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ASSESSING THE EFFECT OF INSECURITY ON FOOD PRODUCTION IN THE EASTERN PART OF SOKOTO, SOKOTO STATE, NIGERIA

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Abstract

This study examines the effects of insecurity on food production in the Sokoto East Senatorial Zone, Nigeria using a survey data for a sample of three hundred and fifty-five (355) respondents. In the model the dependent variable is food production while the independent variables are insecurity and other factors such as climate change, access to inputs, and farming techniques. In the estimation, the study used Ordinary Least Square regression and the results show that that insecurity has a significant negative impact on food production in the study area. Additionally, the study finds that other factors, including limited access to inputs, inadequate infrastructure, and unfavorable weather conditions, also contribute to a reduction in food production. These findings emphasize the need for policymakers and stakeholders to address issues of insecurity and other related factors to enhance food production and ensure food security in the Sokoto East Senatorial Zone. Implementing measures to improve security, provide better access to resources, and promote resilient farming practices will be crucial in mitigating the negative impacts on food production.

Keywords: *Insecurity, Food production, Sokoto East, Nigeria.*

INTRODUCTION

In recent years, Nigeria has faced an unprecedented surge in insecurity, making national security a major concern for the government and leading to substantial budget allocations to address this issue (Odalonu, 2022). The scourge of conflict has afflicted all parts of the country, but its prevalence and intensity have not been the same across the country. Accusations point to the legacy of colonialism and the ongoing interplay of external and domestic imperialist forces, who are alleged to be fueling the violence for their own selfish gains. The current predicament is attributed to a confluence of factors, including politics, globalization, natural disasters, the proliferation of weapons and light armaments, corruption, executive abuse of power, and incompetent leadership (Schreier, 2011). These complex and interconnected issues have collectively contributed to the alarming levels of insecurity experienced throughout Nigeria.

The rise of insurgency in Sokoto State, particularly in the eastern senatorial zone, has led many farmers to abandon their crops (Achumba et al., 2013). Fear of attacks, especially from roaming bandits, clashes between herdsmen and farmers, community disputes, and other forms of violence have driven this exodus. Numerous farmers have deserted their communities and sought refuge in nearby towns, state capitals, and the neighboring Niger Republic. As a result, farmers can no longer produce in sufficient quantities to meet the demand from other regions of Nigeria. Most of the young people who used to assist with agriculture in rural areas have

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been killed or displaced, reducing the available labor force in Nigeria's agricultural sector. Sokoto serves as an important link between Nigeria's agricultural regions and the drier Sahelian area extending into the deserts of Niger, Benin, and Libya. The disruption of this connection has had significant implications, leading to food shortages and their cascading effects.

Agriculture, particularly farming, has historically been a crucial livelihood for a significant portion of Nigeria's population. However, the country's escalating instability has made farmers and agricultural investors increasingly cautious and skeptical about investing in the sector (Ilesanmi & Odefadehan, 2022). In Sokoto State, the clashes between herders and farmers have largely undermined agricultural activities. Farmers in many regions avoid going to work due to the fear of being attacked, or the insurgency killing them, destroying their crops, or harvesting them to feed their flocks or fighters. This has resulted in food scarcity for the state's general population.

Furthermore, the entrepreneurs who had ventured into farming for food security and job creation are now reconsidering their continued involvement in commercial agriculture due to the pervasive insecurity. This has, in turn, raised the rate of unemployment in the state and the country at large (Ilesanmi & Odefadehan, 2022). The disruption of agricultural production, coupled with the reluctance of investors to participate in the sector, has had far-reaching consequences on food security and employment in Sokoto State and Nigeria as a whole. Addressing the underlying security challenges is crucial to reviving the agricultural sector and ensuring the well-being of the population.

Existing empirical evidence on the relationship between insecurity and food production in various parts of Nigeria is diverse and inconclusive. While several studies have been undertaken based on relevant literature, there is a lack of consensus based on empirical findings (Ilesanmi & Odefadehan, 2022; Babatunde et al., 2008; Usman, 2022). Consequently, the purpose of this study is to contribute to the ongoing discussion by providing fresh insights into the complex relationship between insecurity and food production in Sokoto State. To the best of the researchers' knowledge, there is no single study that has comprehensively captured the nexus between these two critical issues in the specific context of Sokoto State. Therefore, the primary objective of this study is to empirically evaluate how insecurity affects food production in Sokoto State. By addressing this research gap, the study aims to offer valuable evidence-based information that can inform policy discussions and interventions to mitigate the impact of insecurity on agricultural productivity in the state. Based on the objective, this paper is divided into five sections. Section one is the introduction, section two presents a theoretical framework and review of related empirical studies. section three consists of data and methodology. Section four consists of results and discussions while section five comprises conclusions and recommendations.

