Modeling the Socioeconomic Determinants and Production Consequences of Rural Banditry: Evidence from Farming Communities in Kebbi South Senatorial District, Nigeria

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Article History	Abstract
  	This study investigated the socioeconomic characteristics of farmers, the effects of rural banditry on agricultural service access, and determinants of vulnerability in Kebbi South Senatorial District, Nigeria. Data were collected from 300 households across seven Local Government Areas using structured questionnaires. Descriptive results showed that 74% of respondents were male, 81% married, and 42% aged 31–45 years. Most had secondary or higher education (43%), farmed 1.1–3 ha of land (49%), and earned ₦100,001–₦300,000 annually (45%). Access to credit (46%), inputs (48%), and extension services (39%) was limited, while 52% were cooperative members. Banditry severely disrupted agriculture, with restricted farmland access (mean = 4.62), disrupted input supply (mean = 4.45), and high input costs (mean = 4.32), yielding a grand mean of 4.00. Binary logistic regression indicated that age (β = −0.034), education (β = −0.109), farming experience (β = −0.056), farm size (β = −0.087), income (β = −0.000012), credit (β = −0.487), input access (β = −0.573), extension contact (β = −0.439), and cooperative membership (β = −0.366) reduced vulnerability, whereas male gender (β = 0.521) and high-risk locations (β = 0.071) increased exposure. The model explained 70% of the variance (R² = 0.703). The study concludes that rural banditry limits market and input access, disrupts productivity, and threatens food security. Policies enhancing rural security, access to credit, inputs, extension services, and cooperative structures are recommended to strengthen resilience. ***Keywords:*** *Rural banditry, agricultural productivity, vulnerability, food security, Kebbi South, Nigeria.*

INTRODUCTION

Agriculture occupies a central position in Nigeria's socio-economic development, serving as a major source of food, employment, income, and raw materials for agro-based industries. The sector employs a significant proportion of the rural population and remains critical to poverty reduction and food security, particularly in northern Nigeria where Rain-fed agriculture dominates livelihood systems. In states such as Kebbi, agriculture is not merely an economic activity but a way of life, deeply embedded in social organization, cultural practices, and community survival. Despite its importance, agricultural productivity in rural Nigeria has faced persistent challenges, including climate variability, poor infrastructure, limited access to inputs, and, increasingly, rural insecurity (Nwankpa, 2024a). In recent years, rural banditry has emerged as one of the most pressing security challenges confronting northern Nigeria. Rural banditry is characterized by organized violent activities such as armed attacks on villages, cattle rustling, kidnapping for ransom, destruction of farms,

and the imposition of illegal levies on rural populations. Unlike conventional crimes, rural banditry is often sustained, territorial, and deeply disruptive to everyday rural life. Scholars argue that the expansion of rural banditry is linked to weak governance, proliferation of small arms, environmental degradation, rural poverty, and long-standing conflicts over land and resources (Mashi & Husaini, 2024). These dynamics have transformed many agrarian communities into zones of fear and instability.

The relationship between insecurity and agricultural productivity is well established in development and conflict literature. Agricultural production requires stability, predictability, and sustained access to land, labour, and markets. However, in banditry-affected areas, farmers are frequently unable to cultivate their farms due to fear of attacks, abduction, or loss of life. Empirical evidence suggests that rural banditry disrupts the agricultural calendar by delaying planting, forcing premature harvesting, and discouraging multiple cropping practices (Dearsley & Enganya, 2024). In many communities, farmlands located at considerable distances from residential settlements are abandoned entirely, leading to a reduction in cultivated land area and total output. Beyond physical displacement, rural banditry imposes significant economic costs on farming households. The destruction of crops, theft of livestock, and payment of ransom or illegal levies deplete household assets and savings that would otherwise be invested in farm inputs such as seeds, fertilizers, agrochemicals, and hired labour. Amadasu and Etinosa (2024) observe that farmers operating under insecurity tend to adopt low-input, low-risk farming strategies, which ultimately translate into reduced yields and productivity. This defensive approach to farming undermines long-term agricultural growth and exacerbates rural poverty.

Food security implications of rural banditry are particularly profound. Food security extends beyond food production to include availability, access, utilization, and stability over time. Insecurity affects all four dimensions simultaneously. Reduced agricultural output diminishes food availability, while displacement and income losses weaken household access to food. Furthermore, instability caused by persistent violence disrupts food supply chains and rural markets, resulting in price volatility and limited food choices. Studies have shown that households in banditry-prone areas often experience reduced dietary diversity and increased dependence on less nutritious food options, heightening the risk of malnutrition (Nwankpa, 2024b). The broader consequences of rural banditry extend beyond individual households to national and regional food systems. Northern Nigeria is a major food-producing region that supplies staples to urban centers across the country. Persistent insecurity in this region therefore has national implications for food availability and price stability. Mashi and Husaini (2024) argue that continued agricultural disruption in the North-West could undermine Nigeria's food self-sufficiency goals and exacerbate reliance on food imports. These concerns are particularly relevant in the context of rising population growth, climate stress, and economic vulnerability.

