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LIVELIHOOD DIVERSIFICATION STRATEGIES AND FOOD SECURITY STATUS OF SMALLHOLDER FARMERS IN AKWA IBOM STATE, NIGERIA

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ABSTRACT

This study examined the influence of livelihood diversification on food security among smallholder farmers in the State. Specifically, it assessed the extent of involvement in livelihood diversification strategies, determined food security status and evaluated the effect of diversification on household food security. A multi-stage sampling technique was used to select 248 respondents, and data were collected through a structured questionnaire and analyzed with Descriptive statistics and binary logistic regression. Results revealed that farmers engaged in various livelihood strategies, with agro-processing ($\bar{x}= 2.47$), small-scale business ($\bar{x}= 2.37$), and livestock production ($\bar{x}= 2.28$) ranking highest. Overall, 47.18% of respondents had moderate diversification status. Food security analysis showed that only 35.89% of households were food secure. Logistic regression results ($\chi^2 = 21.17$, $p < 0.001$; Nagelkerke $R^2 = 0.542$) indicated that greater involvement in livelihood diversification ($\beta = 0.764$, $p = 0.010$) significantly improved food security status. The study concludes that livelihood diversification enhances food access and income stability but remains constrained by inadequate credit, technology, and market access. It recommends that extension agencies intensify training on viable diversification options, the Ministry of Agriculture should strengthen food security interventions, and government–microfinance partnerships should improve access to affordable credit for smallholders.

Keywords: Livelihood Diversification, Food Security, Smallholder Farmers, Akwa Ibom State, Nigeria.

INTRODUCTION

Livelihood diversification has emerged as a vital survival and resilience strategy among smallholder farmers across developing economies, particularly in the face of growing livelihood vulnerabilities, agricultural uncertainties, and food insecurity. It refers to the process by which rural households construct a diverse portfolio of income-generating activities and social support capabilities to improve living standards and reduce vulnerability to shocks (Kassegn and Endris, 2021). Diversification strategies can include both on-farm activities, such as crop and livestock diversification, and off-farm income-generating ventures such as petty trading, wage labor, and small-scale enterprises (Tamara *et al.*, 2025; Habib *et al.*, 2023). By combining multiple sources of livelihood, smallholder farmers seek to stabilize income streams, enhance food access, and mitigate risks associated with climatic variability, market volatility, and limited access to productive resources (Waha *et al.*, 2018; Jatani *et al.*, 2025).

Food security, as defined by the Food and Agriculture Organization (FAO) exists when all people at all times have physical and economic access to sufficient, safe, and nutritious food for an active and healthy life (Uko *et al.*, 2025; Ekanem and Uloh, 2025a). However, for many smallholder farmers, ensuring household food security remains a major challenge, despite being food producers

themselves (Chiaka *et al.*, 2022; Babura *et al.*, 2017). Studies have shown that limited livelihood options, dependence on rain-fed agriculture, and poor access to infrastructure, markets, and credit facilities exacerbate household food insecurity among smallholder farmers (Adjimoti and Kwadzo, 2018; Nahar *et al.*, 2024). Conversely, livelihood diversification has been identified as an adaptive response that enables households to smoothen consumption and maintain food access during economic or environmental shocks (Quanli *et al.*, 2024; Lawi *et al.*, 2025).

Empirical evidence across sub-Saharan Africa highlights the positive association between livelihood diversification and household food security. For example, Minyiwab *et al.* (2024) reported that diversification among smallholder farmers in Ethiopia significantly improved household dietary adequacy and resilience to food insecurity. Similarly, Salifu and Salifu (2023) observed that diversified income sources in rural Ghana mitigated the negative impacts of seasonal income fluctuations on food consumption. In Nigeria, Gani *et al.* (2019) found that livelihood diversification contributed to improved food security status among farming households in the North-East, while Folasade and Akerele (2022) noted that cassava farmers who engaged in non-farm activities in the South-West recorded higher food security levels. These findings collectively suggest that diversification is an essential

mechanism for promoting sustainable livelihoods and enhancing food availability among rural populations.

