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Food Insecurity Status among Smallholder Farmers in Niger State, Nigeria

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Abstract

This study assessed food insecurity among smallholder farmers in Niger State, Nigeria, using the Household Food Insecurity Access Scale (HFIAS) A multistage sampling procedure was used to select 317 respondents for the study. Results showed that anxiety and uncertainty about food supply (87.4%), insufficient food quality (88.6%), and insufficient food intake and its physical consequences (73.2%) were widely experienced domains of food insecurity. Access-related prevalence revealed that only 32.0% of households were food secure, while 11.0% were mildly, 12.4% moderately, and 44.6% severely food insecure. The regression model indicated that being male-headed (β = −1.388), more educated (β = −0.689), and more experienced in farming (β = −0. 088) reduced the likelihood of being food secure, whereas being married (β = 2.322), owning land (β = 2.476), and having a higher income (β = 0.348) increased food security. The study concludes that food insecurity is both widespread and severe among smallholder farmers in Niger State The findings underscore the need for targeted extension and social protection interventions that address gender-specific vulnerabilities, strengthen access to land and income, and support less-resilient households in Niger State.

Keywords: Food insecurity, smallholder farmers, household food insecurity access scale

Introduction

Food insecurity is a major global development concern. Around 733 million people faced hunger globally, equivalent to about one in eleven people, while an estimated 2.33 billion people experienced moderate or severe food insecurity, often characterised by compromised diet quality, uncertainty about food, or reduced food intake (World Health Organisation, 2024). Africa is disproportionately affected, with about 58% of the population experiencing moderate or severe food insecurity, reflecting the combined effects of conflict, climate shocks, and economic crises on rural livelihoods and smallholder food systems (Food and Agriculture Organization, 2024). This global picture underscores a persistent paradox: smallholder farmers who produce a large share of the world's food are themselves frequently food insecure.

Nigeria mirrors this global crisis, as high inflation, currency depreciation, and persistent insecurity have eroded households' purchasing power and constrained

access to adequate food. The number of food-insecure Nigerians rose from about 66.2 million to approximately 100 million by the first quarter of 2024, with over 31.8 million people experiencing acute food insecurity in the same year (FAO, 2024). Projected assessments further warn that about 33.1 million people in Nigeria are at high risk of food insecurity (FAO, 2024; Ifatimilehin & Oyibo, 2024). These pressures are particularly pronounced in rural areas, where smallholder farmers face high production costs, limited access to credit and inputs, and recurrent disruptions from conflict and climate variability.

North Central zone, often referred to as part of Nigeria's food basket, plays a critical role in supplying cereals, tubers, and legumes to other regions, yet farm households in the zone still experience significant food access challenges (Ogunfolaju et al, 2026).

Niger State, located in North Central Nigeria, is a predominantly agrarian state with considerable potential for crop and livestock production, yet smallholder farmers there are increasingly exposed to multiple stressors (Ogunfolaju et al, 2026). Insecurity linked to banditry and farmer–herder conflicts, rising input and transportation costs, and weak rural infrastructure limit households' ability to translate on-farm production into stable year-round food access. Despite the state's importance to the national food supply, there is limited empirical evidence documenting the access-related domains of food insecurity experienced by smallholder farmers in Niger State, the prevalence and severity of access-related food insecurity, and the socioeconomic factors that shape these outcomes. (Olayemi and Oyibo, 2024; Popoola and Popoola, 2023; Ogunfolaju et al, 2026)

Against this backdrop, this study assesses food insecurity among smallholder farmers in Niger State, Nigeria. The specific objectives were to: (i) identify the food insecurity access-related domains experienced by smallholder farmers in the study area; (ii) determine the access-related prevalence and severity of food insecurity among the respondents; and (iii) examine the factors influencing food insecurity among smallholder farmers in the study area.

The study tests the null hypothesis that there is no significant relationship between selected socioeconomic characteristics and respondents' food insecurity status.

