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Assessment of Determinants of Food Security among Farming Households of Akwa Ibom State, Nigeria

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Abstract **Original Research Article**

Food insecurity remains a significant global problem particularly in developing nations like Nigeria. This research assessed determinants of food security among rural households in Akwa Ibom. Secondary data used for this study were General Household Survey data, wave 4, panel 2018/2019 sourced from the National Bureau of Statistics. 215 farming households were selected in Akwa Ibom. Descriptive statistics, food security index and Ordinary Least Square (OLS) were used to analyze the data. The result revealed that in Akwa Ibom, above average of them (64.65%) were food secured while the remaining (35.35%) were food insecure. The regression result revealed that increase in food expenditure (p=0.0001) and annual rainfall(p=0.001) have the likelihood to raise the food security while household head age (p=0.0001) and household size (p=0.0001)have the probability of reducing their food security. It was revealed that three prominent coping strategies that ranked first, second and third according to weighted mean scores result were eating less preferred food, eating few kinds/varieties of food and eating reduced quantity of food respectively. This study concluded that increase in food expenditure and inputs prices have the likelihood of affecting food security status of the farming households in both South-South and North Central regions of Nigeria during post-harvest season. It was recommended that farming households should be optimistic to spend more on cheaper but nutritive food items. Government should also assist the farmers with farm inputs at subsidized cost to improve their productivity and consequently food security.

Keywords: Food Insecurity, Food Security, Rural Households, Akwa Ibom, Nigeria, General Household Survey, Farming Households, Descriptive Statistics, Food Security Index, Ordinary Least Square, Food Expenditure.

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INTRODUCTION

Agriculture serves as the primary driver of West Africa's economy, upon which a majority of the population relies for their livelihood (Akpan and Udoh, 2023). According to FAO, 2024, statistics reveal that 67% of the total populace is engaged in agriculture, contributing about 39.4 percent to the Gross Domestic Product, with 43 percent of all exports consisting of agricultural products. Over the past few years, there has been a notable shift in the perception of economists and policymakers as regards the function of agriculture in economic development. Approximately 25% of earthly surface is currently under cultivation, with additional land converted to crop productions in the 30 years following 1950 than in the preceding 150 years (IFPRI, 2023).

It's intriguing to note that agriculture plays crucial roles such as fostering connections with related industries, providing employment, and standing out as a primary source of food for the entire population. The stability and sustenance of a nation, socially, politically, and economically, hinge on the agricultural sector. Agriculture is often regarded as the backbone of developing countries, being a major source of employment and indirectly ensuring food security among the population. With rapid global population growth and increasing food demand, agriculture emerges as the key solution to this persistent challenge (World Bank, 2023).

Food, ranking only after air and water, holds paramount importance for all living beings. Availability, Accessibility, Utilization and Affordability of food, however, determine the food security of the world population. Despite its critical role, the absence of available, affordable, and accessible food leads to hunger and food insecurity. Food availability encompasses the

supply chain through production, distribution, and exchange (FAO, 2024). Factors influencing food production include land ownership, soil management, crop and livestock breeding, and external environmental factors like changes in rainfall and temperatures (FAO, 2024; FAO, 2024). The competition for resources such as land, water, and energy further impact food production (IFPRI, 2023).

Food security is defined as easy access to food that is available all the time. Household achieve food security when its members are not plagued by hunger or the fear of malnourishment. The four pillars of food security are identified as food availability, access to food, utilization, and stability (FAO, 2024). On the flip side, food insecurity refers to a state of inadequate or unsure access to nutritionally sufficient and safe foods. The concept of food insecurity started in the mid-1970s during discussions of international food troubles amid a universal food disaster. Initially centered on supply-side concerns, negotiations lead to the redefinition of food security, recognizing the critical aspect of potentially susceptible and pretentious populace (FAO, 2024).

