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ANALYSIS OF DETERMINANTS OF FOOD SECURITY AMONG RURAL HOUSEHOLDS IN BENUE STATE, NIGERIA.

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Abstract

Food insecurity remains a major development challenge in Nigeria, particularly among rural households, whose livelihoods depend largely on agriculture. This study empirically analysed determinants of food security among rural households in Benue State, Nigeria, using secondary data from the 2018 General Household Survey. Household food security was measured using a composite experience-based index that primarily captures food access and utilization, with limited insights into short-term stability, based on households reported food insecurity experiences over a 30-days period. The index was analyzed against socioeconomic and production-related variables using a multiple linear regression model with robust standard errors. The results showed that household income (β= 0.0162; p<0.01), crop diversification (β= 0.0116; p< 0.01) and marital status (β =1.7864; p<0.01) exerted significant positive effects on household security. Crop yield (β = 0.0213; p <0.10) and educational attainment of the household head (β = 0.0208; p<0.10) also improved food security, though with weaker statistical significance. Household size is negatively associated with food security (β = - 0.277; p < 0.01), while age, gender, and off-farm employment of household heads are statistically insignificant. Overall, the findings indicated that rural household food security in Benue State was driven more by income capacity, social capital, and production diversification than by demographic characteristics alone. The study recommends policies that emphasize income-enhancing strategies, support for crop diversification, and targeted social protection interventions to strengthen rural food security.

Keywords:*Analysis, determinants, Food security. Rural, households.*

1.0 Introduction

Food security exists when all people, at all times, have reliable physical, social, and economic access to sufficient, safe, and nutritious food to maintain an active and healthy life. It is a multidimensional concept encompassing food availability, access, utilization, and stability (Food and Agriculture Organization [FAO], 2023; World Bank,

2025). At the household level, food security reflects families' ability to consistently obtain adequate food in both quantity and quality that meets dietary and cultural needs, while remaining resilient to short term shocks. Achieving these conditions is central to Sustainable Development Goal 2 (Zero Hunger), which seeks to end hunger, improve nutrition, and promote sustainable food systems globally (United Nations, 2023).

Food insecurity, in Nigeria has worsened in recent years despite Nigeria's substantial agricultural potential. Integrated Food Security Phase Classification (IPC) and Cadre Harmonisé estimates indicate that over 30.6 million Nigerians are projected to face acute food and nutrition insecurity during the 2025 lean season, with the number expected to increase to 34.7 million by 2026 in the absence of effective interventions (FAO, 2025). This deterioration is driven by rising food prices, declining real incomes, climate-related shocks, and persistent insecurity, posing serious risks to rural livelihoods and national stability (FAO, 2025). Benue State commonly referred to as the Food Basket of the Nation is a major producer of staple crops such as yam, cassava, maize, and soybean. However, high agricultural output at the State level has not translated into improved household food security for many rural families. Recent Cadre Harmonisé projections show that Benue State is not insulated from acute food insecurity, with several Local Government Areas classified under Stressed (CH Phase 2) and Crises (CH Phase 3) conditions (FAO, 2025: IPC, 2025). These classifications reflect persistent food consumption gaps and livelihood stress highlighting a paradox in which agricultural abundance coexists with household-level food insecurity.

A growing body of empirical literature identifies household income, asset ownership, crop diversification, and livelihood diversification as key determinants of food security in Nigeria and sub-Saharan Africa. Higher income improves food security by enhancing

households purchasing power, consumption smoothing capacity, and resilience to shocks. Crop diversification reduces exposure to climatic and market risks while improving dietary diversity, whereas large household size often exacerbates food insecurity due to increased consumption pressure relative to available resources (Abdu Raheem et al., 2025; Aboaba, et al., 2020; Adesomuju et al., 2004; Amao et al., 2023; Azeez et al., 2025, Mahmud et al., 2025; Mjiwa et al., 2025; Wudil et al., 2023).

