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Abstract

Food insecurity is one of the most pressing development issues confronting the world, particularly in developing countries such as Nigeria. This study investigated household food insecurity and its determinants in rural communities of Ogun State, Nigeria, using primary data that were obtained from 285 respondents across the study area. The data obtained were analyzed using the food insecurity index and a binary logistic regression model. The headcount food insecurity index estimation showed that less than half (40.5%) of the rural households were food insecure, while the remaining 59.5% were food secure. The result of the binary logistic regression model revealed that the household income ($p<0.05$), farm size ($p<0.10$), level of education ($p<0.10$) gender of the household head ($p<0.05$), and household size ($p<0.01$) had a significant effect on household food insecurity status in the study area. The study concluded that there were more food-secure households than food-insecure households in the study area and recommended implementing policies to enhance income generation, expand access to farmland, promote family planning, and prioritize education for rural household heads to improve food security in the study area.

Keywords: Rural household, hunger, food insecurity, food accessibility, food expenditure, SDG indicator 2.1.1

Insécurité alimentaire des ménages et ses déterminants dans les communautés rurales de l'État d'Ogun, au Nigéria

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Résumé

L'insécurité alimentaire est l'un des problèmes de développement les plus urgents auxquels le monde est confronté, en particulier dans les pays en développement comme le Nigéria. Cette étude a examiné l'insécurité alimentaire des ménages et ses déterminants dans les communautés rurales de l'État d'Ogun, au Nigéria, à partir de données primaires recueillies auprès de 285 répondants dans la zone d'étude. Les données obtenues ont été analysées à l'aide de l'indice d'insécurité alimentaire et d'un modèle de régression logistique binaire. L'estimation de l'indice d'insécurité alimentaire par personne a montré que moins de la moitié (40,5 %) des ménages ruraux étaient en situation d'insécurité alimentaire, tandis que les 59,5 % restants étaient en sécurité alimentaire. Les résultats du modèle de régression logistique binaire ont révélé que le revenu du ménage ($p < 0,05$), la superficie de l'exploitation agricole ($p < 0,10$), le niveau d'éducation ($p < 0,10$), le sexe du chef ou de la cheffe de ménage ($p < 0,05$) et la taille du ménage ($p < 0,01$) avaient un effet significatif sur le statut d'insécurité alimentaire des ménages dans la zone d'étude. L'étude a conclu que le nombre de ménages en sécurité alimentaire était supérieur à celui des ménages en situation d'insécurité alimentaire dans la zone étudiée et a recommandé la mise en œuvre de politiques visant à favoriser la création de revenus, à faciliter l'accès aux terres agricoles, à promouvoir la planification familiale et à prioriser l'éducation des chefs de ménage ruraux afin d'améliorer la sécurité alimentaire dans cette zone.

Mots-clés : ménage rural, faim, insécurité alimentaire, accessibilité alimentaire, dépenses alimentaires, indicateur ODD 2.1.1

1.0 Introduction

Food is indeed a fundamental necessity for life, serving as the primary means of sustenance. When consumed appropriately, both in quantity and quality, it is essential for maintaining health and productivity (World Health Organization [WHO], 2024; Food and Agriculture Organization [FAO], 2021). The persistent gap between food demand and supply in rural communities of Ogun State remains one of the most pressing development challenges in the State. Despite global advancements in food production, household food security is not guaranteed in most of the rural communities in Ogun State. This discrepancy can be attributed to various factors, including unequal resource distribution, disparities in agricultural productivity, and differing motivations for food production. As a result, even with increases in global food production, food insecurity and malnutrition remain significant challenges, particularly in developing nations like Nigeria. Studies show that while food production has risen, issues such as economic inequality, inadequate infrastructure, and limited access to nutritious food continue to undermine efforts to achieve food security in many regions (FAO, 2021; World Bank, 2020).

Food security, as described by international organizations such as the FAO, International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP), and WHO (2024), refers to a condition where individuals have consistent physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for a healthy and active life. This concept can be broken down into four key dimensions: food availability, economic and physical access to food, proper food utilization, and stability of food access over time. According to Akerele et al. (2013), food-secure people constitute a pool of potential that is capable of transforming a nation into a developed state. However, this may not occur if their health is compromised by nutritional deficiencies.

