % | Freq. | % | Freq. | % | Freq. | % |
| **Years of School** | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 1 | 3.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1-6 | 3 | 16.7 | 2 | 9.1 | 4 | 12.1 | 2 | 28.6 | 2 | 5.3 | 0 | 0 |
| 7-12 | 5 | 27.8 | 11 | 50 | 9 | 27.3 | 2 | 28.6 | 11 | 28.9 | 1 | 50 |
| 13-18 | 10 | 55.6 | 9 | 40.9 | 17 | 51.5 | 1 | 14.3 | 22 | 57.9 | 1 | 50 |
| >18 | 0 | 0 | 0 | 0 | 2 | 6.1 | 2 | 28.6 | 3 | 7.9 | 0 | 0 |
| **Economic Activity** | | | | | | | | | | | | |
| unemployed | 1 | 5.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trading | 4 | 22.2 | 10 | 45.5 | 6 | 18.2 | 2 | 28.6 | 10 | 26.3 | 1 | 50 |
| Civil servant | 6 | 33.3 | 5 | 22.7 | 14 | 42.4 | 2 | 28.6 | 10 | 26.3 | 0 | 0 |
| Artisans | 7 | 38.8 | 6 | 27.3 | 10 | 30.3 | 1 | 14.3 | 17 | 44.7 | 1 | 50 |
| Others | 0 | 0 | 1 | 4.5 | 3 | 9.1 | 2 | 28.6 | 1 | 2.6 | 0 | 0 |
| **Average Income (₦)** | | | | | | | | | | | | |
| <50,000 | 5 | 27.8 | 13 | 59.1 | 2 | 6.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100,000 | 5 | 27.8 | 8 | 36.4 | 6 | 18.2 | 4 | 57.1 | 5 | 13.2 | 1 | 50 |
| 150,000 | 3 | 16.7 | 1 | 4.5 | 9 | 27.3 | 1 | 14.3 | 5 | 13.2 | 0 | 0 |
| 200,000 | 2 | 11.1 | 0 | 0 | 4 | 12.1 | 1 | 14.3 | 3 | 7.9 | 0 | 0 |
| >200,000 | 3 | 16.7 | 0 | 0 | 12 | 36.4 | 1 | 14.3 | 25 | 65.8 | 1 | 50 |

Food security incidence was linked to three socio-economic characteristics — years of schooling, occupation of household head and income. These socio-economic characteristics may or may not have great impact on the quantity of food demanded by households, which determines their food security status. However, the comparison gives an indication of the direction and nature of food insecurity with respect to level of education and income earned which is associated with income-generating activity.

The results indicate that the food security status of the households increased with the number of years of education. This corroborates the finding by Jabo et al. (2017) that level of education significantly influences the food security status of households. This suggests better income earning opportunities with increased level of education which also indicates better knowledge of dietary needs. It also shows that the number of insecure population is highest among traders which may be attributed to the size and type of business enterprise, inconsistencies in income or personal consumption habits, which this study did not capture. Among the traders that are insecure 72.92 percent come from the poor area, 15.38 percent from the middle class area and 7.69 percent from the rich class. This may be as a result of their low income which determines the basket of food to which households have access (Ibok et al., 2014; Ahmed et al., 2015). Food insecurity appears to be high among those with low average income. Food insecurity was 41.9 percent for those with income less than ₦50,000 and 3.2 percent for those with an average income of ₦200,000. This suggests that better income could dictate better access to good quality food in the right quantity.

*Determinants of Food Security Status*

The signs of the coefficients of a discriminant function show the direction in which the food security status of a household would move as the values of the variables in the function change. The positive sign favours food security whereas the negative sign favours food insecurity.

Table 5 shows that the signs of the coefficients of $X_6$ and$X_{11}$ are consistently positive in all the four functions but significant at 99 percent and 95 percent confidence interval for Ogwola and the local government area respectively. These coefficients are total household income and household size. In Ogwola, Sapele Road, Government Residential Area (GRA), the food security status of households would probably improve as

the total household income ($X_6$) improves. The results also show that food security status will improve as household size increases, which goes against expectation and the result gotten under food security index against household size in this study. This may be related to the economic viability of the members; if most of the members contribute to food supply within the household then access to food will improve.

**Table 5: Coefficients of discriminant functions**

| Variables | Ogwola | Sapele Road | GRA | Oredo LGA |
|---|---|---|---|---|
| Status area ($X_1$) | | | | .796 |
| Sex of household head ($X_2$) | .128 | -.017 | -.443 | -.091 |
| Age of household head ($X_3$) | -.149 | -.214 | .603 | .215 |
| Marital status of household head ($X_4$) | -.070 | .100 | .209 | .272 |
| Year of schooling of household head ($X_5$) | .056 | .101 | -.365 | .231 |
| Total household income ($X_6$) | .628 | .347 | .555 | .380 |
| Formal/ informal source of income ($X_7$) | -.301 | 1.140 | .048 | -.534 |
| Own business source of income ($X_8$) | -.059 | .465 | .659 | .074 |
| Expenditure on non food item ($X_9$) | .299 | -.759 | .350 | .167 |
| Value of household asset ($X_{10}$) | .136 | -.348 | .216 | -.037 |
| Household size ($X_{11}$) | .873 | .247 | .029 | .310 |
| Degree of freedom (df) | 10 | 10 | 10 | 11 |
| Significance level | .025 | .443 | .883 | .000 |

