FOOD SECURITY STATUS OF THE FARMING HOUSEHOLDS IN ENUGU STATE, NIGERIA

ARUA, ROSEMARY NNEDINSO*
Department of Agricultural Economics, University of Nigeria, Nsukka.
Email address & phone no: rosemary.arua@unn.edu.ng/ 07039743906 (Corres. author)

MUOMAIFE, RICHAEL CHIDINMA
Department of Agricultural Economics, University of Nigeria, Nsukka
Email address and phone number: chidinma.muomaife.241482@unn.edu.ng/09061680069

IBE, JUSTINA CHITURU
Department of Agricultural Economics, University of Nigeria, Nsukka
Email address and phone number: justina.ibe@unn.edu.ng/ 08060658781

ABSTRACT
The world economy is not growing as expected because of conflict and instability causing migration of large population from place to place. Also climate change impacts on agricultural productivity, food production and natural resources has shifted the food ways to a new food security, nutrition and health challenges. Food insecurity and poverty are significant problems facing the majority of Nigeria as the economy is mainly dependent on agriculture which is susceptible to different shocks, seasonality and trends. This study examined the determinants of the food security status of the farming household in Enugu State, Nigeria and specifically the study i) identified the socio-economic status of farm households; ii) ascertained the food security status of farm households; iii) examined the determinants of food security; and iii) identified the coping strategies adopted. The study used multistage sampling technique to select 160 respondents for the study and data were analyzed using descriptive statistics, food insecurity experience scale and ordered logistic regression. The result shows that greater proportion of the farming households were male (55.0%) and were within the age of 20-39 years. Majority of the respondents (67.6%) attained secondary education and 95% were married. The food security status result shows that majority of the respondents (83.8%) were food insecure while only 6.3% had low food insecurity level. The significant variables that influenced the food security status include age, education level and farm size. The study recommends targeted interventions to enhance food security level which includes training for farmers in order to manage their farm resources properly.

Keywords: Determinants, Farming households, Food security level.
JEL Codes: D1, Q18, Q12

1.INTRODUCTION
The entire world economy is not growing as much as expected. Conflict and instability have increased and become more difficult, encouraging greater population to migrate from place to another. Climate change and increasing climate variability and extremes are affecting agricultural productivity, food production and natural resources which have enormous impacts on food systems and rural livelihoods, including a decline in the number of farmers. These led to major shifts in the way in which food is produced, distributed and consumed worldwide and thus causing new food security, nutrition and health challenges. According to Debeli et *al* (2021) Food insecurity is still a major global concern as 2 billion people in the world experience moderate or severe food insecurity/ Furthermore, more than 820 million people in the world are still starving today, emphasizing the immense challenge of achieving the Zero Hunger target by 2030 (Debeli *et al*., 2021). Hunger is intensifying in almost all sub regions

of Africa and, to a lesser extent, in Latin America and Western Asia. People who are moderately food insecure lack regular access to nutritious and sufficient food, putting them at greater risk of malnutrition and poor health. The major factors contributing towards food insecurity and under nutrition are poverty and inability to afford healthy diets (Osuafor *et al*, 2020).

According to FAO (2013) there are four elements that affect household food security and they are availability of food, access to food, utilization of food and sustainability of access. The type of food insecurity observed in SSA is a combination of widespread chronic food insecurity, resulting from continuing or structural poverty, inadequate power supply and lack of hygienic water. Household food security has been positively influenced by higher education of household heads, higher household incomes and place of residence. The interconnection of social, economic, and biophysical systems to meet people's nutritional requirements is a strong determining factor for food insecurity (FAO 2018). Poverty and food insecurity are crucial and pertinent problems facing Nigeria as the economy is mainly dependent on agriculture which is susceptible to different shocks, seasonality and trends (Bedemo et al, 2014 as cited by Seid et al, 2017). Enugu State, located in southeastern part of Nigeria is not an exception. Recent studies indicate majority of farming households in Enugu Sate suffer food insecurity yet its coping strategies have not been properly studied (Akukwe, 2020; Onyenekwe et al., 2022; Onyenekwe et al, 2025).. Also majority of the studies used different methods other than food Insecurity Experience Scale (FIES) to estimate the food security status (Akukwe, 2020; Obi-Egbede & Owo, 2023; Wudil et al., (2023) This study therefore examined the food security status of the farming households in Enugu State, Nigeria using food Insecurity Experience Scale (FIES). Specifically the study: i) identified the socio-economic status of farm households in Enugu State; ii) ascertained the food security status of farm households; iii) examined the determinants of food security; and iv) identified the coping strategies adopted by the respondents. A review of literature theories and its link to food security status and coping strategies is presented before the description of data and analytical techniques employed in the data analyses for the study. Thereafter, the results are presented and discussed, conclusion drawn and policy recommendations proffered.