With only four years remaining until 2030, trends in hunger and food insecurity remain troubling, with progress falling short of achieving the goal to end hunger and food insecurity (SDG Target 2.1). Similarly, global nutrition indicators suggest that the world is not on course to eliminate all forms of malnutrition (SDG Target 2.2). Billions of individuals worldwide continue to face barriers to accessing nutritious, safe, and sufficient food (FAO, IFAD, UNICEF, WFP and WHO, 2024). Most of these people are from developing countries, especially in Asia and Africa. The assessment of global hunger in 2023, measured by the prevalence of undernourishment (PoU) (SDG Indicator 2.1.1), reveals a continuing lack of progress towards the goal of Zero Hunger. A recent study by Nigeria's international development partners, reported by Anyaogu (2024), found that over 31.8 million Nigerians face acute food shortages, exacerbated by security challenges and the removal of fuel subsidies. The rise in food commodity prices, resulting from the removal of fuel subsidy in addition to security challenges for farmers on the farm, has placed millions of Nigerians in a precarious situation. This significant increase from the 18.6 million reported in late 2023 highlights the complex interplay of economic and security factors affecting food access.

Food insecurity, or the inability to access a nutritionally adequate diet, can manifest in various forms at the household or national level. Chronic food insecurity arises when food supplies consistently fail to meet the nutritional needs of all individuals. On the other hand, transitory food insecurity occurs when there is a temporary decline in access to adequate food due to instability in food production, increases in food prices, or income shortfalls (Omonona & Agoi, 2007).

Accurate assessment of household-level food security indicators is crucial for developing targeted policies and interventions to support vulnerable populations and effectively address food insecurity. This is due to the fact that identification of household behaviours relating to food access serves as a critical building block for the development of policies and programs for helping vulnerable populations, the effective targeting of assistance, and the evaluation of impact (Ehebhamen et al*.,* 2017).

In Nigeria, studies by Omonona and Agoi (2007), Orewa and Iyanbe (2009), and Egwue et al. (2020), among others that have investigated the causes of food insecurity, have focused only on national or regional scales. This does not reflect the realities of rural households and micro-level research that relies on current, location-specific data. Additionally, many of the previous studies were carried out prior to the current economic downturns and rising input costs, which have made the farming households in the study area more vulnerable. This study intends to fill these gaps in the literature by investigating the current situation and determinants of household food insecurity in the rural communities in Ogun State, Nigeria.

This study provides useful insights into the factors influencing food insecurity in rural areas by applying a household-level analytical approach that combines socio-economic and agroecological variables. This work aligns with broader efforts to find sustainable solutions to improve food security in rural communities in Nigeria.

2.0 Literature Review

The definition of food security as a condition where all people, at all times, have physical, social, and economic access to adequate, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life is widely recognized. This concept is endorsed by major international organizations such as the FAO and the WHO. For instance, the FAO's 2022 report "The State of Food Security and Nutrition in the World" affirms the advantage of ensuring that everyone has access to adequate food. Similarly, the WHO highlights the multifaceted nature of food security, with a focus on availability, access, utilization, and stability as key pillars.

The main approaches to measuring food security include several frameworks that capture different dimensions of access to food. The food availability approach focuses on the balance between food supply and population growth, highlighting the need for a steady and sufficient food production to meet the demands of a growing population (FAO, 2022). The income-based approach emphasizes the economic access to food, where individuals' purchasing power determines their ability to acquire sufficient food (Ruel et al., 2023). The basic needs approach ensures that all people have access to a minimum standard of living, which includes adequate nutrition, safe water, and shelter, underscoring the role of broader social development in food security (Gasper, 2023). The entitlement approach**,** developed by Amartya Sen, highlights how access to food is shaped by social and economic rights, where food security is closely tied to individuals' entitlements through income, assets, and social support (Gasper, 2023). Additionally, the expenditure approach looks at household spending patterns on food, indicating that those with higher levels of expenditure are more likely to achieve food security (Leroy et al., 2025; Scott et al., 2024). These approaches, when used together, provide a comprehensive understanding of the multiple factors affecting food security.

Omonona and Agoi (2007) explored food security and insecurity among urban households in Nigeria. Their study found that the incidence of food insecurity in the area was 0.49, with higher rates observed among households where the head of the household was aged between 61 and 70 years (0.58) compared to those in the 21–30-year age range (0.30). The study also noted that food insecurity was relatively lower among individuals in professional occupations and higher among traders.

Babatunde et al. (2007) studied food security in rural farming households in Kwara State, Nigeria. The study revealed that 36% of the respondents were food secure, while 64% were food insecure. The results showed that the key determinants of food security were income, household size, the head of household's education, and food production. The study suggests a multi-dimensional approach for effective food security interventions to improve sustainable food security in the study area.