Households can fall into two categories: food secure or food insecure. A household is recognised food secure once it can easily access and afford food at reasonable prices. Conversely, a food insecure household faces challenges in accessing and affording food. The global population's sustainability relies heavily on individual households being food secure. The affordability of food is primarily influenced by income and food prices, with production costs playing a role in determining these prices (Akpan and Udoh, 2023). Natural factors, particularly climate, play a crucial role in agricultural production. Climate, controlled by nature, significantly impacts total yield during harvesting. Many African food crop farmers, who lack resources for irrigation farming, depend on these natural factors. Greenhouse gases are contributing to global warming, leading to anticipated changes in precipitation patterns. Predictions indicate that Southern Africa, in particular, is expected to become 10-20 percent drier by 2050 (IFPRI, 2023).

Climate variability adversely affects agricultural production, influencing food crop prices. Sudden and unexpected climate changes, often due to farmers' unpreparedness, result in reduced total yield and abrupt food price shocks. This scenario leads to a decreased food supply, exacerbating the challenge of meeting the growing demand caused by population increase. High risks of crop failures, especially due to droughts impact countries that heavily rely on food imports. Sudden food price shocks force households to prioritize food over other essential expenses, contributing to hunger, malnutrition, and infant mortality, characteristic of poverty-stricken societies (WFP, 2024). Beyond climate-related issues, conflict poses a significant threat to food security. Conflict, whether social, political, or ethnic, can destroy food sources, displacing individuals from their livelihoods and leading to food insecurity. Conflict entails various costs, including human suffering and socio-economic disruptions, impeding both economic and social growth. Indirectly, conflict contributes to hunger, as displaced individuals struggle to meet their basic needs (FAO, 2024).

1.2 Problem Statement

One of the utmost problems facing the entire globe of current is the increasing not have access to food and the rise of hunger (FAO, 2024). After years of stable reduction, global food shortage has slowly been on the increase since 2015. An estimated 821 million people in the world suffered from food insecurity in 2018. Data from the World Food Program in November 2022 for 26 states in Nigeria and the Federal Capital Territory (FCT) show that the share of those in stressed food security situations with minimally adequate food consumption was at 34 percent of the population. Nigeria is the most populous country in Sub-Saharan and is estimated to be approximately one-fifth of the total population in the region.

Nigeria is a nation that is opportune to have possessed human and natural resources, has the ability to create a large economy and supply the essential needs of its citizens. Still, Nigeria is grouped among the deprived and starving nations of the world (IFPRI, 2023). Nigeria as a country is endowed with immense agricultural resources, over 81million arable and largely fertile hectares with maize, cassava, guinea corn, yam, beans, millet and rice being major crops (Akpan and Udoh, 2023). In spite of increasing local production of staples, the global increase in food prices is adversely affecting food security conditions. Nigeria still highly depends on food importation with over bloated food import bills (FAO, 2024). Having yearly population expansion rate of 2.64% and population of 206, 139,589 people, Nigeria ranked 94th among 113 countries based on the indices of availability, affordability, quality and safety (World Bank, 2023; Global Hunger Index, 2023).

Despite the concentrated efforts of government in make food available through various programs with projects put in place, larger percentage of Nigerians are still not food secure (Akpan and Udoh, 2023). The interplay of climate variability, sudden food price shocks and conflicts contributes to food insecurity. The consequences include hunger, malnutrition and socio-economic disruptions. Despite efforts to address these issues, global hunger has been on the rise since 2015, with Africa facing particular challenges (FAO, 2024). Nigeria, despite its agricultural potential, struggles with food security as a result of factors like rising global food prices and dependence on food imports (IFPRI, 2023). As of 2019, Nigeria ranked poorly in global food security, and despite efforts, a significant percentage of the population remains food insecure (IFPRI, 2023). The deficient of quality and adequate food negatively affects productivity of human resources, hindering the overall economic development of the nation (Akpan and Udoh, 2023). In addressing these challenges, it is crucial to examine the factors contributing to insufficient food consumption and implement effective measures to achieve food security.