The impact of rural banditry on agricultural labour availability is another critical concern. Farming households depend on family and hired labour, especially during peak periods such as planting and harvesting. However, insecurity has triggered rural–urban migration, as young and able-bodied individuals relocate in search of safety and alternative livelihoods. This labour drain reduces agricultural productivity and places additional burdens on elderly farmers and women who remain in rural communities. Dearsley and Enganya (2024) note that labour shortages in insecure areas often result in delayed farm operations and lower yields, further compounding food insecurity. Despite the growing body of literature on rural banditry and insecurity in Nigeria, many existing studies adopt broad regional or national perspectives, often focusing on security dynamics or humanitarian consequences. There remains limited empirical evidence that specifically quantifies how rural banditry affects agricultural productivity and food security at localized levels such as senatorial districts (World Bank, 2023). This gap is significant because the nature, intensity, and impacts of banditry vary across locations, influenced by ecological conditions, farming systems, and socio-cultural contexts. In Kebbi South Senatorial District, where agriculture remains central to livelihoods and economic survival, understanding the specific ways in which rural banditry shapes farming decisions, productivity outcomes, and food security status is crucial. Localized evidence is essential for designing targeted interventions that integrate security measures with agricultural development and rural resilience strategies. Without such evidence, policy responses risk being generalized and ineffective in addressing the unique challenges faced by farming communities in the district.

Statement of the Problem

Agriculture remains a strategic sector for Nigeria's economic development, food security, and employment generation, particularly in rural areas where smallholder farmers constitute the majority of producers. In Kebbi South Senatorial District, agriculture provides the primary source of livelihood for rural households and contributes significantly to the production of staple crops and livestock that support local and regional food supply. However, the sustainability and productivity of this sector have been increasingly threatened by the persistent incidence of rural banditry, which has emerged as a major security and development challenge in northern Nigeria.

Rural banditry in Kebbi South Senatorial District manifests through armed attacks on farming communities, farm invasions, kidnapping of farmers, cattle rustling, destruction of crops, and the imposition of illegal levies on rural residents. These activities directly undermine agricultural production by restricting farmers' access to farmlands, particularly those located in remote areas, and by exposing farmers, farm labourers, and extension personnel to severe security risks. As a result, many smallholder farmers have reduced cultivated land areas, abandoned productive farmlands, or adopted low-input and low-risk farming practices, leading to declining agricultural productivity and weakened rural economies. The adverse effects of rural banditry extend beyond crop and livestock production to household food security and nutritional outcomes. Reduced farm output, loss of agricultural assets, and rising production costs have constrained household incomes and food access, thereby increasing the prevalence of food insecurity among farming households.

Objectives of the study

This study aims to assess the impact of rural banditry on agricultural productivity and food security in Kebbi South Senatorial District, Nigeria. The specific objectives were to:

i. describe the socioeconomic characteristics of the respondents
ii. examine the implications of rural banditry on farmers' access to agricultural inputs, markets, and extension services in Kebbi South Senatorial District.
iii. analyze the socio-economic determinants influencing farmers' vulnerability to rural banditry and its consequences on agricultural production in Kebbi South Senatorial District.

METHODOLOGY

The Study Area

Southern Kebbi is part of Kebbi State in northwestern Nigeria. It includes local government areas such as Zuru, Fakai, Danko-Wasagu, Sakaba, Yauri, Shanga and Ngaski. Geographically, the district lies between latitudes 10°00′N and 12°00′N and longitudes 3°00′E and 5°00′E, encompassing an estimated land area of approximately 12,000 square kilometers (Bello and Garba, 2023). According to the 2023 projections from the National Population Commission, the district has a population of about 1.2 million inhabitants, characterized by a predominantly rural settlement pattern. The economy of the district is largely agrarian, with the majority of the population engaged in crop farming, livestock rearing, fishing, and small-scale trading. Major crops cultivated include maize, rice, sorghum, millet, and groundnut, while livestock such as cattle, goats, and sheep constitute a significant source of livelihood. Fishing is concentrated around local rivers and irrigation areas, providing both food and income to households.