Similarly, a study by Orewa and Iyanbe (2009) assessed household food insecurity in Nigeria and found that, on average, only 31% of households in the surveyed areas were able to meet the FAO's minimum daily calorie intake. Rural households were more likely to meet this daily requirement (30.43%) compared to low-income urban households, where only 20.45% met the recommended daily calorie intake. However, a higher proportion of low-income urban households (25%) met the recommended daily protein intake than rural households (19.6%). The study highlighted that undernourishment and malnutrition remained significant issues in Nigeria, with many households failing to meet minimum dietary standards.

Omotesho et al. (2010) used discriminant analysis to evaluate the prevalence of poverty and food security among rural households, which make up the majority of Nigeria's food producers. Access to health services, household size, farm size, and food spending were shown to be important factors in determining food security status, with household calorie and protein requirements serving as the foundation for classification. Furthermore, one of the main factors impacting the likelihood that households would not be in poverty was non-farm income. The study recommended family planning programs and focused activities for food-insecure households and the rural poor as effective policy measures.

Egwue et al. (2020) conducted a study on rural household food insecurity during the COVID-19 pandemic in South-East Nigeria. Their findings revealed that 69.5% of households were food insecure, while only 30.5% were food secure. The food-secure households had an average household size of five, while food-insecure households had an average of nine members. The headcount ratio for food-secure households was 0.30, compared to 0.70 for food-insecure households. Their study revealed that positive drivers of food security included marital status, educational level, cooperative membership, and the annual income of household heads.

Mukaila et al. (2020) examined the food security determinants and coping strategies among vegetable farming households in Kwara State, Nigeria, using primary data from 180 respondents. The findings of the study revealed that 45.55% of the respondents were food secure. Food-secure households exceeded the food security line by 17%, while food-insecure households fell below it by 36%, with an average daily calorie intake of 1,581.35 kcal. The results showed that the key determinants of food security include respondent income, cooperative membership, vegetable production, and access to credit facilities. The study suggested encouraging vegetable production and expanding credit availability in order to increase household food security in the study area.

Ranta et al. (2025) studied food security in urban households in Kano State, Nigeria, focusing on socio-economic factors such as income, gender, age, education, and dependency ratio. The study found that higher dependency ratios and larger households increased food insecurity, while higher education and income reduced it. The study recommends increased education and alternative income-generating activities.

Tchuente et al. (2024) investigated the food security status and dietary diversity in semi-urban areas of Cameroon's West, Northwest, and Littoral regions. Dietary diversity was evaluated using a 24-hour dietary recall, and food security status was calculated by adding the scores for individual dietary diversity and food consumption. The findings showed a medium level of dietary diversity with the mean dietary diversity score of 3.53 ± 1.44. The study further revealed that the majority of the respondents still experience food insecurity, even though around half of the respondents were food secure. The study concluded that in order to increase diet quality and raise overall food security in Cameroon, specific food security policies and nutritional interventions are required.

A scoping review by Onyango et al. (2025) found that food security initiatives often fail to meet the cultural needs of Black-identifying immigrants in Canada. Barriers included the unavailability of familiar food options, transportation difficulties, poor accessibility of ethnic food stores, and financial constraints. Sociocultural factors like perceived stigma and discrimination in employment and migration exacerbated these challenges. The study emphasized the need for culturally relevant food security programs that recognize food as an integral part of cultural identity and holistic well-being, addressing both nutritional and socio-cultural dimensions of food insecurity.

The reviewed empirical research from both inside and outside Nigeria showed a variety of factors that can influence food security, from institutional and environmental effects to socio-economic and demographic factors. While these studies offer insightful information, the majority focused on specific geographic areas, paying little attention to the distinct socio-economic circumstances of rural farming communities in Ogun State. This literature gap emphasizes the necessity of more research on the variables influencing rural households' food security among rural households.

3.0 Material and Methods

The study was conducted in Ogun State, Nigeria. The State is located in the southwestern region of Nigeria. Ogun State covers an area of 16,743.2 km² and is divided into 20 Local Government Areas (LGAs), which are further categorized into four political zones: Egba, Yewa, Ijebu, and Remo. To ensure a representative distribution of respondents across the state, a multistage sampling technique was adopted for this study. In the first stage, one local government area was purposefully selected from each of the four political zones. Thus, Odeda LGA was selected from Egba zone, Odogbolu LGA was selected from Ijebu zone, Sagamu LGA was selected from Remo zone, and Yewa North LGA was selected from Yewa zone. This approach aimed to provide a thorough representation of the diverse factors influencing household food insecurity across different zones of the study area.