The ranking of the variables on the basis of the absolute magnitudes of their coefficients can be used to infer the relative contributions of the variables to the household food security status. In this regard, it was found that four variables, $X_6$, $X_7$, $X_9$ and $X_{11}$, occupied the highest rank in the poor class. This means that total household income, formal/informal source of income, expenditure on non-food items and household size distinguish food secure households from food insecure households. In the middle income class, the four highest ranking variables are $X_7$, $X_4$, $X_9$ and $X_8$. This means that for this class, formal/informal source of income, marital status, expenditure on non-food items and own business account for the food security status of households. Marital status was shown to have a positive relationship which means that households headed by a married individual were more food secure compared to those whose head was divorced or widowed. In the high

income class, the four highest ranking variables were $X_{8,}$ $X_{3,}$ $X_6$ and $X_{2.}$ This means that own business source of income, age of household head, total household income and sex of household head distinguish food secure households from the food insecure households. In Oredo Local Government Area as a whole, status area ($X_{1)}$ and formal/ informal source of income ($X_7$) had the highest ranks. The status area, which is significant, thus shows that food security status is affected by the income class area of the household.

**Conclusion**

This study sought to assess dietary diversity as it relates to food security using a household socioeconomic cross sectional data survey of perceived differences in the incomes of households. Discriminant analysis showed that household income was a major factor that distinguished between food secure and food insecure households, which invariably means that the higher the income of households, the more food secure the households. Therefore, income improvement strategies, such as entrepreneurial programmes should be embarked upon by government, non-government organizations and private organizations to create more income for people, thereby enabling them to have more food groups in their diet. This should be targeted more at the urban poor.

**References**

Abu O. (2012). Food security in Nigeria and South Africa: policies and challenges. *Journal of Human Ecology*, 38(1): 1-5.

Adepoju A.O. and K.A. Adejare (2013). Food insecurity status of rural households during the post-planting season in Nigeria. *Journal of Agriculture and Sustainability* 4(1): 16-35.

Adewuyi K.A. and Y. Hayatu (2011). Effect of poverty on food security of rural households in Adamawa State, Nigeria. *Journal of Environmental Issues and Agriculture in Developing Countries*, 3(1): 150-156.

Ahmed F.F., C.E. Eugene and P.O. Abah (2015). Analysis of food security among farming households in Borno State, Nigeria. *Journal of Agricultural Economics, Environment and Social Sciences*, 1(1): 130-141.

Ajani, S.R. (2010). An assessment of dietary diversity in six Nigerian states. *Afr. J. Biomed. Res,* 13: 161 -167.

Ayantoye K., S.A. Yusuf, B.T. Omonona and J.O. Amao (2011). Food insecurity dynamics and its correlates among rural households in

South Western, Nigeria. *International Journal of Agricultural Economics and Rural Development*, 4(1): -13.

CBN. (2014). Entrenching Macroeconomic Stability and Engendering Economic Development in Nigeria, pp.1-18.

Eme, O.I., A.O. Onyishi, O.A. Uche and I.B. Uche. (2014). Food security in Nigeria: a thematic exposition. *Arabian Journal of Business and Management Review,* 4 (1): 1-14.

Girei A.A., B. Dire, M.M. Iliya and M. Salihu (2013). Analysis of impact of National Fadama II Facility in alleviating poverty on food crop farmer in Adamawa State, Nigeria. *Global Journal of Agricultural Research,* 1(3): 8-15.

Ibok, O.I., N.E. Bassey, E.A. Atairet and Obot (2014). Food security determinants among urban food crop farming households in Cross River State, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*, 3(1): 76-90.

Idrisa Y.L., M.M. Gwat and H. Shehu (2008). Analysis of food security status among farming households in Jere Local Government of Borno State, Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension*, 7(3): 1-7.

Jerome, A. (2012). Nigeria's food security programs: implications for MDG's goal of extreme hunger eradication. *International Journal of Business and Social Science*, 3(9): 243-253.

Jabo, M.S.M., M.M. Ismail, A.M. Abdullah and M.N. Shamsudin. (2017). Measurement and determinants of rural poverty in Nigeria: recent evidence from the General Household Survey Panel. *International Food Research Journal*, 24 (3): 1011-1018.

Olaolu, M.O., O.M. Akinnagbe and T. Agbor. (2013). Impact of National Fadama Development Project Phase II on poverty and food security among rice farming beneficiaries in Kogi State, Nigeria. *American Journal of Research Communication*, 1(10): 280-295.

Omotesho, O.A and A. Muhammad-Lawal. (2010). Optimal food plan for rural households' food security in Kwara State, Nigeria: the goal programming approach. *Journal of Biotechnology and Sustainable Development*, 2(1): 007-014.

(EIU) Economist Intelligence Unit. (2017). Global Food Security Index 2017: Measuring the Impact of resource risks, pp.1-56.

Vakili, M., P. Abedi, M. Sharifi and M. Hosseini. (2013). Dietary diversity and its related factors among adolescents: a survey in Ahvaz-Iran. *Global Journal of Health Science*, 5(2).