2. **LITERATURE REVIEW**

2.1 **Theoretical Literature**

A theoretical framework provides a well thought-out foundation for a research study, directing the development of arguments, and validating the relevance of the research. It introduces and describes the theory that provides explanation for the reality of the research problem being examined (Swanson, 2013). This study was guided by Neo-Mathusian theory and the rational choice theory.

The Neo Malthusian theory extended the idea developed by Thomas Malthus that population growth will outpace the agricultural production leading to inability of the society to address hunger challenges. The theory highlights the pessimistic perspective on agricultural production emphasizing that the society may not be able to produce continuously for its populace. A country like Nigeria with rapid population growth and declining food production, Neo Malthusian theory provides valuable insights into the pressing challenges of ensuring food security sustainability (Onyenkwe et al. 2025).

The next theory is rational choice theory and it can also be called choice theory. This theory is based on the assumption that individuals choose a line of action that they most preferred. The theory explains that individuals anticipate the outcomes of alternative courses of action and calculate that which would be best for them. The rational choice theory is therefore used to model human decision making, especially as it concerns microeconomics, where it helps us to

better understand the behaviour of a society in terms of individual actions which is explained through rationality. These choices are reliable because they are made according to personal preferences. This study applies rational choice theory to elicit the coping strategies adopted by the farming households. Each farm household chose the coping strategies that are most preferred according their rationality.

2.2 **Empirical Literature**

The understanding of the determinants of food security at farming household level and how farming household cope with food insecurity by adopting different measures could be essential to resolving the problem of food insecurity of farming households in Nigeria. Several studies have identified the determinants of food security in Nigeria. Akukwe (2020) found the determinants of food security in SouthEastern Nigeria include marital status, level of education, monthly income, dependency ratio and distance to market. Oyebanjo et al, (2013) found that age, education, household size and farming experience were significant factors influencing food security status of farming households in Nigeria. Wudil et al., (2023) identified extension contact, farm size, rice output and educational attainment as the positive determinants of food security while credit constraints and household size were negatively influencing food security status. The study used household food security index in identifying the food security status of the beneficiaries and non-beneficiaries of an irrigation project in Nigeria.

Furthermore, Obi-Egbede and Owo, 2023 studied the effect of agricultural shock coping strategies on food security among farming households. The study found that most households sampled were food insure and did not adopt any coping strategy. The study also found out that assiatance-based coping strategies enhanced the ability of the households being food secure along with education, credit access and cooperative membership. The study by Ahmed et al., (2024) showed that insecurity has negative effects on food security in Nigeria. Aboaba et al. (2020) found that most rural households to be food insecure as they measure high on the food insecurity scale. The food security categories were significantly influenced by age, gender, marital status, access to credit, dependency ratio, household size, ownership of farmland and farming experience. These studies used several methods such as household food security index, per capital monthly food expenditure and USDA food security questionnaire core module approach to measure the food security status. Besides, a study conducted by Onyenekwe et al., (2025) that used food Insecurity Experience Scale (FIES) to measure the food security status of the farming household but failed to identify the coping strategies of adopted by farming households. This study seeks to fill this gap by providing empirical evidence from Enugu State, Nigeria.