The second stage involved random selection of five farming communities from each of the four selected LGAs. In the third stage, which is also the final stage, respondents were selected proportionately from each of the five communities, based on their population size. After determining the proportional number of respondents to be drawn from each of the communities, simple random sampling was used to select the required respondents. This method ensured that every

eligible household in that community had an equal chance of participating in the study while preserving proportional representation across the communities. Thus, questionnaires were distributed to 285 randomly selected household heads. Table 1 presents the distribution of respondents across the study area.

Table 1. *Sampling Procedure and Sample Size*

Division	**Number of selected Local Government Area**	**Selected locality**	**Number of households selected**
Egba	Odeda	1.Agbetu	12
		2.Atebo/papa	9
		3.Bakatari	10
		4.Idera	16
		5.Olodo	26
Yewa	Yewa North	1.Imala oko	10
		2.Igan ikoto	17
		3.Idi-eme	13
		4.Sawonjo	14
		5.Igan Alade	17
Ijebu	Odogbolu	1.Ibido	12
		2.Ala	11
		3.Isanya	20
		4.Okelamuren	16
		5.Laworo	9
Remo	Sagamu	1.Simowa	18
		2.Odelemo	14
		3.Shotubo	13
		4.Agunfoye	15
		5.Abatiwa	13
		Total	285

Source: Authors, Field Survey 2025.

3.1 Model Specification

3.1.1. Household's Food Insecurity Status. The food insecurity index was estimated using the expenditure approach as used by Omonona and Agoi (2007), Arene and Anyaeji (2010), and more recently outlined by Scott et al. (2024). This method was employed to categorize respondents into food-secure and food-insecure households, thereby determining the food insecurity status of each household. The expenditure approach is widely recognized for its ability to accurately reflect household food security by assessing consumption patterns and income allocation, providing a robust framework for this analysis. Below is the expression:

$$\text{Fi} = \frac{Per\ capita\ monthly\ food\ expenditure\ for\ ith\ household}{\frac{2}{3} mean\ per\ capita\ monthly\ food\ expenditure\ of\ all\ household} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where Fi = Food insecurity index. When Fi ≥ 1, it implies that the ith household is food secure, but when Fi < 1, it implies that the ith household is food insecure. A food secure household is one that has a per capita monthly food expenditure of at least two-thirds of the mean per capita monthly food expenditure. According to Omonona and Agoi (2007), a household is considered food secure if it attains at least two-thirds of the average per capita food expenditure per month, and is considered food insecure if it falls below two-thirds of the average per capita food expenditure. The per capita monthly expenditure (MPCE) is calculated by dividing the total monthly household food expenditure by the number of household members, based on the information provided on major food categories like cereals, legumes, vegetables, fruits, meat, fish, and dairy products.

The mean MPCE was then computed using the formula:

$$\text{MPCE} = \frac{Total\ per\ capita\ expenditure\ for\ all\ household}{Total\ number\ of\ households} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The MPCE was used to assess household food insecurity using the food expenditure share approach. Households were classified based on the proportion of total expenditure allocated to food, with higher food expenditure shares indicating limited income for non-food needs, and lower shares indicating food security, serving as a reliable monetary indicator for rural households.

However, this study did not account for differences in household composition using adult-equivalent scales because detailed information on the numbers of children, adult males, and adult females in each household was not available. Consequently, household size was used in calculating the MPCE. This may affect the accuracy of food expenditure estimates since food needs differ across age groups and between males and females.

3.1.2. Binary Logistic Regression Model. A binary logistic regression model was used to identify the factors influencing household food insecurity in the study area. This statistical method is used to assess whether the probability of a binary outcome is associated with a set of explanatory variables. The model is specified as follows:

Prob (Event) = Prob (*Y*, represents ith household is food secure, and 0 otherwise).

The binary model is estimated using the following specification.

$$y^{*}= \begin{cases} y = 0, & if\ U\ V^{0} \geq U(V^{1}) \\ y = 1, & if\ UV^{0} < U(V^{1}) \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where y^{*} is the unobservable latent value of the household, and V^{0} and V^{1} represent the expected outcomes of food security and non-food security in a certain period. The equation shows that a household would be regarded as food insecure when the total income for the month is on the poverty line or below. The empirical model of household i on period t can be written as:

$$yit^{*} = \beta_0 + \beta_i X_{it} + \mu_{it}$$

$$yit = 1\ if\ yit^{*} > 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$yit = 0 \text{ Otherwise}$$

Where yit^{*} is the unobservable value of household I in time t, yit is the observable choice, X_{it} is the explanatory variable for a household I, β_i is a vector of coefficients for the household$I$, and μ_{it} is a vector of unobservable

characteristics related to household i in time t. Our empirical strategy is based on the operation that household status is not a nested problem. Therefore, we have a binary response as:

$E(yit^{*}\| X_{it}, \mu_{it}) = \beta_o + \beta_1 X_{it} + \mu_i$ ..... (5)

Where a binary response y_{it}, we have $E(yit^{*}\|X_{it}, \mu_{it}) = \pi_{it} = \Pr(y_{it} = 1)$ and a generalized intercept model for the dependency probability π_{it} on X_{it} is:

$F^{-1}(\pi_{it}) = \beta_0 + \beta_1 X_{it} + \varepsilon_i$ ..... (6)

Where F^{-1} is the link function, which is the inverse cumulative distribution function of a known distribution. In the logit model,$F^{-1}(\pi_{it})$ is the log-odds that y=1. Thus, this gives us the equation:

$log\left(\frac{\pi_{it}}{1-\pi_{it}}\right) = \beta_0 + \beta_1 X_{it} + \mu_i$..... (7)

Therefore, β_1 is the effect of one unit change in x on the log odds that y = 1, while holding the household effect μ_i constant. Simply put, we are looking at the effects of x on household food insecurity status.

Let X_i represent the set of parameters that influence the food security of the *i*th household. Z_i is a direct utility, which is a linear function of k explanatory variables (X). These are expressed as follows.

$Z_i = \beta_0 + \sum_{i=1}^{n} \beta_i X_{ki}$ ..... (8)

Where β_0 is the intercept, $\beta_1, \beta_2, \ldots\ldots\ldots\ldots \beta_i$ are coefficients associated with the explanatory variables $X_i \; X_2, \ldots\ldots\ldots\ldots\ldots \; X_{ki}$ Factors in a vector X explain the probability of the *i*th household being food secure.

$P_i = \frac{e^{zi}}{1+e^{zi}}$ ..... (9)

Where P_i denotes the probability that the *i*th household is food secure, and $(1 - P_i)$ is the probability that the household is food insecure. The odds (Y=1 versus Y = 0) to be used are defined as the ratio of the probability that the household is food secure(P_1) to the probability of food insecurity $(1 - P_i)$ namely odds $= {}^{P_i}/_{(1-P_I)}$. By eliminating the natural log, we get the following equation:

$L_I = ln\left(\frac{P_i}{1-P_i}\right)$ ..... … (10)

Where L_i = log of the odds ratio, P_i = probability of being food secure, and $(1 - P_i)$ = the probability of being food insecure.

$P_I = \frac{1}{1+e^{-zt}}$ ..... (11)

The value of Z_I is referred to as the log of the odds ratio in support of being food insecure and is calculated as:

$Z_I = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots\cdots \beta_n + \mu$ ..... (12)

Where β_0 = intercept term.

$\beta_1, \beta_2, \beta_3, \ldots\ldots\ldots \beta_n$ are slopes of the parameter of the model, which measure L_i for a unit change in explanatory variables.

Y (Household Food Security Status): A binary variable where food-secure households were coded as 1, and food-insecure households were coded as **0**.

X_1 ····· X_n are factors that explain the factors influencing the food security of a household. The explanatory variables included in the model are:

X_1= Age of respondent (Years)

X_2= Household income per annum (₦)

X_3= Farm size of a household (ha)

X_4= Household size

X_5= Working experience (years);

X_6 =Co-operative membership; (1 if yes; 0 if otherwise);

X_7= Level of education of the household head (years);

X_8 = Gender of the household head (1 for; male, 0 for female);

X_9 =Diversification Index (number and types of crops cultivated during the farming season)

X_{10} = Household production enterprise (1 if farm enterprises alone, 0 otherwise)

X_{11}= Dependency ratio (the proportion of household members that are not working to those members of the household that are working)

X_{12}= Access to extension agent (1 if yes, otherwise 0);

X_{13}= Source of labour (1 if hired labour, otherwise 0)

X_{14} = Dietary diversity (low dietary diversity =0, high dietary diversity =1)

The food insecurity status was measured using Omonona and Agoi's (2007) method, where a household is considered food secure if it attains at least two-thirds of the average per capita food expenditure per month, and the sampled households are considered food insecure if they fall below two-thirds of the average per capita food expenditure.

To ensure the reliability of the estimated parameters, multicollinearity diagnostics using the Variance Inflation Factor (VIF) and the pairwise correlation matrix approach were conducted to ensure parameter reliability. Results showed no multicollinearity problem, and the explanatory variables were found to be sufficiently independent and suitable for regression analysis.