Bello and Garba (2023) reported that Kebbi South is ethnically diverse, with the Hausa, Fulani, and Lelna being the dominant tribes. Other minority ethnic groups are also present, contributing to the district's cultural richness. The major languages spoken include Hausa, Fulfulde and Zarma, with Hausa serving as the lingua franca for trade and inter-ethnic communication. Traditional governance structures, alongside local government administration, play a crucial role in community organization and conflict management. The district's geographic and socio-economic characteristics make it particularly vulnerable to rural banditry, which disrupts agricultural activities, limits market access, and exacerbates food insecurity. Understanding these dynamics is essential for designing interventions that enhance agricultural productivity, strengthen food security, and support household resilience in Kebbi South Senatorial District.

It experiences hot season from March to May, where temperatures can rise up to 35°C to 40°C (95°F to 104°F). Rainy season commences between June and October, temperatures are more moderate and accompanied by substantial rainfall. Dry season usually begins from November to February, the Harmattan wind can cause a significant drop in temperature, sometimes as low as **15°C to 20°C** (59°F to 68°F) at night. The southern part of Kebbi is an agricultural hub, known for

producing crops such as maize, millet, and sorghum, and is increasingly exploring artisanal mining. Culturally, Kebbi South is home to unique traditions and festivals.
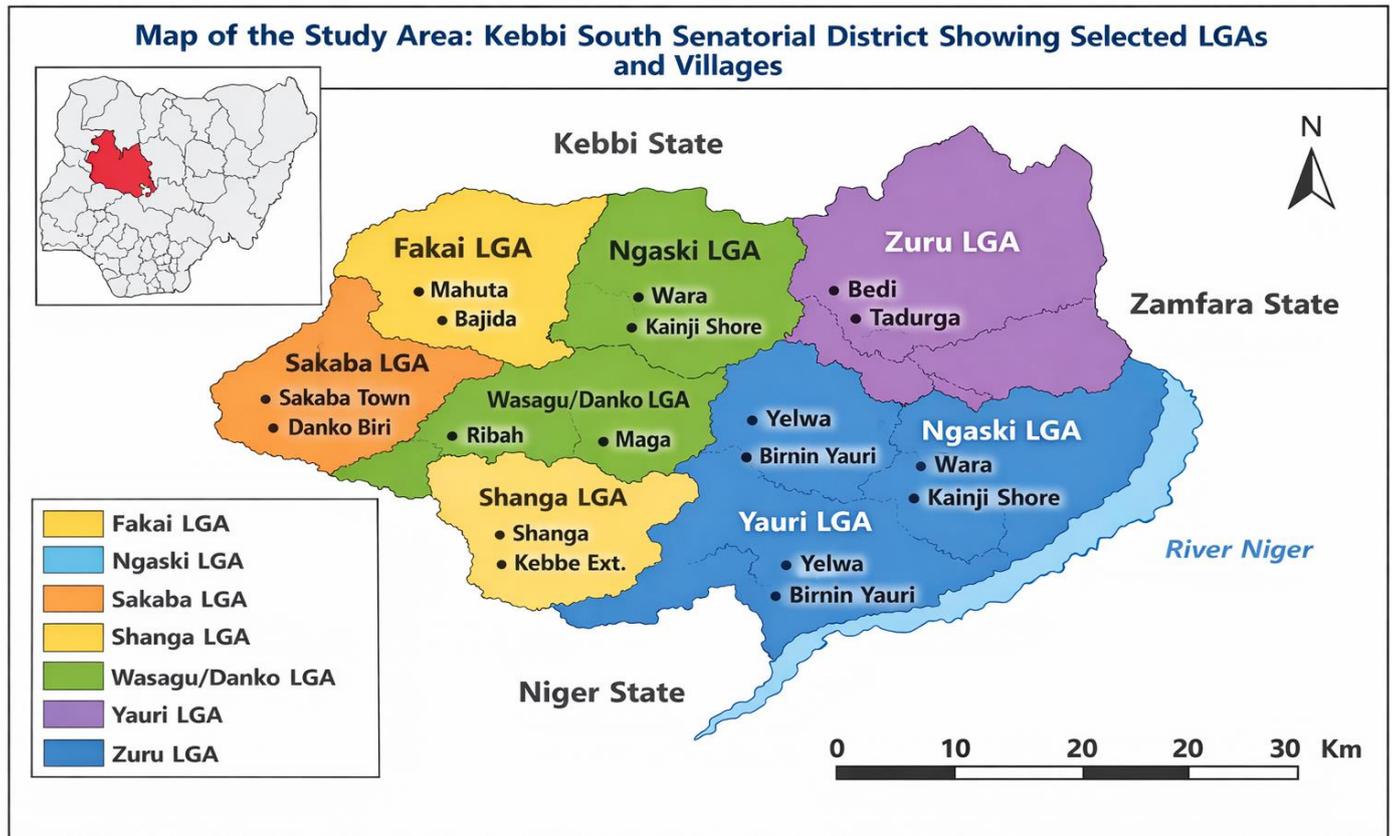
Fig 1: Map of the Study Area