Methodology

Niger State is located approximately between latitudes 8°–11°N and longitudes 3°–7°E, and is the largest state in Nigeria by land area (about 76,000–77,000 km²). Administratively, Niger State has 25 Local Government Areas, mostly rural, with households relying heavily on smallholder farming but facing constraints such as limited access to inputs, credit, extension services, and emerging challenges from insecurity, climate variability, and rising production costs, all of which have implications for household food insecurity (Ogunfolaju et al, 2026),

Primary data were collected through an interview schedule using a structured questionnaire administered to registered smallholder farmers.
A multistage sampling procedure, as shown in Table 1, was used to select 317 respondents from the Agricultural Development Programme (ADP) structure in Niger State. In the first stage, 50% of the ADP zones were selected, resulting in the inclusion of Zones A and C. In the second stage, 20% of the ADP blocks within each selected zone were randomly chosen. In the third stage, 20% of the cells within each

selected block were randomly selected. In the final stage, respondents were drawn from the list of registered smallholder farmers maintained at the ADP offices for each selected cell.

Table 1: Sampling procedure

50% of zones from each state	20% of blocks from the selected zone	20% of cells from the selected block	Total number of registered farmers in the selected cell	Sample size ($n=N/1+N(e^2)$)
Zone A	Mokwa	Bokani	80	23
TNB=15	*TNC=10*	Mokwa	75	21
	Kacha	Badegi	79	23
	TNC=10	Kacha	80	23
	Lavun	Kutigi	75	21
	TNC=10	Lanle	82	24
Zone C	Ibbi	Ibbi	81	23
TNB=20	*TNC=10*	Zugurma	77	22
	Kontagora	Kontagora	80	23
	TNC=10	Tungan Wawa	79	23
	Wushishi	Wushishi	76	21
	TNC=10	Kodo	78	22
	Zungeru	Zungeru	85	24
	TNC=10	Kaliko	85	24
			Total= 1,112	**= 317**

Footnote: TNB=Total number of blocks, TNC=Total number of cells
Source: Field survey, 2024

Measurement of Food Insecurity

Household food insecurity was measured using the Household Food Insecurity Access Scale (HFIAS), a validated 9-item tool developed to capture the severity of food insecurity related to access over a 30-day recall period. The HFIAS consists of nine occurrence questions, each followed by a frequency-of-occurrence question, and is designed to reflect three domains of food insecurity: (i) anxiety and uncertainty about household food supply, (ii) insufficient food quality, and (iii) insufficient food quantity and intake.

Households were asked whether, during the last 30 days, they experienced situations such as worrying about not having enough food, being unable to eat preferred foods, consuming a limited variety of foods, eating foods they did not want to eat due to lack of resources, eating smaller meals than needed, skipping meals, having no food of any kind in the household, going to sleep hungry, or going a whole day and night without eating. For each occurrence question, households that did not experience the condition were assigned a score of 0. If the condition occurred, respondents indicated whether it happened rarely (1–2 times), sometimes (3–10 times), or often (more than 10 times), which were scored as 1, 2, and 3, respectively. The household HFIAS score was obtained by summing the scores across the nine items, yielding a range from 0 to 27, with higher scores indicating greater severity of food insecurity.

Classification of Food Insecurity Prevalence

To estimate the prevalence and severity of food insecurity, households were further classified into Household Food Insecurity Access Prevalence (HFIAP) categories based on their pattern of responses to the nine HFIAS questions. Using the recommended classification algorithm, households were grouped into four mutually exclusive categories:
Food secure: no experience of food insecurity or only occasional worry about food, with no compromises in food quality or quantity

Mildly food insecure: anxiety about food and/or compromises in food quality (e.g. inability to eat preferred foods, limited dietary variety) without substantial reduction in food quantity

Moderately food insecure: clear reductions in food quantity, such as eating smaller meals or skipping meals, but without experiencing the most severe deprivation conditions

Severely food insecure: extreme food access constraints, including running out of food, going to sleep hungry, or going a whole day and night without eating

Households were assigned to one of these four categories, and the proportions in each group were used to describe the prevalence and severity of food insecurity among the sampled smallholder farmers.