4.0 Results and Discussions

4.1 Dominance Analysis of Socio-economic Characteristics of the Respondents

Table 2 shows the socio-economic characteristics of the respondents in the study area. The results indicate that respondents are primarily middle-aged, with an average age of 49 years. About 50.2% of respondents are between 41 and 50 years old, indicating they are still strong and active enough to engage in livelihood and household activities.

The study further revealed that the majority of the household heads are male. About 98.5% were male, while only a few were female. This shows that men constitute the major proportion of household heads in the study area.

About 87% of respondents were married, suggesting that many households benefit from family support and shared responsibilities among household members. In terms of education, 53% of respondents had completed primary

school, about 32.3% had secondary or higher education, and only a small number had no formal schooling.

Household size in the study area was generally large, with an average of seven persons per household. Large household size usually puts pressure on food needs and on food expenditure. Most of the respondents, about 76%, were members of cooperatives. This helped them in getting access to soft loans, information, and other forms of support that could improve their welfare and food security.

Slightly more than half of the respondents (51.5%) relied primarily on farming, while others combined farming with petty trading or other small jobs to supplement their income. In addition, 55.5% of respondents had 16–20 years of farming experience, with an average of 18 years.

Most of the farmers worked on small plots of land. About 35.8% of respondents cultivated between 3 and 4 hectares, with an average farm size of 4.6 hectares. This shows that the majority of the respondents are small-scale farmers. Income was generally low, with about 43% of respondents earning ₦90,000- ₦120,000 per month, while 29.5% earned less than ₦90,000. On average, households earned ₦46,880.54 per month, while their average monthly spending on food was ₦29,013.85. This shows that a large share of their income goes on food, as most households spend between ₦20,000 and ₦30,000 per month on feeding.

Table 2. *Socio-Economic Characteristics of the Respondents*

Characteristic	**Category**	**Frequency**	**(%)**	**Mean**
Age (years)	≤30	21	7.4	
	31–40	43	15.1	
	41–50	143	50.2	48.5
	51–60	48	16.8	
	61–70	21	7.4	
	>70	9	3.2	
Gender	Male	4	1.5	
	Female	281	98.5	
Marital status	Single	18	6.3	
	Married	247	86.5	
	Widowed/Divorced	20	7.2	
Education level	No formal education	42	14.7	
	Primary education	151	53.0	
	Secondary & above	92	32.3	
Household size (persons)	1–3	42	14.7	
	4–6	35	12.3	
	7–9	208	73.0	7
Cooperative membership	Yes	215	75.5	
	No	70	24.5	
Primary occupation	Farming	147	51.5	

Characteristic	Category	Frequency	(%)	Mean
	Others	138	48.5	
Years of farming experience	<10	20	7.0	
	11–15	91	31.9	
	16–20	158	55.5	18
	> 20	16	5.6	
Farm size (ha)	≤2	63	22.1	
	3–4	102	35.8	4.6
	5–6	78	27.4	
	7 and above	42	14.7	
Monthly household income (₦)	< ₦90,000	84	29.5	
	₦90,000–₦120,000	123	43.0	46,879.54
	> ₦120,000	78	27.5	
Monthly food expenditure (₦)	Below ₦20,000	97	34.0	
	₦20,001–₦30,000	123	43.0	29,013.85
	₦30,001–₦40,000	38	13.5	
	₦40,001–₦50,000	10	3.5	
	Above ₦50,000	17	6.0	
	Total	**285**	**100**	

Source: Field survey, 2025.

4.2 Household's Food Insecurity Status

The food insecurity profile of rural households in Ogun State, Nigeria, presents significant insights into the socio-economic conditions that affect food security in the study area. As presented in Table 3, the food insecurity line, which is calculated as two-thirds of the mean per capita food expenditure of the total households, was determined to be ₦8,136.53 per month. This line was based on the 2008 World Bank revised purchasing power parity (PPP) figure of $1.25 per day. This methodology is consistent with global food insecurity measurement standards, where households with a per capita expenditure below ₦8,136.53 are considered food insecure, and those with expenditure at or above this threshold are considered food secure.

The headcount index, which measures the proportion of households that fall below the food insecurity line, showed that 40.5% of the households were classified as food insecure, while the remaining 59.5% were classified as food secure. This finding is consistent with the earlier studies of Hoddinott et al. (2002) and Adeyemo et al. (2023). For instance, studies by Hoddinott et al. (2002) and Adeyemo et al. (2023) have consistently shown that a significant proportion of rural populations in sub-Saharan Africa experience varying degrees of food insecurity due to factors such as limited access to resources, income disparity, and climatic variability.