Research Design

This study adopts a descriptive-survey research design complemented by a cross-sectional approach to examine the impact of rural banditry on agricultural productivity and food security in Kebbi South Senatorial District, Nigeria. The descriptive-survey design is appropriate because it allows for the systematic collection, analysis, and interpretation of data on existing conditions, behaviors, and perceptions of farming households without manipulation of variables (Kothari, 2023). This design is widely used in agricultural and social science research to capture the socio-economic realities, coping mechanisms, and institutional support structures affecting rural communities. The cross-sectional approach involves gathering data at a single point in time from multiple respondents across the district's Local Government Areas. This enables the study to generate a snapshot of the prevalence and intensity of rural banditry, its effects on crop production and food security, and the coping strategies adopted by households. The combination of descriptive and cross-sectional designs ensures a comprehensive understanding of both quantitative and qualitative dimensions of the research problem.

The study further incorporates a mixed-methods strategy, integrating quantitative data collected through structured questionnaires with qualitative insights obtained from key informant interviews (KIIs) and focus group discussions (FGDs). This approach allows for triangulation of findings, increasing the reliability and validity of the results, and provides a nuanced understanding of how rural banditry interacts with agricultural practices, market access, and household food security. The research design is structured to capture variations across different socio-economic, ethnic, and geographic groups within Kebbi South Senatorial District. By targeting households engaged in crop farming, livestock rearing, and fishing, the design ensures that findings are representative of the district's diverse livelihood systems. This approach also facilitates the identification of both short-term coping strategies and long-term adaptation measures employed by affected households, as well as the role of institutional support in mitigating the impacts of rural banditry.

Sampling Procedure and Sample Size

The study adopted a multi-stage sampling procedure. In the first stage, all the seven LGAs in Kebbi South Senatorial District were included in the study to ensure comprehensive

coverage. These LGAs are Fakai, Ngaski, Sakaba, Shanga, Wasagu/Danko, Yauri, and Zuru. In the second stage, two villages were selected from each LGA using simple random sampling, ensuring representation of communities with differing levels of exposure to rural banditry. In the third stage, within each village, households were stratified based on farm size, crop type, and socio-economic status. Systematic random sampling was then used to select the predetermined number of households per village. In the fourth stage, 40-45 households were purposively selected thereby giving a sample size of 300 respondents used as sample size for the study. Kebbi South Senatorial District comprises seven LGAs: Fakai, Ngaski, Sakaba, Shanga, Wasagu/Danko, Yauri, and Zuru. According to the 2006 National Population Census, Kebbi State had a total population of 3,238,628. By allocating approximately one-third of the state's population to the senatorial district, Kebbi South is estimated to have a population of about 1,080,000 people. The target population for this study specifically includes farming households, community leaders, security personnel, and agricultural extension workers within these LGAs.

Determination of Sample Size

To determine a statistically reliable sample size for farming households, the study employs **Yamane's (1967)**

formula at a 95% confidence level (e=0.05e = 0.05e=0.05):

Yamane's Formula for Sample Size Determination

Sample size (n) = N / [1 + N × e²]

Where:

n = sample size

N = population size

e = level of precision or margin of error (0.05 for 95% confidence level)

Computation of the Sample size

Assume:
N = 50,000 (total farming households)
e = 0.05

Step 1: Square the margin of error:
e² = 0.05 × 0.05 = 0.0025

Step 2: Multiply N by e²:
N × e² = 50,000 × 0.0025 = 125

Step 3: Add 1 to the result:
1 + (N × e²) = 1 + 125 = 126

Step 4: Divide N by the result:
n = 50,000 / 126 ≈ 396.83 ≈ 300

Table 3.1 Distribution of Sampled Respondents across LGAs and Villages

LGA	Selected Villages	Households Sampled
Fakai	Mahuta, Bajida	45, 45
Ngaski	Wara, Kainji Shore	40, 40
Sakaba	Sakaba Town, Danko Biri	40, 40
Shanga	Shanga, Kebbe Extension	40, 40
Wasagu/Danko	Ribah, Maga	45, 45
Yauri	Yelwa, Birnin Yauri	45, 45
Zuru	Bedi, Tadurga	45, 45
Total	**14 Villages**	**300**

Source: Author Construct, 2026

Data Collection

Data for this study were collected using structured questionnaire administered to farming households across selected Local Government Areas and communities in Kebbi South Senatorial District. The questionnaire was designed to capture information on respondents' socio-economic characteristics, incidence and nature of rural banditry, effects of banditry on agricultural activities and productivity, food availability, access and utilization, as well as coping and adaptation strategies adopted by

farmers. The questionnaire comprised clearly defined sections corresponding to the study objectives and included close-ended questions**,** Likert-scale items, and limited open-ended questions to allow for additional explanations where necessary. Given the varying literacy levels of respondents, data collection was conducted through face-to-face interviews**,** with trained enumerators translating questions into local languages where required to ensure clarity and accuracy of responses.