3. **METHODOLOGY**

3.1 **Study Area and data**

The survey study was carried out in Enugu State. Enugu State is located between latitude 5^0 56`-$7^0$6N and longitude $6^0$53`E. The State occupies an area of 71,161Km^2 with an estimated population of 3,257, 298 (NBS, 2020). The State has about 58.45% of her population living in rural areas, where farming is the most predominant means of livelihood (Emeka *et al*., 2015). It has tropical climates marked by two distinct seasons; wet and dry. The vegetation is classified as derived savannah. The scarcity of firms for white-collar jobs in the State has made agriculture the most economically viable source of livelihood for the teaming population, especially for the people in rural communities. The State is divided into six agricultural zones; Agbani, Agwu, Enugu, Enugu-Ezike, Nsukka and Udi. The division into zones was to, among other reasons, help the government coordinate farming activities and manage programmes for farmers more efficiently at grass root level.

A multi-stage sampling technique was used to select the respondents for the study. In Stage 1, four agricultural zones (Agwu, Nsukka, Enugu-Ezike and Udi) were purposively selected from the six agricultural zones in Enugu State. These agricultural zones were selected based on the study's focus on food security status cutting across the two senatorial zones. In stage 2, one local government was randomly selected from each of the selected agricultural zones. In stage 3, a town each was randomly selected from the four selected local government areas. In stage 4, two villages each were randomly selected from these towns making a total of eight villages. In stage 5, 20 farmers were randomly selected from these eight villages giving a total of 160 respondents for the study.

Primary data were used for this study and were collected through the use of structured questionnaires and personal interviews directly from the respondents sampled for the study. The questionnaire was divided into four sections according to the objectives of the study. Therefore, it also elicits responses on the socio-economic characteristics of the respondents, food security status of the farming household, coping strategies adopted by the farming households and limitations faced by the farming households.

Data were analyzed using both descriptive and inferential statistics. Objective (i) was achieved using descriptive statistics such as tables, percentages, and frequency distribution. Objective (ii) was achieved using food insecurity experience scale (FIES). Objective (iii) was achieved using ordered logit regression model. Objective (iv) was achieved using Likert scale rating.

3.2 Model Specification

3.2.1 Food Insecurity Experience Scale (FIES)

The FIES is a statistical scale like other widely-accepted scales designed to measure unobservable traits such as intelligence, personality, and a broad range of social psychology and health-related conditions (FAO, 2025). The responses to the questions must always be examined together as a scale and not as separate items. This scale consists of eight questions regarding people's access to adequate food with simple binary reponses (yes/no) as shown in Table 1. The questions are the experiences of the individual or households and they center on self-reported food-related behaviours and experiences linked with rising difficulties in accessing food due to resource constraints (FAO, 2025).

Table1. Food Insecurity Experience Scale Questions:

Number	Question
	During the last 12 months, was there a time, because of lack of money or other resources:
1	You were worried you would not have enough to eat?
2	You were unable to eat healthy and nutritious food?
3	You ate only a few kinds of foods?
4	You had to skip a meal?
5	You ate less than you thought you should?
6	Your household ran out of food?
7	You were hungry but did not eat?
8	You went without eating for a whole day?

Source: FAO, 2025.

Each of the questions was scored 1 when the household answers in the affirmative. The scores of the items were summed up and this ranged from zero to eight (0-8). The higher the score, the higher the food insecurity experienced by the household. Households that did not answer in the affirmative to any of the questions score (0) were considered food secure, households that scored between one and four (1-4) were categorized as mildly food insecure, households that scored between five and eight (5-8) were categorized as highly food insure.