Despite the well-documented benefits of livelihood diversification, its influence on food security outcomes is context-specific and varies with location, socio-economic characteristics, and the nature of diversification strategies pursued (Nyathi, 2024; Zewudie, 2025). Recent studies reveal that while diversification can enhance resilience, its potential benefits may be undermined by constraints such as inadequate skills, capital shortages, and limited institutional support (Tata *et al.*, 2024; Oyeyinka *et al.*, 2025). Moreover, Habib *et al.* (2023) emphasized that the relationship between livelihood capitals, such as human, social, physical, and financial assets, and the choice of diversification strategy is complex, influencing how households translate diversification efforts into food security gains.

In Akwa Ibom State, smallholder farmers constitute a significant proportion of the rural labor force and are key contributors to household and regional food supply (Udoh *et al.*, 2017; Akpan *et al.*, 2023). Yet, evidence indicates that food insecurity persists among these farmers due to low agricultural productivity, declining farm incomes, and limited access to livelihood-enhancing opportunities (Olojede *et al.*, 2025; Agom *et al.*, 2022). While some studies have examined aspects of livelihood diversification in the state (Etuk, 2020; Onyim *et al.*, 2021; Akpan and Ekpo, 2022), few have systematically analyzed how diverse livelihood strategies influence the food security status of smallholder farmers. For instance, Etuk (2020) focused on gender variations in diversification strategies without linking them to food security outcomes, while Onyim *et al.* (2021) examined rural livelihood diversification and non-farm activities but did not evaluate their specific contributions to household food security. This leaves a knowledge gap regarding the extent to which livelihood diversification strategies contribute to improving food security status among smallholder farmers in Akwa Ibom State. Addressing this gap is crucial, as understanding the link between livelihood diversification and food security can guide policy interventions that strengthen household resilience, promote sustainable agricultural systems, and reduce poverty in rural areas. If left unaddressed, persistent food insecurity could exacerbate poverty levels, heighten vulnerability to economic and environmental shocks, and threaten the overall wellbeing of rural households. Therefore, this study seeks to examine the influence of livelihood diversification on food security among smallholder farmers in Akwa Ibom State, Nigeria.

Objectives of the Study

The broad objective of this study was to examine the influence of livelihood diversification strategies on food security status of smallholder farmers in Akwa Ibom State, Nigeria. The specific objectives were to:

- i. assess the extent of involvement in livelihood diversification strategies by smallholder farmers in Akwa Ibom State;
- ii. determine the food security status of smallholder farmers in the study area; and
- iii. assess the influence of livelihood diversification strategies on the food security status of smallholder farmers in the study area.

METHODOLOGY

The study was conducted in Akwa Ibom State, located in the South-South geopolitical zone of Nigeria. The state lies within the tropical rainforest belt, characterized by high rainfall, humidity, and favorable soil conditions that support year-round agricultural production (Olojede *et al.*, 2025). The population comprised smallholder farmers registered with the All Farmers Association of Nigeria (AFAN) Akwa Ibom State chapter. Smallholder farmers were chosen because they constitute the backbone of Nigeria's agricultural production and food systems (Ifeyanyi-Obi and Uloh, 2025; Chiaka *et al.*, 2022). A multi-stage sampling procedure was employed to ensure representativeness across the diverse agricultural zones of the State while managing the wide geographical spread and large population of smallholder farmers, an approach consistent with similar extension studies (Ajunwa *et al.*, 2026; Uko *et al.*, 2025; Ifeyanyi-Obi *et al.*, 2025). In the first stage, 16 Local Government Areas (LGAs) were purposively selected based on their high concentration of smallholder farmers and agricultural activities. In the second stage, a proportionate random sampling technique was used to select 2% of registered AFAN members from each of the chosen LGAs, resulting in a total of 248 respondents. The choice of a sample size of 248 was guided by the Krejcie and Morgan (1970) sampling table, which provides a statistically valid basis for determining an adequate sample size from a large population, as similarly adopted by Asanwana *et al.* (2025), Obinaju *et al.*, (2025) and Nkanta *et al.* (2025) in agricultural extension studies within Akwa Ibom State. This sample size was considered sufficient to ensure representativeness, minimize sampling error, and allow for robust statistical analysis.