Data were analysed using percentages, means, and standard deviations,

To identify the determinants of food insecurity, a binary logistic regression model was employed. For this purpose, households' food insecurity status was recoded into a binary outcome variable (food secure versus food insecure) based on the HFIAS classification. The dependent variable took the value 0 if a household was classified as food insecure and 1 otherwise. Explanatory variables included selected socioeconomic and farm characteristics of the household head and household.

Model specification

The model for the binary logistic regression is specified below:

$$\log(P(Y_i = 1) / (1 - P(Y_i = 1))) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9$$

Where:
$P(Y_i = 1)$ = probability that the household is food secure
β_0 = intercept
$\beta_1 \ldots \beta_9$= regression coefficients
X_1 = Age of household head
X_2 = Sex of household head
X_3 = Marital status
X_4 = Household size
X_5 = Education level
X_6 = Land ownership
X_7 = Farm size
X_8 = Farming experience
X_9 = Income

Results and Discussion

Food Insecurity Access-related Domains among Smallholder Farmers

The results in Table 2 indicate that all three access-related domains are highly prevalent among the sampled households, confirming that food insecurity in the study area is widespread and multidimensional. Anxiety and uncertainty about the household food supply were reported by 87.4% of respondents, while 88.6% experienced insufficient food quality, implying that most households regularly worry about food availability and struggle to maintain preferred or nutritionally adequate diets. This pattern is consistent with studies among smallholder farmers, which document high levels of food-related worry and compromised diet quality as core features of household food insecurity (Otekunrin et al, 2021; Lolaso et al, 2024; Ogunfolaju et al, 2026)

Insufficient food intake and its physical consequences were also common, affecting 73.2% of households, suggesting that more than two-thirds of respondents experience more severe manifestations, such as reduced portion sizes, skipped meals, or the physical effects of inadequate food consumption. Households often first compromise on diet quality and then, as conditions deteriorate, reduce the quantity and frequency of food intake. Taken together, the high prevalence across all three domains reinforces evidence that smallholder households in comparable settings experience food insecurity as a combination of psychological stress, poor diet quality, and insufficient intake, with serious implications for their health and productivity (Lolaso et al, 2024; Ajao et al, 2023; Ogunfolaju et al, 2026)

Table 2: Food insecurity access-related domains

Food Insecurity access-related domains	Percentage (%)
Anxiety and uncertainty about the household food supply	87.4
Insufficient Quality	88.6
Insufficient food intake and its physical consequences	73.2

Source: Field survey, 2024

Food Insecurity Access-Related Prevalence among Smallholder Farmers

The results in Table 3 show that food insecurity is both widespread and severe among the smallholder farmers, with only about one-third of households (32.0%) classified as food secure. This implies that roughly two-thirds of households experience some level of food insecurity. This finding aligns with Kayode and Alabi (2025) that the majority of farming households fall into one of the food-insecure categories.

The most striking feature of the distribution is the high share of severely food-insecure households (44.6%), compared with 11.0% mildly food-insecure and 12.4% moderately food-insecure. This pattern suggests that for many households in the study area, food insecurity has progressed beyond occasional worry or moderate compromise to frequent or extreme deprivation, such as running out of food, going to bed hungry, or going an entire day without eating (Oni et al, 2024; Otekunrin et al, 2021; El Jarari et al, 2025).