The scale of food insecurity severity (FIES) is defined on a continuum that goes from being food secure to being highly food insecure. A threshold, or level of severity on the scale must be chosen and used consistently and this defines a certain "class" of food insecurity. It is important to be consistent in the threshold you use in order to be able to monitor food insecurity prevalence over time, to be able to communicate the result effectively and to be able to produce comparable results (FAO, 2018).Respondents can then be categorized as belonging to that class if the severity of their food insecurity is beyond that threshold level. This study used two thresholds classes of food insecurity (food secure or low food insecurity; mild food insecurity and high food insecurity) (FAO, 2018). Several previous studies (for example Onyenekwe et al., 2022; Onyenekwe et al, 2025; Cafiero et al., 2018; Ballard et al; 2013) had used this type of model

3.2.2 Ordered Logistic regression

The ordered Logistic regression is an expansion of the logistic regression used when the dependent variable Y is categorical and has a significant order with more than two categories (Bellizzi et al., 2018). This is one of the most commonly used tools for analyzing the determinants of food security status especially when FIES is used because of its suitability where the dependent variable exhibits sequential ordering but is not continuous (Wooldridge, 2019; Deneke *et al*. 2022). The advantage of the model is that it has easy-to-interpret, straightforward and inituitive results. Considering that the aim of this study is to estimate the determinants of food security status with an ordered or ordinal outcome, ordered logistic became appropriate. Previous studies (for example, Hussayn et al., 2020; Otekunrin, 20022; Onyenekwe, 2025; Mukaila, 2024) had used this model

The ordered logistic regression for food security status was measured in three ordered categories (low = 1, mild = 2 and high = 3), and it is expressed thus, following Adenuga et al., 2023 and Mukaila, 2024);

$$\Pr(Y_i) > j = \frac{\exp(\propto_j + X_i\beta_j)}{1 + \{\exp(\alpha_j + X_i\beta_j)\}}, j = 1, 2, \ldots, M-1$$

Where j = response category of farming households, X_i = vector of explanatory variables, $\alpha_j =$ cut off points for the thresholds of the ordered model, β = vector of the parameters to be estimated and M = number of categories of the ordinal dependent variable, which is equal to 3 (low, mild and high).

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Socio-economic characteristics of farming households

The socio-economic characteristics of the farming households are presented in Table 2 and they include sex, age, marital status, educational level, years of experience in farming, membership of Farmers Based Organization, household size, farm size cultivated and access to credit.

The result of the analysis shows that the majority of the farming household heads were male (55.0%) with the female household heads being less by 45.0%. Majority of the farming households heads fell within the age group of 20-39 (51.3%), followed by the age group 50-59 (23.8%). This signifies that most of the household heads are still in their active, productive workforce, energetic, innovative to participate more in the hurdles involved in the farm and nonfarm businesses as well as other developmental activities. According to Oko*n* et al (2017), this age bracket contained the innovative and adoptable individuals. Middle-aged and energetic household heads are expected to cultivate larger farmers compared to older and weaker household heads.

A higher percentage of the respondents attained some form of formal education, 22.5% and 58.8% had primary and secondary education respectively. This indicates a high level of literacy among the farming household heads. The educational status of an individual in the household

plays an important role in his or her income earning capacity and food expenditure. According to Migotto et al (2019), education is an important part of human capital, which determines participation in both farm and nonfarm activities. This confirms the findings of Mjonono et al (2020) that level of education attained is one of the major factors that positively and significantly influenced business management capabilities which may in turn reduce food insecurity.

The findings show that majority of the farming household heads were married (95.0%), while 2.5% were single and 2.5% were widowed. The result implies that farming is also more attractive to married couple who are engaged in various social and economic commitments. From the result, majority (45.0%) of the farming households had household size of between 5-6 persons, followed by3-4 persons that were 27.0. The number of people living in the household can influence the household food availability and income. This is because members of the farming households can contribute immensely to farming labor supply for increased income into the household. Olayide *et al* (2013) have argued that large household size is an advantage to farming household in terms of its contribution to household labour supply. However, large household size can increase per capita food expenditure of the households thus increasing their likelihood of being food insecure. According to Thamaga-Chitja *et al* (2025), as household size increases, income per head declines and the less food secure the household becomes.