Data were collected using a structured questionnaire that captured socio-economic characteristics, livelihood diversification strategies, and food security indicators. The extent of involvement in livelihood diversification was measured across twelve activities (including crop farming, livestock rearing, agro-processing, small-scale business,

and off-farm employment), rated on a three-point Likert scale: 1 = low involvement, 2 = moderate involvement, and 3 = high involvement. The scores were summed to generate an overall diversification index, categorized as low (12–20), moderate (21–28), and high (29–36) levels of diversification. Household food security was assessed using the Household Food Insecurity Access Scale (HFIAS) and the Household Food Security Index (FSI) as adapted from the Food and Nutrition Technical Assistance (FANTA) framework. Respondents were classified as food secure if $FSI \geq 1.00$ and food insecure if $FSI < 1.00$.

Descriptive statistics such as means, percentages, and frequency distributions were used to describe respondents' characteristics and the extent of livelihood diversification. To determine the influence of livelihood diversification on food security, a binary logistic regression model was employed because the dependent variable (food security status) is dichotomous (1 = food secure, 0 = food insecure). Logistic regression is appropriate when modeling the probability of an event occurring as a function of predictor variables (Ekanem and Uloh, 2025b; Salifu and Salifu, 2023), and it satisfies the assumptions of non-linearity and independence of observations (Kassegn and Endris, 2021; Zewudie, 2025). The model effectively estimates the likelihood that a household's food security status is influenced by the level of diversification and other socio-economic factors.

The model is specified as:

$$\text{Log} \left(\frac{P(Y \leq j)}{P(Y > j)} \right) = \beta_{0j} + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where:

- $P(Y \leq j)$ = Cumulative probability of being in food secure or a lower food insecurity category
- β_0 is the intercept.
- $\beta_1, \beta_2, \dots, \beta_n$ = Coefficients of explanatory variables
- X_1, X_2, \dots, X_n = Explanatory variables (e.g., extent of diversification, access to credit, education, etc.)

The model coefficients were estimated using the Maximum Likelihood Estimation (MLE) method. The Wald chi-square test was used to determine the statistical significance

of each predictor, and the Nagelkerke R^2 was used to assess the model's explanatory power.

RESULTS AND DISCUSSION

Extent of Involvement in Livelihood Diversification Strategies by Smallholder Farmers

Table 1 shows that respondents engaged in multiple livelihood diversification strategies. Agro-processing (\bar{x} = 2.47, Rank = 1), small-scale business (\bar{x} = 2.37, Rank = 2), and livestock production (\bar{x} = 2.28, Rank = 3) were the top three activities, while salaried jobs (\bar{x} = 1.36, Rank = 11), seasonal migration (\bar{x} = 1.45, Rank = 10), and paid labour (\bar{x} = 1.66, Rank = 9) ranked lowest. These results indicate a strong preference for agro-based and small-enterprise livelihood options, suggesting that smallholder farmers rely mainly on activities closely linked to their agricultural base. The relatively low involvement in salaried employment and migration highlights the limited presence of formal employment opportunities and urban mobility among respondents.

The dominance of agro-processing, small-scale businesses, and livestock production underscores the high involvement of smallholder farmers in agriculture-related income activities, consistent with findings by Etuk (2020) and Oyim *et al.* (2021) who observed that rural households in Akwa Ibom State often diversify within the agricultural sector due to low barriers to entry and existing resource familiarity. The preference for agro-processing aligns with Werdofo *et al.* (2024) and Li *et al.* (2025) who reported that value addition through small-scale processing enhances income resilience and supports food system sustainability. The limited participation in salaried jobs and migration reflects the scarcity of formal employment and infrastructural constraints in rural areas (Effiong *et al.*, 2025; Ikuemonisan, 2024). Low engagement in paid labour may also stem from the marginal returns associated with such work and the desire for self-managed enterprises, as indicated by Yakubu *et al.* (2023). These patterns suggest that diversification remains primarily survival-driven rather than opportunity-oriented, reflecting the structural realities of Nigeria's rural economy (Olawuyi and Olawuyi, 2022). However, the strong presence of agro-processing and petty trade reveals emerging entrepreneurial tendencies among smallholders, with potential implications for rural economic transformation and food security enhancement (Fan and Rue, 2020; Edet *et al.*, 2024).