Research Objectives

The major objective of the research is to assess the determinants of food security among rural households of selected regions of Nigeria.
Specific objectives are:

- To determine the food security status of respondents in the study area.
- To examine the determinants of food security among the respondents in the study area
- To determine the coping strategies adopted by the respondents in the study area.

Justification

This study justifies its significance by highlighting the pressing issue of food insecurity in Nigeria. FAO's projection of 25.3million citizens liable to severe food insecurity in the nearest year, coupled with challenges such as climate change and security issues, underscores the urgency of addressing this critical issue. The study aims to contribute valuable insights by examining food security and its determinants among farming households in various regions of Nigeria. This regional approach allows for meaningful comparisons and offers policymakers a targeted understanding the sternness of food insecurity in each area. By identifying and addressing the determinants of food security, this study seeks to assist in the formulation of effective policies to enhance household welfare, achieve sustainable development goals and provide region-specific solutions to regions affected by conflicts and natural disasters. The study's outcomes are expected to guide policymakers in implementing measures which tackle multifaceted problem linked to food insecurity in Akwa Ibom being one of the oil and gas producing states and as such seen as wealthy state in Nigeria.

METHODOLOGY

The study utilized a post-harvest data from the General Household Survey, wave 4, panel 2018-2019, obtained from the National Bureau of Statistics. 215 farming households were selected from Akwa Ibom state. The dataset encompassed food consumption data and variables influencing food security over the last 30 days. Descriptive statistics, including percentages, frequency tables and bar charts were employed to depict the food security status and coping strategies against food insecurity. Respondents identified and ranked the coping strategies most applicable to them from a list of potential strategies.
A food security index was established to evaluate the food security status of farming households. Utilizing the FAO food security baseline (2500kcal/adult equivalent/day), households were categorized as either food secure or food insecure. The study followed the same food security baseline recommended by FAO. Data on household food consumption (105 food items) were used to calculate respondents' calorie supply. The resulting per capita daily calorie intake was derived by dividing the calorie value by the number of Adult Equivalents (AE) and further divided by a 7-day recall period.

Model Specification

The food security index is expressed empirically as:

$$Z=\frac{\text{Household's daily per capita calorie availability (A)}}{\text{Household's daily per capita calorie requirements (R)}} \quad \text{.....(i)}$$

Based on Z, some food security measures were calculated: the shortfall or surplus index, P, as

$$P=\frac{1}{M}\sum_{i=1}^{m} GK \quad \text{.....(ii)}$$

$$GK=\frac{(Xk-1)}{I} \quad \text{..... (iii)}$$

P= shortfall or surplus index
X_k= Average daily calories availability to the j^{th}
M = the number of households that are food secured (surplus index) or food insecure (shortfall index)
The head count ratio (h) is given as

$$H=\frac{m}{n} \quad \text{.....(iv)}$$

Where m = the number of food secure or insecure members of the sample population
n = total population understudy.

HFS_i = Total net calorie consumed by a household daily / Household size measured by adult equivalent

Where: HFS_i is Household Food Security of the ith household and i=1, 2, 3…130. Therefore, based on the HFS_i value, the households' food security status was determined that those households whose HFS_i is greater or equals to 2500 kcals per day were generalized as food secured and the others were concluded as food insecure.

Determinants of Food Security Model

The determinants of food security status among farming household in the study area was analyzed using Ordinary Least Square (OLS) regression model.
The general formula for a linear regression model with 'n' independent variables is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_n X_{ni} + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots (v)$$

Where:
Y_i *is the dependent variable.*
$X_{1i}, X_{2i}, ..., X_{ni}$ *are the independent variables (predictor variables).*
β_0, *is the intercept (the value of Y when all X's are zero).*
$\beta_0, \beta_1, \beta_2, ..., \beta_n$ *are the coefficients (regression coefficients) representing the change in Y for a one-unit change in the corresponding X, holding other variables constant.*
ε *is the error term, representing the random variation or unexplained portion of Y.*

Double-log Regression (Log-Log Regression):