Majority of the farming household heads (32.5%) have years of experience in farming of above 20 years, followed by 23.8% that have 6-10 years experience. This shows that they are experienced in farming and can to a reasonable extent, plan and manage their farm enterprise which in turn boosts food security. From the result, majority (56.3%) of the farming households have 1-3 plots of land that they cultivate. In addition, the result show that majority of the household heads (96.3%) do not have access to credit and also do not belong to any farmers based organization (90.0%) with only 10.0% belonging to some farmer based organization. Membership of a farmer based organization plays a role in the farmer's ability to gain access to farming resources.

Table 2: Socio-economic characteristics of the farming households

Variable	Frequency	Percentage
Sex		
Male	88	55
Female	72	45
Age		
20-29	14	8.8
30-39	68	42.5
40-49	30	18.8
50-59	38	23.8
60- 79	10	6.3
Educational Level		
Primary	36	22.5
Secondary	94	58.8
Tertiary	30	18.9
Marital status		
Single	4	2.5
Married	152	95.0
Widowed/Widower	4	2.5
Household Size		
3-4	36	22.5
5-6	72	46.0
7- 8	36	22.5

9-11	16	10.0
Years of Farming Experience		
1-5	30	18.8
6-10	38	23.8
11- 15	26	16.3
16-20	14	8.8
21- 25	52	32.5
Total farn size cultivated		
1-3	90	56.3
4-6	60	37.5
7-9	4	2.5
10-15	6	3.8
Access to credit		
No	154	96.2
Yes	6	3.8
Membership to farmers organization		
No	144	90.0
Yes	16	10.0
Access to credit		
No	154	96.2
Yes	6	3.8
Membership to farmers organization		
No	144	90.0
Yes	16	10.0

Source: Field Survey 2024

4.2 Food Security Status of Farming Households.

The food security status of farming households is presented in Table 2 and it shows three levels of food security: low food insecurity, mild food insecurity and high food insecurity. The results indicate that majority of the farming households (83.8%) are highly food insecure, while 10.0% are mildly food insecure and fewest of the farming households (6.3%) are lowly food insecure or food secure. This result shows that the farming households may have experienced some challenges in accessing enough food or faced periods of uncertainty pertaining their food supply. Some of the reasons may be the inability of the majority to access credit, being married, having small farm size and not members of cooperatives as stated in Table 2. This is in line with the study done by Onyenekwe et al. (2022) which examined the vulnerability of farming households to food insecurity due to factors such limited access to resources and climate variability. The studies by Akukwe, (2020); Oyebanjo et al., 2013 and Aboaba et al., 2020 which reported majority of their respondents were food insecure.

This is in contrary with the findings of Osuofor et al (2023) who discovered that the greater percentage of the farming households in the study area, both the farm (64.4%) and nonfarm households (73.3%) were food secured. The food insecure farm and nonfarm households were 18.1% and 19.5% far off from the minimum level of calorie requirement, respectively. And also contrary with the findings of Asa *et al* (2016) who revealed that 86.7% of farming households were food secure while 13.3% were food insecure.

Table 3: Food insecurity status of the respondents

Variables	Frequency	Percent
Low	10	6.3
Mild	16	10.0
High	134	83.8
Total	160	100.0

Source: Field Survey 2024

4.3 Determinants of food security status among farming household

Table 4 presents the determinants of food security status of the farming households. The age of the household head positively influenced the level of food security status of the farming households $(P < 0.01)$. This shows that the food security status of the farming households increased alongside age. The age of household head will determine whether the person will be able to get involved in a paid job, *ceteris paribus.* Thus a farming household with a household head that is in active age will have a better food security status. This corroborates with previous findings by Oyebanjo et al. (2013) and Aboaba et al. (2020) that age positively influenced food security status.

Education level positively influenced the food security status of the farming households $(P < 0.1)$. This implies that food security status of the farming households increased as the education level increased. This is because the higher knowledgeable a farming household, the better the nutrition and production decisions that will be taken (Bassey et al. 2014). This result is in line with the findings of Akukwe, (2020); Ogunniyi *et al* (2021) and Ajaero (2017).