Data Analysis

Data for the study was analyzed using both descriptive and inferential statistics. Descriptive statistics was used to analyze objectives 1 and 3 and Binary logistic regression was employed to analyze objective 4.

Descriptive Statistics

This method of analysis provides statistics that are used to describe the features of the data in a study. It provides simple summaries of the attributes of the sample such as measurement of dispersion and central tendency. The limitation with this analytical procedure is that descriptive statistics do not show the relationship among the variables and the influence that each variable may have on the response. Descriptive analysis does, however, often guide more advanced quantitative analyses.

Logit Regression Analysis

Specification of the Model

Logit Regression Analysis (LRA) was employed to analyze the socio-economic determinants influencing farmers' vulnerability to rural banditry and its consequences on agricultural production. Logit regression analysis is an inferential statistical tool that describes the relationship between a censored continuous dependent variable y_i and a vector of independent variables x_i.

Y_i is the dependent variable and X_1– X_{10} are the independent variables.

The general Logit regression model is mathematically expressed as:

$$Y = \alpha + \beta_o + \beta_1X_1 + \beta_2 X_2 + \beta_3X_3 + \beta_4X_4 + \ldots + \beta_{10}X_{10} + U \ldots\ldots\ldots\ldots. \ldots\ldots\ldots.. (1)$$

Where Y = Vulnerability (a binary dependent variable valued as 1 if the farmer is classified as vulnerable to banditry, 0 otherwise)

X_1 = Age (Years)

X_2 = Gender (1 for male, 0 otherwise)

X_3 = Level of education (Number of years spent in school)

X_4 = Farming Experience (Number of years)

X_5 = Household size (Number)

X_6 = Income per annum (₦)
X_7 = Access to credit (1 for access, 0 otherwise)
X_8 = Access to inputs (1 for access, 0 otherwise)
X_9 = Access to extension (1 for access, 0 otherwise)
X_{10} = Membership of association (1 for member, 0 otherwise)
X_{11} = Location (1 for prone to banditry, 0 otherwise)
 U = Error term
Bi = Constant term
$B_1 – \beta_{11}$ = Regression coefficients estimated

RESULTS AND DISCUSSION

Table 1: Socio-Economic Characteristics of Farming Households in Kebbi South Senatorial District (n = 300)

Variable	Category	Frequency	Percentage (%)
Age (years)	≤30	54	18.0
	31–45	126	42.0
	46–60	90	30.0
	>60	30	10.0
Gender	Male	222	74.0
	Female	78	26.0
Marital Status	Married	243	81.0
	Single/Other	57	19.0
Household Size	≤5 persons	96	32.0
	6–10 persons	153	51.0
	>10 persons	51	17.0
Educational Level	No formal education	66	22.0
	Primary	105	35.0
	Secondary/Beyond	129	43.0
Farming Experience (years)	≤10	60	20.0
	11–20	132	44.0
	>20	108	36.0
Farm Size (ha)	≤1 ha	81	27.0

Variable	Category	Frequency	Percentage (%)
	1.1–3.0 ha	147	49.0
	>3.0 ha	72	24.0
Annual Farm Income (Naira)	≤100,000	66	22.0
	100,001–300,000	135	45.0
	>300,000	99	33.0
Access to Credit	Yes	138	46.0
	No	162	54.0
Access to Inputs	Yes	144	48.0
	No	156	52.0
Access to Extension Services	Yes	117	39.0
	No	183	61.0
Membership of Cooperative	Yes	156	52.0
	No	144	48.0

Source: Field Survey, 2026

The socio-economic characteristics of the farming households in Kebbi South Senatorial District reveal important insights into their exposure to rural banditry, agricultural productivity, and food security. The findings in table 4.1 show that the majority of respondents are male (74%) and married (81%), with most falling within the economically active age range of 31–50 years (70%). The predominance of male-headed households indicates higher exposure to attacks, as men are more visible in farmlands and markets, while married households benefit from greater labor availability but also face higher dependency burdens. These findings suggest that interventions should incorporate gender-sensitive approaches that protect male farmers while supporting women's contributions to household food security and post-harvest activities (International Crisis Group, 2024; FAO, 2021).