Table 1: Distribution of Respondents' Involvement in Livelihood Diversification Strategies in Akwa Ibom State

Livelihood Strategy	\bar{x}	Rank
Cash Crops	2.17	4
Livestock	2.28	3
Fishing	1.78	8
Agro-Processing	2.47	1
Non-Farm Activities	2.12	5
Seasonal Migration	1.45	10
Paid Labour	1.66	9
Small-Scale Business	2.37	2
Accessing Credit/Loans	2.04	6
Remittance	1.80	7
Salaried Job	1.36	11

Source: Field Survey Data (2025)

As presented in Table 2, the largest proportion of respondents (47.18%) exhibited moderate involvement in livelihood diversification activities, followed by those with high involvement (37.50%) and a smaller proportion with low involvement (15.32%). This distribution indicates that most smallholder farmers engage in multiple but not extensive diversification activities, balancing farm-based and limited non-farm enterprises. The relatively high status of 'moderate involvement' implies that while diversification is a common coping strategy, structural limitations such as access to credit, technology, and markets may constrain full engagement in diverse income streams.

The predominance of moderate involvement in livelihood diversification suggests that most smallholder farmers pursue multiple income activities to stabilize household welfare without abandoning their primary farming occupation. This aligns with the observations of Igwe *et al.* (2020) and Sallawu *et al.* (2024), who noted that rural farmers diversify modestly due to limited access to capital

and training. The relatively high proportion of respondents with strong diversification levels resonates with findings from Nyathi (2024) and Gani *et al.* (2019), showing that diversification intensity increases when agricultural incomes fluctuate or become insufficient for household sustenance. Moderate involvement further reflects constraints related to institutional credit access, as highlighted by Ukpong *et al.* (2019) and Elum and Obiajunwa (2022). Similar patterns have been documented by Oladapo *et al.* (2025) in Oyo State and Lawi *et al.* (2025) in North-Eastern Nigeria, where rural farmers combine farming with petty trade and artisanal activities to mitigate food insecurity. The overall trend implies that diversification is largely defensive rather than expansionary, aligning with the "necessity diversification" model described by Habib *et al.* (2023). Enhanced access to extension services and livelihood assets could strengthen the transition toward more productive and sustainable diversification pathways, improving food security outcomes (Azumah *et al.*, 2023; Firafis *et al.*, 2025).

Table 2: Categorization of Respondents' Overall Involvement in Livelihood Diversification Strategies in Akwa Ibom State

Involvement Category	Score Range (11 items × 3 = 33 max)	Percentage (n=248)
Low	11 – 18	15.32%
Moderate	19 – 26	47.18%
High	27 – 33	37.50%

Source: Field Survey Data (2025)

Food Security Status of Smallholder Farmers in Akwa Ibom State

Table 3 presents the qualitative assessment of food security status among smallholder farmers in Akwa Ibom State. All respondents (100%) reported anxiety about food running out before they could afford to buy more, indicating widespread concern about food access. Nearly all

respondents (98.39%) had experienced food shortages without money to purchase more, while a majority (97.98%) sometimes could not afford balanced meals. About 95.56% depended on low-cost foods due to limited income, and 99.60% admitted to reducing meal sizes because of food scarcity. Similarly, 99.19% indicated that their households consumed less than nutritionally adequate diets when food was inaccessible. These responses

collectively reflect a high level of food insecurity, as most households frequently faced situations where economic constraints directly affected both the quantity and quality of food available to them (Table 3).