The headcount index of 40.5% also suggests that while a majority of households in Ogun State may be able to secure enough food for their household members, a substantial proportion still faces food insecurity, often due to inadequate income, seasonal fluctuations in food availability, and other socio-economic challenges. This observation is consistent with an earlier study by Nweke et al. (2025), who noted that food insecurity is disproportionately high in rural areas where agricultural productivity is low, and households rely heavily on informal or subsistence farming. Furthermore, the study by Egwue et al. (2020) on rural food insecurity during the COVID-19 pandemic in South-East Nigeria found that economic disruptions significantly exacerbated food insecurity in rural households, with a similar pattern of households being categorized based on their food expenditure.

This profile also underscores the importance of policies aimed at improving the economic access of rural households to food. For example, improving agricultural productivity, diversifying income sources, and enhancing social safety nets could be effective in reducing food insecurity in Ogun State and similar regions across Nigeria. It is also worth noting that the variation in food security status based on income levels highlights the critical role of economic policies that target poverty alleviation, especially in rural areas, as evidenced in the works of Orewa and Iyanbe (2009), which identified income as a major determinant of food insecurity in Nigerian households.

Table 3: *Food Insecurity Status Distribution*

Food Security Status	**Frequency**	**Percentage**
Food Insecure	115	40.5
Food Secure	170	59.5
Total	285	100.0

Source: Author Computation, 2025.

4.3 Determinants of Food Insecurity in Rural Communities of Ogun State, Nigeria

The logistic regression model was used to examine the factors associated with food insecurity among rural farming households in Ogun State, Nigeria. Table 4 presents the results of the Logit regression analysis. The results, presented as coefficients (β) and marginal effects (ME), indicate the direction and relative strength of associations between explanatory variables and the probability of food insecurity. The model was well fitted, as evidenced by a significant Chi-square value of 140.57 at the 1% level. The results revealed that household income, farm size, household size, level of education, and gender of the household head significantly influenced food insecurity status in the study area.

The analysis showed that household income was negatively and significantly associated with food insecurity at 5% level (β = -0.0687; ME = -0.0165; z = -2.47). This indicates that households with higher incomes tend to experience lower levels of food insecurity. Each additional unit increase in income is associated with an estimated 1.65 percentage point decrease in the probability of food insecurity, holding other variables constant. This aligns with our a priori expectations that higher income provides greater access to food. This finding aligns with earlier work by Gebre (2012) and Taruvinga et al. (2013), who found

that higher income is positively correlated with improved food security. A priori expectation also supports this relationship, as income is expected to directly influence a household's capacity to purchase food.

Table 4. *Determinants of Rural Household Food Insecurity in Ogun State*

Variable	**Coefficient (β)**	**Marginal Effect**	**z-value**
Age	-0.018	-0.0043	-0.59
Household income	-0.0687**	-0.0165	-2.47
Farm size	-0.0147*	-0.0035	-1.79
Household size	3.788***	0.9091	4.16
Farming experience	0.1597	0.0383	0.34
Cooperative membership	-0.7106	-0.1705	-0.93
Education level	-0.0708*	-0.017	-1.67
Gender (male = 1)	-0.0888*	-0.0213	-1.87
Diversification index	11.8409	2.8418	0.99
Household production enterprise	0.1629	0.0391	0.95
Dependency ratio	-0.0588	-0.0141	-0.9
Access to extension agent	-1.163	-0.2791	-1.45
Source of labor	-0.1834	-0.044	-0.37
Dietary diversity	-0.5266	-0.1264	-0.59

Notes: Number of observations 285
LR 〖chi〗^2 (16) 40.57***
Log likelihood -64.710099
Pseudo R 0.5207
*** significant at 1%, ** significant at 5%, *significant at 10%

Source: Authors.

Age had a small negative association with food insecurity (β = -0.018; ME = -0.0043; z = -0.59), suggesting that older household heads were slightly less likely to experience food insecurity. However, this effect was not statistically significant, indicating no strong association in the data.

Farm size was negatively associated with food insecurity (β = -0.0147; ME = -0.0035; z = -1.79), suggesting that households cultivating larger areas of farmland were marginally less likely to experience food insecurity. This association is significant at the 10% level, indicating a modest relationship. This suggests that households with larger farms are more likely to produce enough food for consumption and generate more income to purchase more food from external sources. Our findings are consistent with the results of Obasan et al. (2017), who found a positive relationship between farm size and food security.

This is consistent with our a priori expectation that larger farm sizes would reduce the likelihood of food insecurity, particularly in rural settings where farming is a primary source of livelihood. These results provide evidence that addressing factors such as income and farm size is crucial in reducing food insecurity in rural areas.