Table 3: Food Insecurity access-related prevalence among smallholder farmers

Food Insecurity access-related prevalence	Percentage (%)
Food Secure	32.0
Mildly Food Insecure	11.0
Moderately Food Insecure	12.4
Severely Food Insecure	44.6

Source: Field survey, 2024

Determinants of Food Insecurity among Smallholder Farmers

The binary logistic regression results in Table 3 show that male-headed households had lower odds of being food secure compared with female-headed households (β = −1.388), indicating that male-headed households were more likely to be classified as food insecure. This pattern contrasts with the usual assumption that male-headed households are better off and may reflect local constraints such as weaker participation in gender-targeted support programmes or differential exposure to income and production shocks (Maahmud et al, 2025).
Marital status had a strong positive effect: married households were more likely to be food secure (β = 2.322). This suggests that married households have higher odds of food security, likely due to resource pooling, joint labour, and better risk sharing within the household (Ogunfolaju et al., 2026).

Education level was negatively associated with food security (β = −0.689, p = 0.016), meaning that higher levels of education reduced the odds of being food secure, i.e., more educated household heads were more likely to be food insecure. This runs counter to the findings of Ayele et al (2020), which generally find a positive link between education and food security, as higher education improves awareness, job opportunities, and income-generating activities. The counterintuitive result may arise because more educated farmers either migrate to unstable off-farm jobs or have higher expectations for diet quality (Villacis et al, 2022)

Farming experience likewise showed a negative and significant effect (β = −0. 088, p = 0.007), indicating that each additional year of farming experience increased the odds of being food insecure. The pattern may reflect cumulative exposure to climate shocks, price volatility, and insecurity among long-time farmers, which gradually erodes resilience despite accumulated experience (Ifatimehin & Oyibo, 2024).

Income was positive and significant (β = 0.000), indicating that higher income was associated with higher odds of being food secure. This finding aligns with Adeniyi et al. (2022), which found that household income is a key determinant of food security among smallholder farmers. Age (β = −0.022), household size (β = 0.004), Land ownership (β = 2.476) and farm size (β = 0.348, p = 0.115) were not statistically significant.

Table 4: Binary logistic regression for determinants of food insecurity

Predictor	β	*SE*	Wald χ^2	*df*	*P*	Exp(*B*)
Age	−0.02	0.03	0.65	1	0.42	0.98
Sex	−1.39	0.62	5.08	1	0.02*	0.25
Marital status	2.32	1.11	4.38	1	0.04*	10.20
Household size	0.01	0.07	0.00	1	0.95	1.00
Education level	−0.69	0.29	5.85	1	0.02*	0.50
Land ownership	2.48	1.30	3.61	1	0.06	11.89
Farm size	0.35	0.22	2.49	1	0.12	1.42
Farming experience	−0.09	0.03	7.26	1	0.01*	0.92
Income	0.00	0.00	16.46	1	<.01*	1.00
Constant	−0.48	2.27	0.04	1	.834	—

*P≤0.05

Source: Field survey, 2026

Conclusion and Recommendations

The study concludes that food insecurity is both widespread and severe among smallholder farmers in Niger State, with the majority of households experiencing at least one of the three access-related domains—worry about food supply, insufficient food quality, or reduced food intake. The high proportion of severely food-insecure households highlights that many farming families are routinely exposed to extreme deprivation, including going to bed hungry or spending entire days without food, despite their role as food producers. The findings from the binary logistic regression show that household food security status is significantly influenced by gender, marital status, education level, farming experience, land ownership, and income, suggesting that structural and household-level factors jointly shape food access outcomes

Based on these results, extension services and policymakers should prioritise interventions that strengthen household resilience among smallholder farmers in Niger State. Extension programmes should design gender-sensitive strategies that address the specific vulnerabilities of male-headed and more educated households, including improved access to credit, input support, and off-farm income opportunities. Efforts should also focus on supporting married households to better leverage their resource-pooling advantages and on expanding access to secure land and irrigation for smallholders. Furthermore, nutrition-sensitive agricultural programmes that raise awareness of healthy diets and household food management practices should be integrated into existing extension delivery systems to reduce both anxiety about food and more severe forms of food deprivation.

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