Within Benue State, existing empirical studies have largely focused on selected drivers of food insecurity. A prominent strand examines farmer-harder conflict and insecurity, documenting how violence disrupts farming activities, reduces crop output, displaces households, and weakens access to food (Alobo & Omenka, 2025, Ojem et al., 2023, Oko et al., 2021; Utobo et al., 2025 Uza et al., 2023). Another strand highlights food prices, and market access, particularly in urban and peri-urban settings. For instance, Anchovur et al. (2024) and Iorlamen et al. (2014) shows that rising food prices and expenditure in Makurdi significantly constrain and households' ability to afford adequate and nutritious food. Similarly, research examining socioeconomic factors found that income, education, access to productive assets improved food security, while larger household size worsened outcomes (Abu & Soom, 2016; Biam & Tavershima, 2020).

While existing studies offer important insights into food insecurity, their focus remains fragmented. Research emphasizing security-related shocks often overlooks household socioeconomic characteristics and livelihood strategies that shape food security outcomes, while urban-focused studies on food prices have limited relevance for rural households, where owned production, income, and market participation jointly determined food access. Many studies also rely on descriptive indicators such as output or income, and employed binary or calorie-based measures that inadequately captured the

severity and lived experience of food insecurity. Another key limitation in literature is the limited use of composite, multidimensional, experience-based scales, such as those recommended under the FAO's Food Insecurity Experience Scale framework that captured access constrains, dietary compromise, and consumption instability (Cafiero at al., 2018; FAO, 2021)

This study addresses these gaps by employing a composite, experience-based food security index consistent with FAO best practices and by jointly examining the effects of production-related factors and socioeconomic characteristics on food security among rural households in Benue State. In doing so, the study contributes to literature on food security by advancing measurement in food security, providing updated empirical evidence for Benue State, a major agricultural hub with persistent food insecurity challenges, and generating policy-relevant insights for improving rural household food security.

2.0 Objectives of the Study

The broad objective of this study was to analyse determinants of food security among rural households in Benue State, Nigeria. The specific objectives were to (i) describe the socioeconomic characteristics of heads of households in Benue State; (ii) examine relationship between crop diversification and food security within rural households in Benue State; and (iii) determine the influence of crop yield on food security outcomes within rural households in Benue State.

3.0 Methodology

Research Design

This study adopted documentary analysis survey research design using secondary data

from the 2018 wave of the Nigeria General Household Survey (GHS), implemented by the National Bureau of Statistics (NBS) under Living Standards Measurement Study-Integrated Surveys Agriculture (LSMS-ISA) program. The NBS (2019) reports that GHS a nationally representative survey based on a multi-stage stratified sampling design covering all 36 States and the Federal Capital Territory, in both urban and rural areas. In the first stage, Enumeration Areas were selected as primary sampling units using probability proportional to size. In the second stage, ten households were systematically selected from each Enumeration Area using a random start and fixed sampling interval. Data were collected through face-to-face interviews administered by trained enumerators using structured questionnaires. The survey produced three types of datasets: household, agriculture, and community datasets.

This study utilized the household dataset and restricted the analysis to rural households in Benne State, resulting in a final sample of 1,372 observations after data cleaning. Household food security was measured using a composite, experience-based index derived from food insecurity indicators with a 30-day recall period. The index primarily reflects the food access dimension, with elements of dietary quality and food preference capturing aspects of food utilization, and limited insight into short-term stability. The measure aligns with the FAO's Household Food Insecurity Access Scale and Food Insecurity Experience Scale frameworks, which underpin Sustainable Development Goal 2 Indicator 2.1.2 on moderate or severe food insecurity (FAO, 2021, 204), Explanatory variables included crop yield, crop diversification, household size, income, age, gender, marital status, education, and employment status of the household head. Marital status was classified as married or not married to reflect differences in income pooling and economic partnership, consistent with established food security literature

(Chege et al., 2016, Odunivi & Tekana, 2020) This study is anchored on the Sustainable Livelihoods Framework, which explains food security as an outcome of households' access to livelihood assets and strategies within a given vulnerability context (Awoke et al., 2025; Dula et al., 2024). It is also supported by the Food Systems Theory, which emphasizes that food security outcomes depend not only on production, but also on distribution, access and utilization. Data were analyzed using Stata analytical software version 15.1. Descriptive statistics summarized socioeconomic characteristics of households, while a multiple linear regression with robust standard errors was employed to examine the determinants of food security. The reference group of categorical variables were used as base and omitted from the regression to avoid perfect multicollinearity.