LITERATURE REVIEW

In the context of this research, the Elite theory of insecurity serves as the theoretical foundation for examining the relationship between insecurity and food production in Sokoto State. This theory was developed by Pareto and Mosca as a response to Karl Marx's theory of power and state, as well as Abraham Lincoln's concept of democracy (Esetang & Atai, 2023). The Elite theory is based on the premise that society is divided into two broad groups: the rulers and the ruled. The former represents the minority, while the latter is the majority. However, the minority elite hold authority and are able to misappropriate state resources to the detriment of the governed. Pareto and Mosca primarily attributed the elites' ability to maintain power to the

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internal organization of the elite class. This allows them to create a cohesive and coherent minority against the masses, who are often unorganized and easily manipulated.

Empirical research has been conducted on the impact of insecurity on the agricultural sector in Nigeria. For instance, Akhanolu, and Ogunnubi (2024) carried out a study on the impact of the Boko Haram insurgency on the agricultural sector. They applied a t-test analysis and found that the agricultural value added to GDP was high before the Boko Haram disruption, but had reduced during the period of insurgency. Additionally, Eneji and Agri (2020) examined the effect of national insurgency, including Boko Haram, the Niger Delta conflict, and Fulani herdsmen clashes, on agricultural development and productivity in Nigeria. Their findings revealed that a unit decrease in agricultural food production in a particular year would lead to a 4.30% increase in the share of agriculture to GDP in the following year. Conversely, a shift from non-violence to violence in any year caused by these insurgencies reduced the contribution of the agricultural sector to GDP by around 17.60%, 19.50%, and 17.50%, respectively. The empirical findings highlighted the significant negative impact that insecurity, in the form of insurgencies and conflicts, has had on agricultural production and the overall contribution of the agricultural sector to Nigeria's GDP.

Kah (2017) investigates the persistent food insecurity caused by the Boko Haram conflict in parts of Nigeria and Cameroon. This insurgency, which began in 2009, has devastated entire towns, damaged food crops, killed livestock, and forced farmers to flee to safer areas. As a result, many people now rely on food assistance from international organizations. While Nigeria and its neighbors strive to control the rebels, a larger problem has arisen or been exacerbated: food shortages, which have far-reaching consequences. Markets have been closed, and customs taxes have been reduced. In addition, Nwozor et al., (2019) explored Nigeria's efforts to achieve food security in the face of national insecurity. Given Nigeria's classification as food insecure, the study investigates the relationship between national insecurity and food production as a precursor to the realization of food security. The study uses primary and secondary data in the analysis and reported that achieving food security is impossible until the insecurity that infiltrates and envelops rural communities is addressed. The study highlights the significant impact that insecurity, particularly the Boko Haram insurgency, has had on food production, food security, and the overall agricultural sector in Nigeria and its neighboring countries.

Babatunde et al., (2008) investigated the predictors of susceptibility to food insecurity in male and female-headed agricultural families in Nigeria. According to the findings of the study: that there is evidence of gender imbalance in terms of resources accessible to male and female-headed families in the research location. That is, male-headed families have more resources than female-headed households, and female-headed households are more vulnerable to food insecurity than male-headed households. Farm size and crop productivity were crucial in influencing susceptibility to food insecurity in male-headed families. Finally, Amaza et al., (2006) investigate the determinants of food security in Borno State, Nigeria, using a multi-stage sampling approach on a sample of 1,200 households. The study employed the Logit model to analyse the data and discovered that over 58% of the sample families are food insecure. home size, gender, educational level, farm size, and kind of home agricultural operation are major drivers of food insecurity.

DATA AND METHODOLOGY

The research is carried out in the eastern part of Sokoto State, Nigeria. The eastern region of Sokoto state comprises into eight local government areas (LGAs). These are Illela, Gwadabawa, Wurno, Rabah, Sabon Birni, Isa, Gada, and Goronyo. The local governments have a land mass

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of 26,648Km2. They shared border to the north by Niger Republic, to the east by Zamfara State, and to the west by Kebbi State. It is an open tsetse fly-free grassland appropriate for grain crop production and animal husbandry. The average annual rainfall ranges from 500mm to 1,300mm. Over eighty percent (80%) of the residents in these local governments engage in some sort of agriculture, such as the cultivation of cereal crops (millet, maize corn, sorghum, rice, and so on); tuber and root crops (potatoes, cassava, onion, garlic pepper and so on); fishing, animal rearing, and vegetable production.

The population of this study consists of all households in the sampled local government areas. According to the National Population Commission - NPC (2022), the target LGAs have a population of 2,558,200. From the population, the sample size for this study is 385. The number of respondents chosen in each local government area was calculated using a proportionate allocation formula and is shown in Table 1.