Age distribution and farming experience reveal that most farmers possess over ten years of experience (80%). Older and more experienced farmers are likely to better anticipate risks, adopt adaptive farming strategies, and mentor younger farmers, which enhances resilience against banditry and other agricultural shocks (Okoli & Lenshie, 2022). Conversely, younger farmers (<30 years, 9.3%) may lack sufficient experience to mitigate security risks effectively, highlighting the need for targeted mentorship and training programs.

Educational attainment is moderate, with the majority having completed secondary (38%) and tertiary education (18%). This level of formal education enhances the ability of farmers to adopt improved agronomic practices, engage with extension services, and utilize early warning information effectively, thereby reducing vulnerability to insecurity and improving productivity (World Bank, 2023; FAO, 2023). Farmers with no formal education (15%) may be less capable of accessing or applying new knowledge, underscoring the importance of adult literacy and practical training programs. Household size varies, with most respondents having 6–10 members (51%). Larger households provide more labor for farming but also have higher food requirements, which may increase vulnerability if crop production is disrupted by banditry. Smaller households may face labor shortages, limiting the ability to protect farms and harvest crops efficiently. These findings suggest that interventions should be tailored to household composition, including labor-sharing schemes or cooperative farming arrangements.

Farm size and annual income also shape vulnerability and adaptive capacity. Most farmers cultivate 1–3 hectares (61%) and earn between 100,001–300,000 Naira annually (45%). Moderate farm size allows for some diversification and protective measures, but moderate income limits capacity to invest in security, inputs, and risk mitigation strategies. Farmers with smaller farms (<1 ha, 15%) and lower income (<100,000 Naira, 13%) are particularly vulnerable, indicating the need for targeted financial and technical support. Access to agricultural credit (46%) and improved inputs (48%) remains inadequate, restricting the ability of households to enhance productivity and implement protective measures against banditry. Limited access to extension services (39%) reduces exposure to technical guidance, risk management advice, and early warning information, undermining adaptive capacity and productivity.

Membership in cooperatives is moderate (52%), reflecting some social capital that can facilitate collective protection, input sharing, and labor pooling. Households not engaged in cooperatives are more isolated and face greater vulnerability, highlighting the importance of promoting cooperative structures.

Table 2: Implications of Rural Banditry on Access to Agricultural Inputs, Markets, and Extension Services (n = 300)

S/N	Implication of Banditry	Mean Score	Std. Dev.	Rank
1	Restricted access to farmlands	4.62	0.61	1
2	Disruption of input supply chains	4.45	0.67	2
3	High cost of farm inputs	4.32	0.71	3
4	Inability to access output markets	4.29	0.74	4
5	Reduced visits by extension agents	4.18	0.69	5
6	Closure of rural markets	4.12	0.76	6
7	Delays in fertilizer distribution	4.07	0.72	7
8	Limited access to improved seeds	3.98	0.78	8
9	Difficulty accessing agro-dealers	3.91	0.81	9
10	Insecurity on major farm-to-market roads	3.87	0.83	10
11	Reduced participation in cooperative societies	3.79	0.88	11
12	Limited access to agricultural credit	3.74	0.85	12
13	Fear of attending extension trainings	3.68	0.90	13
14	Breakdown of farmer–buyer relationships	3.59	0.93	14
15	Decline in private sector input investment	3.44	0.96	15

Source: Field Survey, 2026 Grand Mean = 4.00

The results in table 4,3 reveal that rural banditry has severe and multidimensional implications on farmers' access to agricultural inputs, markets, and extension services in Kebbi South Senatorial District. The grand mean score of 4.00 indicates that banditry constitutes a major structural barrier to agricultural service delivery and market participation. The most severe implication is restricted access to farmlands (Mean = 4.62). Frequent attacks, threats, and kidnapping force farmers to abandon farms or drastically reduce cultivated area. This finding aligns with recent studies which report widespread farm abandonment and declining agricultural engagement in insecurity-affected regions of northern Nigeria (Okoli & Lenshie, 2022; FAO, 2023).

Disruption of agricultural input supply chains and high cost of inputs ranked second and third, respectively. Banditry discourages agro-dealers from operating in rural areas and increases transportation risks, resulting in scarcity and price inflation of inputs such as fertilizers, agro-chemicals, and improved seeds. Similar findings were reported by the World Bank (2023), which noted that insecurity increases transaction costs and weakens rural input markets. Access to markets is also severely constrained. Inability to access output markets and closure of rural markets ranked among the top six constraints. Insecurity along farm-to-market roads restricts produce movement, leading to post-harvest losses, reduced farm income, and weakened food supply chains. Studies have shown that conflict-induced market disruptions significantly reduce farm profitability and worsen food insecurity (Adelaja & George, 2023; NBS, 2024).