The double-log regression model is used when both the dependent variable and the independent variables are transformed logarithmically.

$$InY_i = \beta_0 + \beta_1 In_{HHA} + \beta_2 In_{AMFr} + \beta_3 In_{HZ} + \beta_4 In_{AP} + \beta_5 In_{FEXP} + \varepsilon \dots \dots \dots \dots (vii)$$

Where
Y_i = *Food consumption (Kcal/Adult Equivalent (AE))*
β_0 = *Constant estimate*
$_{HHA}$ = *Household head age (yrs)*
$_{AMFr}$ = *Adult meal frequency (number)*
$_{HZ}$ = *Household size (number)*
$_{AP}$ = *Annual precipitation (mm)*
$_{FEXP}$ = *Food expenditure (₦)*
ε_i = *Error term*

RESULTS AND DISCUSSION

Food Security Status of Rural Households in Akwa Ibom State

The result revealed that in Akwa Ibom, above average of them (64.65%) were food secure while the remaining (35.35%) were food insecure.

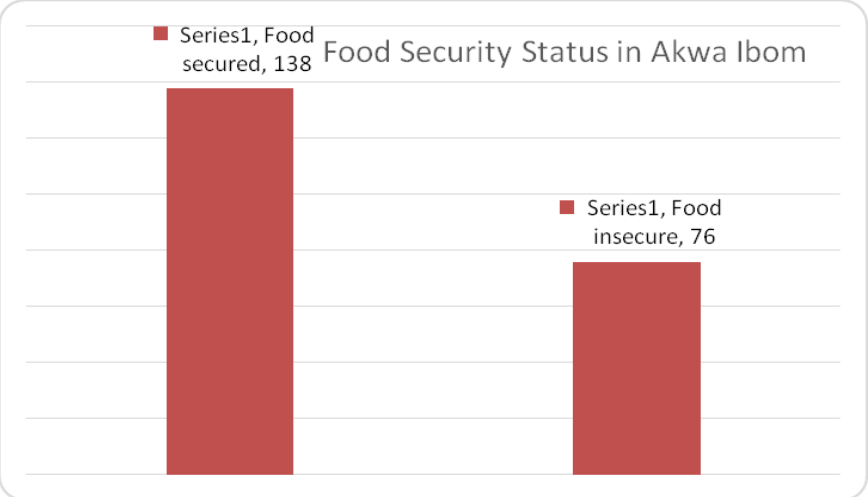

Fig 1: Food Security Status of Akwa Ibom State

Determinant of Food Security Status among Farming Household in Akwa Ibom

The table below showed the determinant of food security status among the sampled farming household in Akwaibom. The household size, food expenditure, household head age were all statistically significant at 1% while annual rainfall was statistically significant at 5% level of significance. The household size has a negative relationship with food security. This implies that household size tends to reduce food security status by 0.1735833. This means that a unit increase in household size leads to a decrease in food security status among the households and it is significant at 1% level of significance. A farmer having more families may be faced with difficulty feeding their families. So, the existence of large number of household size in the household affects their wealth and tends to be food insecure as compared to households with small size. This result is consistent with findings of Echebiri *et al.*, 2017; Endalel *et al.*, 2014; Mut, 2013; Negash and Alemu, 2013; Sani and Kemaw, 2019; Sekhampu, 2013; Welderufael, 2014; Yehuala *et al*., 2018.

The food expenditure i.e. the amount spent on food has a

positive relationship with food security status among the households and it is significant at 1% level of significance. This mean that food expenditure increases food security status i.e. a #1 increase in food expenditure leads to 0.370072 increase in food security status among the households. In other word, the more money they spend on food, the more food secure they are likely to be.
The household head age has a negative relationship with food security among the sampled farming households. This means that household head age reduces the food security by 0.3544058, i.e. a year increase in the household head age brings about a reduction in food security status among farming households and significant at 1% level of significance. This suggests that households with aged household heads tend to suffer food insecurity. This could be as a result of the reduced agility and strength of the bread winner of the household for farming activities which is their predominant occupation (*Echebiri et al.*, 2017; Faustine, 2016; Sani and Kemaw, 2019).