However, expanding farms and improving productivity is often limited by a lack of access to finance, problems with land ownership, and weak institutional support. This highlights the importance of agricultural financing and effective credit systems that allow farmers to invest in land, inputs, and technologies needed to boost food security.

Household size showed a strong positive association that was statistically significant at the 1% level ($\beta = 3.788$; ME = 0.9091; $z = 4.16$), indicating that larger households were more likely to report food insecurity. The marginal effect indicates that each additional household member increases the probability of food insecurity by about 91 percentage points, highlighting the resource strain that larger households may face. Our findings met our a priori expectation that with a larger household size, the available food must be divided among more individuals, thereby decreasing the per capita food availability within the household. This finding is consistent with earlier empirical evidence from Paddy (2003), who found that larger families are more likely to struggle with food insecurity due to increased pressure on household resources, especially in rural areas where economic opportunities and income levels may be limited.

Education level showed a negative association with food insecurity and was significant at the 10% level ($\beta = -0.0708$; ME = -0.017; $z = -1.67$), indicating that higher educational attainment of the household head is associated with a lower likelihood of food insecurity. This finding met the a priori expectation, since the level of education should positively affect the income-earning capacity and level of management of household resources. This implies that household heads with relatively higher levels of education are more likely to be food secure than household heads with lower levels of education.

Finally, the gender of the household head had a negative relationship with the food insecurity status of the household and was statistically significant at 10% ($\beta = -0.0888$; ME = -0.0213; $z = -1.87$). This suggests that male-headed households may have a slightly lower probability of experiencing food insecurity, although these associations are modest. This finding is consistent with earlier studies, although some literature indicates that female-headed households often spend more on food, which can enhance their food security (Taruvinga et al., 2013; Roger, 1996; Oyekale et al., 2017).

5.0 Conclusion and Recommendations

This study examined the factors associated with food insecurity in rural communities of Ogun State, Nigeria, using a logistic regression model. The results showed that household income, farm size, household size, education level, and the gender of the household head were significantly related to food insecurity. Households with higher incomes and larger farms tended to have a lower likelihood of food insecurity, while those with larger household sizes were more likely to be food insecure. Education and gender were also important, suggesting the need for policies and interventions that consider these factors to help improve food security in the area.

Importantly, this study provides empirical evidence that can inform government policy formulation, particularly within existing agricultural development, rural finance, and food security frameworks. Such evidence can be integrated into

policy planning processes by relevant ministries and agencies to refine targeting, prioritize vulnerable groups, and strengthen implementation strategies.

In view of the above observations, the following recommendations are proposed to enhance the level of food security in rural communities of Ogun State, Nigeria:

1. **Improve Household Income:** The study found that families with higher incomes are less likely to experience food insecurity. Therefore, policies should aim to create more ways for rural households to earn money. This can include skill training programs, better access to small loans, and support for small businesses. Encouraging families to earn from other sources besides farming, such as small trading or local enterprises, can also help them have a more steady income and reduce their risk of food shortage. To make this happen, banks and other formal lenders should create loan products that fit the way rural households earn money. The government can help by providing loan guarantees, training programs, and working with farmer groups. These steps mostly improve existing financial systems.
2. **Support Agricultural Expansion and Farm Size**: The study showed that farmers with larger farms tend to be more food secure. This means that helping farmers increase their farm size and productivity is important. The government should make it easier for rural farmers to get land, modern tools, fertilizers, and better seeds. Extension services should also be strengthened to train farmers on improved and efficient farming methods so they can produce more and reduce the problem of food insecurity. Also, having access to agricultural finance can help farmers expand their farms and produce more. Loans from banks or government programs let farmers spend on land preparation, seeds, fertilizer, and new tools or technologies. When these financial support programs work together with existing extension services, farmers can use the money effectively, making the investments practical, sustainable, and helpful for improving food security.
3. **Address the Impact of Household Size**: Larger household sizes were found to increase the likelihood of food insecurity. Family planning initiatives should be promoted in rural areas to help manage household size. These initiatives can be coupled with awareness campaigns that emphasize the benefits of smaller family sizes on food security and household well-being. This approach can reduce the burden on household resources and improve the distribution of food within households.
4. **Invest in Education and Awareness Programs**: The results show that the education level of the household head is linked to food security status. This means that households led by more educated individuals are more likely to be food secure. Thus, improving education, particularly for rural household heads, should be a priority. Educational programs can empower individuals with the knowledge to make informed decisions regarding food production, budgeting, and nutrition.

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