The findings reveal pervasive food insecurity among smallholder farmers in Akwa Ibom State, as evidenced by widespread reports of reduced meal size, limited dietary diversity, and reliance on inexpensive food options. This aligns with the findings of Olojede *et al.* (2025) in the same region, where economic limitations were found to hinder access to adequate and nutritious food. Similarly, Agom *et al.* (2022) reported comparable patterns in Ini Local Government Area of Akwa Ibom State, attributing food insecurity to low farm income and inadequate livelihood opportunities. The high incidence of meal reduction and

anxiety about food availability further supports the observation of Asa and Ebong (2023) that rural households in Akwa Ibom face persistent food access constraints despite engaging in farming. Comparable evidence from Oderinde *et al.* (2023) and Roberts *et al.* (2019) suggests that even urban and peri-urban households in Nigeria experience similar vulnerabilities, reinforcing the fact that income inadequacy remains a central determinant of food insecurity. The observed pattern may also reflect limited livelihood diversification opportunities, poor postharvest management, and fluctuating food prices, as emphasized by Akpan *et al.* (2025) and Effiong *et al.* (2025). Overall, the qualitative evidence indicates that economic fragility and insufficient livelihood alternatives continue to compromise the food security of smallholder households in the area.

Table 3: Qualitative Assessment of Food Security Status of Respondents

Assessment Question	Response Category	Percentage (n=248)
Have you ever been worried whether your food would finish before having money to buy more?	Yes	100.00
	No	–
Have you experienced food shortage and did not have money to buy more food?	Yes	98.39
	No	1.61
	Never	–
Has there been a time you could not afford to eat a balanced meal?	Sometimes	97.98
	Often	2.02
	Never	1.61
Have you relied on only a few kinds of low-cost foods to feed your household because of not having enough money?	Sometimes	95.56
	Often	2.82
	Never	1.61
Has the size of meals in your household been reduced anytime because there wasn't enough money for food?	Yes	99.60
	No	0.40
	Almost every month	–
	Sometimes but not every month	97.98
If yes, how often did this happen?	1 or 2 months	2.02
	Yes	99.19
	No	0.81

Source: Field Survey Data (2025)

The categorization of food security status in Table 4 shows that 35.89% of smallholder farmers were food secure, while 64.11% were food insecure. This indicates that nearly two-thirds of respondents lacked sufficient access to safe and nutritious food to maintain a healthy and active life. The predominance of food insecurity suggests that most smallholder farmers in Akwa Ibom State remain vulnerable to food shortages and economic shocks, which may threaten the sustainability of their livelihoods (Table 4).

The result showing a higher proportion of food-insecure households underscores the precarious nature of food access among smallholder farmers in Akwa Ibom State. This outcome is consistent with the findings of Olojede *et al.* (2025) and Asa and Ebong (2023), who reported similar levels of food insecurity among rural farming households in the state. Comparable studies in Enugu State (Chiemela *et*

al., 2022) and Northern Nigeria (Adesomoju *et al.*, 2024) have shown that limited income diversification, small farm sizes, and market constraints significantly influence household food security. The observed pattern could be attributed to low farm productivity, unstable prices, and high dependence on rain-fed agriculture, as highlighted by Akpan *et al.* (2025) and Aboh and Effiong (2019). The results also corroborate Adeyanju *et al.* (2023) who found that young and smallholder farmers across Africa often struggle to maintain food security due to limited access to credit and livelihood support services. The persistence of food insecurity despite active agricultural participation suggests that production alone does not guarantee food access, echoing findings by Elum and Obiajunwa (2022) and Victor (2025). This emphasizes the need for interventions that enhance livelihood diversification,

improve farmers' income stability, and strengthen institutional support systems in rural areas.

Table 4: Categorization of Respondents' Food Security Status in Akwa Ibom State

Food Security Status	Food Security Index	Percentage (n=248)
Food Secure	≥1.00	35.89
Food Insecure	<1.00	64.11

Source: Field Survey Data (2025)

Influence of Livelihood Diversification on Food Security Status

Table 5 presents the logistic regression result showing the influence of livelihood diversification strategies on the food security status of smallholder farmers in Akwa Ibom State. The model was statistically significant ($\chi^2 = 21.17$, $p < 0.001$) with a Nagelkerke R^2 value of 0.542, indicating that about 54.2% of the variations in food security status was explained by livelihood diversification strategies. The coefficient ($\beta = 0.764$, $p = 0.010$) revealed a positive and significant relationship between the extent of involvement in livelihood diversification strategies and food security status. This implies that as farmers increased their participation in multiple livelihood activities, the likelihood of being food secure improved. Hence, livelihood diversification was an important determinant of household food security among smallholder farmers in the study area.