The annual rainfall has a direct relationship with food security among the sampled farming household and it is statistically significant at 5% level of significance. This implies that a millimeter increase in rainfall brings about 0.9012939 increase in food security status of the households. When annual rainfall is in appropriate quantity, it will have positive effect on farming activities and the result will be bountiful harvest of crops.

Table 1: Determinant of food security status among farming household in Akwa Ibom

Lnfssakwa	Coefficients	Std Error	T-value	P>/t/	95% Coef. Interval	
Increase in input Price	0.0684258	0.2238501	0.31	0.760	-0.37288	0.5097316
Lnhsize	-0.1735833	0.0632758	-2.74	0.007***	-0.2983273	-0.0488392
Lnfoodexpt	0.370072	0.0401761	9.21	0.000***	0.2908675	0.4492765
Lnadultmealfreq	-0.0449718	0.1695125	-0.27	0.791	-0.3791547	0.2892111
Lnhouseholdheadage	-0.3544058	0.1316434	-2.69	0.008***	-0.6139321	-0.0948795
Lnannualprecmm	0.9012939	0.3494882	2.58	0.011**	0.2123006	1.590287
Constant	-0.4939356	2.923659	-0.17	0.866	-6.257737	5.269866

10% *, 5% **, 1% ***
Number of obs = 215
F(6, 208) = 17.88
Prob> F = 0.0000
R-squared = 0.3403
Adj R-squared = 0.3212
Root MSE = 0.57647

Coping Strategies Adopted by Households in Akwa Ibom

As a coping strategy, majority (73.95%) of the sampled households were unable to eat healthy, nutritious and preferred food in the last 30 days. Majority (78.60%) ate few kinds of food in the last 30 days. Good number (71.63%) of them adopted the strategy of skipping meals, fasting or starving in the last 30 days. Eating reduced quantity food was an adopted coping strategy for quite large number (78.60%) of them. Average number (50.70%) of them restricted their consumption for their children to eat. A little (11.53%) of them borrowed food or relied on friends or relative for food in the last 30 days.

Table 2: Coping Strategies Adopted by Farming Households in Akwa Ibom

Coping Strategy	**Yes**	**No**	**WMS**	**Rank**
Eating few kinds of food in the last 30 days	169(78.60)	46(21.40)	1.79	1st
Eating reduced quantity in the last 30 days	169(78.60)	46(21.40)	1.79	1st
Eating less nutritious/preferred food in the last 30 days	159(73.95)	56(26.05)	1.74	2nd
Skipping meals/fasting/starving in the last 30 days	154(71.63)	61(28.37)	1.72	3rd
Restrict consumption for children to eat in the last 30 days	109(50.70)	106(49.30)	1.51	4th
Borrow food/rely on friends or relatives in the last 30 days	25(11.63)	190(88.37)	1.12	5th

Note; values in parentheses are percentages
WMS= Weighted Mean Scores

CONCLUSION

This study therefore concluded that the farming households that were food secure were more than those that were not, contrary to general opinion that rural households are food insecure.
Increase in food expenditure and increase in inputs prices significantly improve food security status of the farming households while increases in household size and household head age significantly reduce the food security status of the farming households. The coping strategies adopted by the farming households contribute immensely to their food security status. The prevailing food coping strategies in both regions were eating less

nutritious/preferred food, eating few kinds of food and eating reduced quantity of food.

RECOMMENDATION

The following recommendations are thereby given;

- Agriculture should be well embraced and practiced by both urban and rural, young and old, rich and poor, literate and illiterate so as to ensure improved food security status.
- Farming households are encouraged to spend more on food items than on other item so as to improve their food security status.
- There should be more general sensitization and enlightenment programs on family planning to the rural communities so as to desist from giving birth too much children that will result in large household size that is capable of reducing their food security status.

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