Table 1: Proportion of the Respondents in each Local Government Area

s/n	Local Government Areas	Population	Sample Size
1	Gada	429,900	65
2	Goronyo	314,300	47
3	Gwadabawa	399,700	60
4	Illela	259,100	39
5	Isa	259,400	39
6	Sabon Birni	358,100	54
7	Rabah	257,400	39
8	Wurno	280,300	42
	Total	2,558,200	385

Source: *NPC, 2022*.

Furthermore, using the Raosoft sample size calculator available at www.raosoft.com, the sample size was estimated with a margin of error of 5% (0.05) and a confidence level of 95%. A basic random selection procedure was used to identify the respondents. The survey questionnaire for this study used a Likert scale with the options Strongly disagree, Disagree, Neutral, Agree and Strongly agree. According to the decision rule, a score of 3.0 or above indicates agreement, while a score of 2.99 or less indicates disagreement. According to Ahmad, Hassan and Marafa (2023) the mean scores for four-point questions were calculated using a criterion of 3.0. In order to get the mean criterion of 3.0, the sum of 5+4+3+2+1 was divided by 5.

However, inferential data analysis used to examine the nexus among the variables. The inferential analysis employed to clarify how food production in the Sokoto East Senatorial Zone is affected by insecurity. Multiple regression was used to model the relationship among the series. The independent variables in the model include insecurity and other control variables involving climate and weather, agricultural inputs, land availability, irrigation, farming techniques, among others. The dependent variable in the model is food production. As a result, the model is defined as follows:

$$FPR_i = \beta_0 + \beta_1 INS_i + \beta_2 OTF_i + \mu_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where FPR = Food production,

INS = Insecurity,

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OFT= Other factors,

i = Study area (Sokoto east senatorial zone),

β_0 = represents constant or intercept

β_1 to β_2 = Coefficients showing the magnitude of insecurity and other factors or coefficients of estimated parameters and

μ = Error Term.

RESULTS AND DISCUSSIONS

In this part, empirical findings for the effect of insecurity on food production in the eastern part of Sokoto State are presented. The researchers distributed a total of 385 questionnaires to the respondents. However, 30 questionnaires went missing, leaving 355 questionnaires that were successfully collected from the respondents. This accounts for 7.79% of the total surveys distributed. The response rate from the respondents was around 92.21%, which is considered highly sufficient for drawing broad conclusions about the study. This high response rate suggests that the study was able to capture a significant proportion of the target population, increasing the reliability and validity of the findings. Beginning with descriptive statistics, the results are summarized and reported Table 2.

Table 2: summary Statistics of the Variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
FPR	355	4.3718	0.6081	3.4	5
INS	355	4.3380	0.5278	3.6	5
OFT	355	4.2247	0.3853	3.83	5

Source: *Authors' Computation from STATA Output.*

From Table 2, the shows that the average mean food production value in the study area is 4.3718 which suggests that, on average, the food production in the eastern part of Sokoto State is relatively high, as the value is close to the maximum of 5.0. The standard deviation of 0.6081 indicates a moderate level of variation in the food production among the respondents. The minimum and maximum values show that the food production ranges from 3.4 to 5.0, implying that while most respondents report high food production, there are some areas with relatively lower production levels.

On the other hand, the mean of insecurity is 4.3380 suggests that, on average, the respondents perceive a relatively high level of insecurity in the eastern part of Sokoto State. The standard deviation of 0.5278 indicates a moderate level of variation in the perceived insecurity among the respondents. The minimum and maximum values show that the insecurity ranges from 3.6 to 5.0, indicating that while most respondents report high levels of insecurity, there are some areas with relatively lower levels. These include local governments like Gwadabawa, Gada and Wurno.

The high mean value of 4.2247 for the other factors, such as climate change, access to agricultural inputs, and farming techniques, suggests that these factors played a significant role in shaping food production in the eastern part of Sokoto State. This indicates that these external factors, beyond just the level of insecurity, have substantially influenced the overall food production in the region. The high mean value implies that these other factors, on average, have

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been quite favorable or supportive of food production, despite the challenges posed by insecurity.

The study conducted a correlation analysis to examine the presence of multicollinearity among the variables. The results of this analysis are reported in Table 3.

Table 3: correlation Analysis of the Variables

Variables	FPR	INS	OFT
FPR	1.0000		
INS	-0.6590	1.0000	
OFT	0.1987	0.2649	1.0000

Source: *Authors' Computation from STATA Output.*

The correlation analysis presented in Table 3 provides valuable insights into the relationships between the key variables in the study. The most notable finding is the strong negative correlation between the food production and the insecurity, with a correlation coefficient of -0.6590. This indicates a robust negative linear relationship between the two variables, suggesting that as the insecurity index increases, the food production ratio tends to decrease significantly. The magnitude of this correlation coefficient underscores the critical importance of addressing insecurity in order to improve agricultural productivity and food security in the area.