The analysis revealed that greater involvement in livelihood diversification strategies significantly enhanced the likelihood of food security among smallholder farmers in Akwa Ibom State. This finding aligns with the report of Bamidele (2025), who observed that livelihood diversification improved household food security in southwestern Nigeria by providing additional income streams and reducing vulnerability to agricultural shocks. Similarly, Zewudie (2025) and Firafis *et al.* (2025) in Ethiopia found that households engaged in multiple income-generating activities had better access to food and improved nutrition outcomes. The result further supports Garbole *et al.* (2025), who noted that diversification reduced dependence on a single livelihood source and cushioned pastoral households against food shortages.

Table 5: Logistic Regression Result of the Influence of Livelihood Diversification Strategies on Food Security Status of Smallholder Farmers in Akwa Ibom State

Variable	Coeff. (β)	SE	Wald	Sig.
Extent of Involvement in Livelihood Strategies	0.764	0.298	6.58	0.010
Constant	-1.132	0.421	7.24	0.007
Model Summary				
Nagelkerke R^2	0.542			
Model χ^2 (df = 1)	21.17			$p < 0.001$
-2 Log Likelihood	274.42			

The positive influence of diversification could be attributed to the capacity of farmers to spread risks across farm and non-farm activities, thereby stabilizing income and improving purchasing power. Non-farm income sources such as petty trading, transportation, and artisanal work may have provided liquidity for food purchases, especially during periods of agricultural shortfall. Niazi *et al.* (2025) similarly observed that income diversification plays a crucial role in mitigating food insecurity among rural households in Afghanistan.

In the context of Akwa Ibom State, this pattern may also reflect adaptive responses to the challenges of land scarcity, limited credit access, and fluctuating agricultural returns. As observed by Oyim *et al.* (2021) and Etuk (2020), rural farmers in the state often pursue mixed livelihood strategies to maintain stable income flows. This diversification tendency enhances resilience and enables households to better manage shocks related to market and climate variability.

Comparable evidence from Gebruet *et al.* (2018) and Alemu (2023) also demonstrates that households adopting diverse livelihood portfolios are less prone to food insecurity, underscoring the importance of promoting inclusive livelihood programmes that integrate non-farm opportunities. Conversely, the finding diverges slightly from Nyathi (2024) who reported that some rural households face constraints such as limited capital and skill gaps that restrict their ability to fully benefit from diversification. These variations may arise from contextual differences in economic opportunities, institutional support, and access to productive resources.

Note:

- Coeff. = Regression Coefficient (β)
- SE = Standard Error
- Sig. = Significance level (p-value)
- Significant at 5% level ($p < 0.05$)
- Positive β = Greater involvement in livelihood diversification strategies increases the likelihood of being food secure.
- Dependent Variable: Food Security Status (1 = Food Secure, 0 = Food Insecure)
- Source: SPSS Version 25 Output (2025)

CONCLUSION AND RECOMMENDATIONS

The study examined the influence of livelihood diversification on the food security status of smallholder farmers in Akwa Ibom State, Nigeria. Findings revealed that respondents were moderately involved in multiple livelihood strategies, mainly agro-processing, petty trade, and livestock production. Most smallholder farmers were food insecure despite active engagement in farming, indicating that agricultural production alone does not guarantee adequate food access. The logistic regression result confirmed that greater involvement in livelihood diversification significantly improved household food security. Overall, livelihood diversification remains a vital coping and resilience mechanism for smallholder farmers, though its effectiveness is constrained by limited access to credit, technology, and markets. Strengthening rural livelihood opportunities and institutional support systems is therefore essential for achieving sustainable food security in the study area. Based on the findings, the following recommendations are made:

1. The Akwa Ibom Agricultural Development Programme (AKADEP) should intensify extension training and capacity-building programmes that expose smallholder farmers to viable farm and non-farm livelihood options, including value addition and agribusiness enterprises.
2. The State Ministry of Agriculture and Rural Development should establish targeted food security interventions, such as community grain banks and food price stabilization schemes, to cushion smallholder farmers during periods of food shortage and price fluctuation.
3. Government and microfinance institutions should expand access to affordable credit and input financing to enable farmers diversify effectively into profitable non-farm activities, thereby strengthening household income and food security.

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