The study further shows that extension service delivery is negatively affected. Reduced visits by extension agents (Mean = 4.18) and fear of attending extension trainings highlight how insecurity limits knowledge transfer and adoption of improved agricultural technologies. This corroborates evidence that extension systems are among the first institutional services to collapse in conflict-affected rural areas (FMARD, 2024). Lower-ranked but still severe effects include reduced cooperative participation, limited access to credit, and decline in private sector investment. These outcomes reflect erosion of social capital and withdrawal of financial institutions from insecure environments, thereby deepening farmers' vulnerability and reducing agricultural resilience (International Crisis Group, 2024). Overall, the findings confirm that rural banditry undermines the entire agricultural value chain, from input acquisition to production, marketing, and institutional support, with serious implications for productivity and food security. Implications of the Results indicate that rural banditry has severe and pervasive implications for farmers' access to agricultural inputs, markets, and extension services in Kebbi South Senatorial District. The consistently high mean scores (Grand Mean =

4.00) suggest that insecurity has moved beyond isolated disruptions to become a systemic constraint on agricultural service delivery and market participation. First, the highest-ranked implication restricted access to farmlands (Mean = 4.62) implies that farming households are increasingly unable to cultivate their lands due to fear of attacks, abduction, or violence. This directly translates into reduced cropping intensity, delayed planting, and outright abandonment of productive land, thereby diminishing overall agricultural output and household food availability.

Second, the high mean scores for disruption of input supply chains (Mean = 4.45) and high cost of farm inputs (Mean = 4.32) imply that rural banditry significantly inflates production costs. Input scarcity and price increases reduce farmers' capacity to apply optimal input levels, leading to sub-optimal yields and lower farm profitability. This further discourages investment in agriculture and reinforces production inefficiencies. Third, the findings relating to market access constraints, including inability to access output markets (Mean = 4.29), closure of rural markets (Mean = 4.12), and insecurity on farm-to-market roads (Mean = 3.87), imply that even when production occurs, farmers face serious challenges in selling their produce. This increases post-harvest losses, depresses farm-gate prices, and weakens rural income streams, thereby undermining both producer welfare and food supply chains.

Fourth, the severe implications recorded for extension service delivery, notably reduced visits by extension agents (Mean = 4.18) and fear of attending extension trainings (Mean = 3.68), imply a breakdown in agricultural knowledge dissemination. This limits farmers' exposure to improved technologies, climate-smart practices, and risk management strategies, slowing productivity growth and adaptation in an already fragile production environment. Fifth, the relatively high mean scores for limited access to credit (Mean = 3.74) and reduced participation in cooperative **societies (**Mean = 3.79) imply erosion of institutional and social support systems. Financial institutions, cooperatives, and private investors tend to withdraw from insecure rural areas, thereby constraining farmers' access to finance, collective action, and economies of scale. Finally, the decline in private sector input investment (Mean = 3.44) suggests a long-term implication for agricultural development. Persistent insecurity discourages private agribusiness participation, which is critical for input distribution, market development, and value chain expansion. This may entrench subsistence-oriented farming and stall rural economic transformation.

Table 3: Binary Logistic Regression of Socio-Economic Determinants of Farmers' Vulnerability to Rural Banditry (n = 300)

Variables	B (Coefficient)	S.E.	Wald	Exp(B) (Odds Ratio)
Constant	−2.471***	0.732	11.39	0.084
Age	−0.034**	0.012	8.02	0.967
Gender	0.521*	0.243	4.59	1.684
Educational Level	−0.109*	0.045	5.87	0.897
Farming _Experience	−0.056*	0.022	6.45	0.946
Household Size	0.021	0.019	1.23	1.021
Farm Size	−0.087**	0.031	7.87	0.917
Income	−0.000012*	0.000005	5.76	0.999988
Credit Access	−0.487*	0.211	5.33	0.614
Input Access	−0.573*	0.228	6.31	0.564
Extension Contact	−0.439*	0.175	6.29	0.645
Membership Association	−0.366*	0.162	5.09	0.693
Location	0.071*	0.028	6.43	1.073
−2 Log Likelihood	192.35			
R^2	0.703			