In contrast, the correlation coefficient between food production and other factors is 0.1987, which indicates a weak positive correlation between these two variables. This suggests that the other factors, such as climate change, access to agricultural inputs, and farming techniques, have a relatively modest influence on the food production in the study area. The weak positive correlation implies that improvements in these other factors may contribute to some degree to increased food production. In addition, the correlation coefficient between insecurity and other factors is 0.2649, which indicates a weak positive correlation between these two variables. This suggests that the levels of insecurity in the region are not strongly associated with the other factors, such as climate change, access to agricultural inputs, and farming techniques. The weak positive correlation implies that the influence of insecurity and the other factors may be relatively independent, and they may be affecting food production through different pathways.

However, the relationship between insecurity and food production is examined and the results are shown in Table 4.

Table 4: Regression Results

Dependent Variable: Food Production				
Variables	Coefficient	Std. Err	T	Prob.
Insecurity	-1.1230	0.0176	-63.56	0.000
Other Factors	-0.0943	0.0243	-3.88	0.000
Constant	0.1012	0.1110	0.91	0.363
R^2 = 0.92, F-stat. = 2110.20 (0.000), H-test = 3.47, Mean VIF =1.08				

Source: *Authors' Computation from STATA Output.*

The regression results presented in Table 4 provide a detailed understanding of the relationship between insecurity and food production in the study area. The coefficient for the insecurity variable is -1.1230, which is negative and statistically significant at the 0.1% level (p-value < 0.001). This finding indicates that a one-unit increase in the insecurity index is associated with

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a 1.1230 decrease in the food production, holding all other factors constant. The high statistical significance of this result suggests that the negative impact of insecurity on food production is highly robust and unlikely to have occurred by chance. These findings align with the conventional wisdom that insecurity and conflict have a detrimental effect on agricultural productivity and food production. The instability and disruption caused by insecurity appear to outweigh any potential coping mechanisms or adaptations developed by the farmers in the area. The findings from the regression analysis presented are consistent with the existing body of research on the relationship between insecurity and food security. Several studies, such as the works of Kah (2017), and Nwozor et al., (2019), have also revealed that insecurity has a detrimental impact on food security in their respective study areas.

Similarly, the coefficient for the other factors variable is also negative and statistically significant at the 0.1% level (p-value < 0.001). This implies that a one-unit increase in the other factors index, which includes variables such as climate change, access to agricultural inputs, and farming techniques, is associated with a 0.0943 decrease in the food production, all else being equal. This suggests that these other factors also have a detrimental effect on food production in the study area. This contradicts the finding of Amaza et al., (2006) who revealed that other factors play significant role in determining food production.

The negative relationship observed between the other factors (including climate change, access to agricultural inputs, and farming techniques) and the food production ratio in the study area can likely be attributed to the challenges faced by farmers in the region. This could be indicative of the detrimental impacts of climate change, limited access to modern agricultural inputs, and the continued reliance on traditional farming techniques in the region.

Climate change, for instance, can disrupt rainfall patterns, increase the frequency and severity of extreme weather events, and negatively affect crop yields and overall agricultural productivity. Similarly, difficulties in accessing essential farm inputs, such as improved seeds, fertilizers, and machinery, can hinder the ability of farmers to optimize their production processes and adopt more efficient techniques.

Moreover, the continued use of traditional farming methods, which may be less effective or adaptable to changing environmental conditions, could also contribute to the observed negative relationship between these other factors and food production. Modernizing agricultural practices, enhancing access to inputs, and implementing climate-smart strategies could be crucial in addressing these challenges and improving food production in the study area. These insights further underscore the multifaceted nature of the factors influencing food security, beyond just the impact of insecurity.

Finally, the model fit and diagnostic tests further strengthen the confidence in these findings. The R-squared value of 0.92 indicates that the model explains 92% of the variation in the food production ratio, and the F-statistic of 2110.20 with a p-value of 0.000 suggests that the overall model is highly statistically significant. Additionally, the Heteroskedasticity test (H-test) value of 3.47 and the mean Variance Inflation Factor (VIF) of 1.08 indicate that the model does not suffer from heteroskedasticity or multicollinearity issues.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, this study concluded that the presence of insecurity, such as conflicts, theft, or vandalism, negatively affects agricultural activities and hampers food production in the

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Sokoto East Senatorial Zone. The study further concludes that factors other than insecurity, such as limited access to inputs, inadequate infrastructure, or unfavorable weather conditions, also have a negative impact on food production. These factors may contribute to challenges faced by farmers and hinder their ability to maximize agricultural output. Hence, the study recommends that Policymakers and stakeholders should prioritize addressing these issues to ensure food security and enhance agricultural productivity in the region. Measures to improve security, provide better access to inputs and resources, and promote resilient farming practices should be implemented to mitigate the negative impacts on food production.

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