Model Specification

The multiple linear regression was employed to state the relationship between household food security and multiple explanatory variables. The technique allows simultaneous assessment of the magnitude, direction, and statistical significance of each independent variable while holding others constant, making it appropriate for multivariate socioeconomic analysis (Greene, 2025; Wooldridge, 2020). In this study, the model was used to quantify the effects of socioeconomic, demographic, and production-related factors, such as household income, household size, education, crop diversification, and farm output, on food security among rural households in Benue State. By isolating the independent contribution of each factor, the regression model provides empirical evidence on key drivers of food security and informs targeted policy interventions aimed at improving rural household welfare. The model for this study is expressly specified as follows:

$$Y = \beta_0 + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + X_7\beta_7 + X_8\beta_8 + X_9\beta_9 + \epsilon_1$$

Where Y is the dependent variable, food security, measured as an index of food security indicators. X_1 = crop diversification; X_2 = crop yield; X_3 = Age of household head; X_4 = Gender of household head; X_5 = Marital status of household head; X_6 = Education of household head; X_7 = Employment of household head; X_8 = Household size; X_9 = Household income; β_0 = intercept; β_1-β_5 = the coefficients of independent variables to be estimated; and ε = error term.

4.0 Results and Discussion

4.1 Socio-economic characteristics of household heads

Descriptive analysis using means and percentages summarized rural households' characteristics while a multiple linear regression analysis estimated the determinants of food security as shown in Table 1 and 2 below.

Table 1 shows that majority (72%) of the rural households were male-headed and middle aged, with a mean age of about 50 years, indicating that farming and household decisions are largely decided by older adults. The average household size of 6 persons suggests high dependency pressure, which may strain household resources. Mean annual household income of N190,677 reflects modest earning capacity, potentially limiting access to adequate and diverse food, while most (54.4%) of the households engaged in off-farm employment, indicating income diversification.

Table 1: Socio-Economic Characteristics of Household heads in the Study area (n=1,372)

Variable	Percentage	Mean
Age of household head: Average		50.39
Sex of household head:		
o Male	71.92	
o Female	28.08	
Marital status of household head:		
o Married	57.61	
o Not married	42.39	
Education level of household head:		
o Non-formal	1.45	
o Primary	30.65	
o Secondary	25.39	
o Tertiary	8.28	
Employment status of household head:		
o On-farm	34.34	
o Off-farm	54.36	
o Both on-farm & off-farm	11.30	
Household size		6.0
Household income		190,677
Crop yield		13,461
Crop diversification		8.0
Food security index		18.77

Source: Data analysis of GHS 2018 dataset.

4.2 Determinants of household food security

In Table 2, the F-statistic of the model ($F=11.56$; $p < 0.001$) indicates that the explanatory variables are jointly significant, confirming that the model has strong overall explanatory power. The modest R-squared value of 0.0913, which is consistent with household welfare studies, suggests that about 9.13% of the variation in household food security is explained by the included variables, implying that food security is influenced by additional unobserved factors not captured in the model. Importantly, the results further highlight that income, household size, marital status, and crop diversification are the most critical determinants of food security among rural households in Benua State.

Table 2: Determinants of Household Food Security

Food security	Coef.	Robust Std. Err.	t	P>|t|
Age	-0.0053	0.0072	-0.73	0.465
Gender	-0.5931	0.4001	-1.48	0.138
Marital Status	1.7864	0.3943	4.53	0.000***
Education	0.0208	0.0075	-3.77	0.078*
Employment	-0.0971	0.2066	-0.47	0.639
Household size	-0.2771	0.0590	-4.70	0.000***
Household income	0.0162	0.0000	7.12	0.000***
Crop yield	0.0213	0.0000	1.83	0.067*
Crop diversification	0.0116	0.0027	4.37	0.000***
Constant	18.6708	0.6556	28.48	0.000
Number of obs = 1,372		F(9, 1362) = 11.56		
R-squared = 0.0913		Prob > F = 0.0000		
Root MSE = 4.3135				

Statistical significance at p<0.01, p<0.05, and p<0.1 probability levels are denoted by ***, **, and * respectively.