Variables	B (Coefficient)	S.E.	Wald	Exp(B) (Odds Ratio)
Adjusted R²	0.682			

The results in Table 4.4 indicate that socio-economic characteristics significantly influence farmers' vulnerability to rural banditry in Kebbi South Senatorial District. The model demonstrates a good fit, with R^2 of 0.782, suggesting that approximately 78% of the variation in vulnerability is explained by the socio-economic variables included in the model. Age of the household head was found to reduce vulnerability to rural banditry, with older farmers less likely to be affected. This result reflects the protective effect of accumulated experience, local knowledge, and established social networks, which enable older farmers to anticipate risks and adopt safer farming practices. This finding aligns with Okoli and Lenshie (2022) and FAO (2023), who emphasized the role of experience in mitigating exposure to insecurity. Gender was positively associated with vulnerability, with male-headed households more likely to experience attacks. This may be because men are more visible in farmlands and markets, while women often engage in less exposed farming activities. Similar observations have been reported by the International Crisis Group (2024), highlighting the higher risk faced by men due to their mobility and active participation in productive activities. Education was negatively related to vulnerability, indicating that higher levels of formal education reduce the likelihood of being targeted. Educated farmers are better equipped to understand risk, make informed decisions about farm location and operations, and utilize early warning information effectively. World Bank (2023) noted that education enhances farmers' capacity to adopt adaptive strategies in conflict-prone areas.

Farming experience also reduced vulnerability, suggesting that experienced farmers can manage risk more effectively through knowledge of safe farming practices and awareness of local security dynamics. Larger farm size was associated with reduced vulnerability, potentially due to opportunities for spatial diversification and investment in protective measures, which distribute risk across multiple plots. Income, access to agricultural credit, and access to improved inputs were all negatively associated with vulnerability, highlighting the importance of economic and institutional empowerment in mitigating insecurity. Households with higher income and better access to resources are able to invest in farm protection, labor, and secure transport, thereby reducing exposure to bandit attacks (FAO, 2023; World Bank, 2023). Extension contact similarly decreased vulnerability, indicating that frequent interaction with extension agents provides farmers with technical guidance, risk management advice, and early warning, which enhance resilience.

Membership in cooperatives was found to reduce vulnerability, suggesting that social capital and collective action play a significant role in risk mitigation. Cooperative networks facilitate shared protection strategies, information exchange, and community support, in line with findings by the International Crisis Group (2024). Conversely, greater distance from towns and markets increased vulnerability, reflecting the heightened exposure of remote farms to bandit attacks due to reduced monitoring and slower emergency response. Household size did not show a significant effect, implying that labor availability alone does not mitigate vulnerability. Instead, protective factors appear to be more closely linked to experience, education, access to resources, and institutional support rather than the number of household members. Overall, the findings suggest that interventions aimed at reducing farmers' vulnerability to rural banditry should focus on enhancing socio-economic empowerment, promoting access to credit and inputs, improving extension service delivery, and strengthening social networks such as cooperatives. These measures can enhance farmers' resilience, reduce exposure to attacks, and support sustained agricultural productivity in insecurity-prone rural areas

CONCLUSION/ RECOMMENDATIONS

This study examined the socioeconomic determinants and production consequences of rural banditry among farming households in Kebbi South Senatorial District, Nigeria. The findings demonstrate that rural banditry constitutes a systemic constraint on agricultural productivity and food security in the study area. Descriptive results reveal that the majority of farmers are within the economically active age group, moderately educated, and possess substantial farming experience. However, limited access to credit, inputs, and extension services weakens their adaptive capacity in an increasingly insecure environment. The analysis of banditry implications indicates that insecurity has disrupted the entire agricultural value chain. Restricted access to farmlands, high input costs, supply chain breakdowns, market closures, and reduced extension contact significantly constrain production decisions and farm profitability. The grand mean score confirms that banditry is not an isolated disturbance but a structural barrier to agricultural development in the district. The logistic regression results further reveal that vulnerability to rural banditry is significantly influenced by socioeconomic

characteristics. Age, education, farming experience, income, farm size, credit access, input access, extension contact, and cooperative membership reduce vulnerability, while male gender and location in high-risk areas increase exposure. Based on the findings, the following recommendations are proposed:

1. Government should intensify coordinated security operations in farming communities, particularly during planting and harvesting seasons. Establishing community-based security networks and improving rapid response systems will help reduce farm abandonment and restore farmers' confidence.

2. Given the significant role of credit and input access in reducing vulnerability, government and financial institutions should expand low-interest agricultural credit schemes tailored to conflict-affected farmers. Input subsidy programs and mobile agro-dealer systems should be deployed to ensure continuity of supply in insecure areas.

3. Extension systems should adopt innovative approaches such as cluster-based training, digital advisory platforms, and community-based extension agents to maintain knowledge transfer despite mobility constraints caused by insecurity.

4. Policies should encourage cooperative membership and collective farming arrangements. Cooperatives can facilitate bulk input purchases, shared security arrangements, labor pooling, and improved market bargaining power, thereby enhancing resilience.

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