The total farm size negatively influenced the food security status of the farming households $(P < 0.05)$. This implies that food security status of the farming households decreased as the size of farm cultivated increased. This is contrary to the *apriori* expectations and findings of Onyenekwe et al (2022), who found out that larger farm size increases the probability of households being food secured. The reason for this result may be due to mismanagement of resources, one can have as much as possible farm size and lack the managerial skills with which to efficiently and effectively manage it. The farmers may be spending much to cultivate large hectares of land but the output may not be commensurate with what was spent. This implies that the farm inputs are not properly used, that the farmers lack the expertise to use improved varieties and technologies accessible to them.

Table 4: Determinants of Food Security Status of the Farming Households

Variables	**Coefficient**	**Std. Error**	**z**	P > z
Age	1.530326***	0.534935	2.860770	0.0042
sex	-0.545037	0.818437	-0.665949	0.5054
Educational level	2.631618*	1.356677	1.939753	0.0524
Marital status	0.320604	1.439843	0.222666	0.8238
Total farm size	-1.253604**	0.526115	-2.382758	0.0172
Farming experience	-0.719995	0.609119	-1.182027	0.2372
Household size	-0.099748	0.562188	-0.177428	0.8592
Credit access	-0.115852	0.265206	-0.436840	0.6622
/cut 1	0.979602	5.059243	0.193626	
/cut 2	2.435965	5.047252	0.482632	
Pesudo R-squared	0.264049			
Schwarz criterion	1.360336			
Hunnan-Quinn criterion	1.181960			
LR statistic	23.32342			
Prob(LR statistic)	0.002973			

*= P < 0.1, ** = P < 0.05, *** =P < 0.01

Source: Field Survey, 2024.

4.4 **Coping strategies of farming households**

Table 5: coping strategies adopted by the respondents

Variable	Mean	Std. Deviation
Limiting portion size	3.18*	1.24
Less preferred food	2.97*	1,23
Skipping meals	2.36	1.33
Borrowing food/money	2.29	1.21
Maternal buffering	2.06	1.28
Depending on wild life	1.99	1.23
Migration	1.84	1.15
Large scale food stockpiling	1.80	1.09
Alternative diets	1.61	0.96

Source: Field Survey, 2024

The results of coping strategies adopted by farming households to cope with food insecurity are presented in table 5. Limiting portion size at meal times (3.18) and less preferred food (2.97) was the very serious strategy used by farming households because they are above 2.55 cut-off limit from the 4-point likert scale while skipping meals, borrowing food/money, maternal buffering, depending on wild life, migration, large scale food stockpiling, alternative diets were not serious strategies used by farming households because they are below 2.55 cut-off limit from the 4-point likert scale. Limiting portion size was the first very serious coping strategy adopted by the farming households. This result is consistent with the findings of Orewa & Iyanbe (2010), who reported that when faced with a food shortage, rural households in Edo state, Nigeria, begin to limit or ration their food intake. This is followed by diverting to less preferred food (2.97) which is also a very serious strategy. This result is consistent with that of Akerele *et al* (2013), who discovered that this strategy is most commonly used among rural households in South West Nigeria. The high rate of use of this strategy in the study area could be linked to the high market price of basic food stuffs as a result of the country's current economic downturn. The low household income in comparison to the high food prices forces households to consume or rather divert to less preferred food such as eating wild fruits or less quality food or buying the type of food (regardless of quality) that the available cash within the household can afford just to ensure that there is food for the household to eat.

CONCLUSION AND POLICY RECOMMENDATIONS

The study set to investigate the food security status of the farming households in Enugu state, Nigeria. Based on the findings, the entire farming household experienced food insecurity but the degree of severity was different. Greater percentage experienced high food insecurity while the least percentage experienced low food insecurity. The coping strategies such as limiting the portion size and eating less preferred food; and some factors such as age and education level improved the food security status of the farming households while farm size negatively affected the food security status. Based on the findings, policies should be targeted at increasing farming households' access to education in order to increase their knowledge. The government's basic education policy should not be only for primary education but should increase beyond the primary level to tertiary levels. The government should also organize trainings targeted at improving farmers' efficiency and effectiveness in the use of farm resources especially farm land.

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