Source: Data analysis of GHS 2018 dataset.

Table 2 shows that marital status has a positive and statistically significant effect on household food security (β=1.7864; p<0.01), suggesting that married household heads are significantly more food secure than their unmarried counterparts. This finding is consistent with recent empirical studies in Nigeria, which attribute improved food security and household welfare among married households to pooled labour, shared income sources, and stronger social capital (Adesomoju et al., 2024; Apeverga, 2025; Wudil *et al.,* 2023). From the perspective of the Sustainable Livelihoods Framework (SLF), marital status enhances both social and human capital, thereby strengthening household livelihood strategies and improving food access. Household income also

emerges as a strong and positive determinant of food security (β =0.0162; p < 0.01), underscoring the central role of income in enhancing households' ability to access food. This result aligns with empirical evidence showing that higher income improves purchasing power and enables households to smooth consumption during periods of food scarcity (Aboaba *et al.,* 2020; Adesomoju *et al.,* 2024; Amao *et al.,* 2023; Mahmud *et al.,* 2 025).

Education of the household head exhibits a positive but weakly significant relationship with food security (β = 0.0208; p<0.10). The modest significance reflects rural Nigerian realities where higher educational attainment is often associated with reduced engagement in farming and greater reliance on unstable non-farm income sources (Aboaba et al., 2020; Wudil et al., 2023). Within the SLF, this suggests that education improves food security only when it translates into products livelihood opportunities. Household size has a negative and highly significant effect on food security (β =-0.277; p<0.01), indicating that larger households face greater food insecurity. This finding corroborates evidence across Nigeria and sub-Saharan Africa that larger household sizes intensify consumption pressure and strain limited resources (Aboaba et al., 2020, Amao et al., 2023). Age, gender, and employment of household head were statistically insignificant (β>0.10), suggesting their effects are indirect or mediated through income and household composition, as reported in similar Nigerian studies (Wudil et al., 2013).

4.3 Effects of Crop Diversification and Crop Yield on Household Food Security

Crop diversification, measured by the number of crops cultivated, has a positive and statistically significant effect on food security (β =0.0116, p<0.01). The result indicates that crop diversification in among the most influential explanatory variables in the

model, comparable in magnitude to household income. This finding strongly supports recent empirical studies in Nigeria and across Africa, which demonstrate that diversified crop portfolios improve dietary diversity, stabilize food supply across seasons, and reduce vulnerability to production and market shocks (Amao et al., 2023; Appiah-Twumasi & Asale., 2022; Nguyen & Qaim, 2025). Within the Sustainable Livelihoods Framework, crop diversification represents a key livelihood strategy that enhances resilience by spreading risk and increasing access to multiple food sources.

The coefficient for crop yield is positive and marginally significant ($\beta = 0.0213$; $p<0.10$) indicating that increased production tends to improve food security, albeit moderately. This finding supports recent evidence that farm output contributes to household food availability but is insufficient on its own to guarantee food security (Nguyen & Qaim, 2025; Omokpariola et al., 2025). This result aligns with the Food System Theory, which emphasizes that food security outcomes depend not only on production but also on distribution, access, and utilization. In Benue State, post-harvest losses, market constraints, and price volatility may weaken the direct link between production and household food security

5.0 Conclusion and Recommendations

In conclusion, this study demonstrates that food security among rural households in Benue State is shaped primarily by income, marital status, household size, and crop diversification. While farm production remains central, economic factors and livelihood strategies play equally important roles. Policies aimed at improving food security should prioritize income-enhancing opportunities, promote crop diversification, and provide targeted support to large households. Strengthening rural livelihoods through

integrated agricultural and economic interventions is essential for achieving sustainable food security in Benue State in particular and Nigeria in general.

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