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## EFFECT OF INSECURITY ON SELECTED ARABLE CROPS OUTPUT IN DELTA STATE, NIGERIA.

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### ABSTRACT

This study examined the effect of insecurity on the output of arable crops by farmers in the rural area in Delta State, Nigeria. Particularly, it determined the effect of insecurity on agricultural enterprises and determined the output of major arable crops in the period of peak insecurity in 2023. Descriptive survey research design was adopted and data were obtained, using structured questionnaires, on 180 randomly selected respondents. The findings revealed that insecurity had far-reaching effects on all the farming processes and land preparation (mean = 2.8), planting, weeding and crop monitoring (mean = 2.6 for the three) were most affected. Crop output was also adversely affected, with cassava (mean = 4.16), yam (3.24), and maize (3.08) being most affected, while vegetables (2.41) and plantain (1.66) were less affected. ANOVA results showed significant difference ( $F = 96.308, p < 0.001$ ) of the levels of output among the crops, a clear evidence that insecurity disproportionately affects arable crop outputs. The study warrants multi-stakeholder interventions as enhanced rural security, peace building activities, investment in infrastructure, and targeted post-insecurity support to resume productivity and increase farmers' resilience.

**Keywords:** Insecurity, Arable Crop, Food Security, Cassava, Yam, Maize, Delta State

### INTRODUCTION

Agriculture plays a major role in the economic development and food production in Nigeria, particularly in rural communities such as those in Delta State, whose primary activity is agriculture. Such crops as yam, cassava, plantain, maize, and vegetables constitute the majority of the availability of food and revenues for the households. However, the agricultural sector in Delta State is increasingly at risk from the mounting cases of insecurity, which have disrupted agriculture and reduced food production across the region. Insecurity, articulated in terms of farmer-herder clashes, communal conflicts, kidnapping, armed robbery, and organised crime, has undermined the peace necessary for farmers, thereby reducing agricultural productivity (Owigho, *et al.*, 2023; Ijeomah & Wonah, 2022; Emaziye *et al.*, 2022; Ndubueze-Ogaraku *et al.*, 2017). Current studies have reported that these security concerns have resulted in displacement, crop loss, and economic hardship, thereby lowering farmers' capacity to sustain production (Akinde & Adekunle, 2024; Jike *et al.*, 2024).

Security concerns have increased in Delta State over the past few years. Ijeomah and Wonah (2022) reported that farm/herder conflicts had intensified due to heightened competition for land resources, resulting in violent clashes, crop burnings, displacement of farmers, and colossal declines in food production. Their observation found that these constant confrontations introduced a tremendous increase in food prices and dissuaded most farmers from undertaking their cultivation business, ultimately threatening food security and livelihood in the region.

Similarly, Emaziye *et al.* (2022) noted that insecurity in Delta State had reached extreme levels, which impacted negatively on smallholder farmers crop output. Movement

restriction and access restriction to farms were noted as major challenges, which reduced farmers' ability to diversify and sell food. The study noted that there was a high correlation between insecurity and food production, such that insecurity did not only impact farm activities but also reduced access to market and inputs.

Apart from farmer-herder conflicts, other forms of insecurity in the Niger Delta sub-region where Delta State is situated extends to kidnapping, violence related to oil, piracy, and other deadly crimes. Ndubueze-Ogaraku *et al.* (2017) discovered insecurity-related shocks such as environmental degradation, political violence, cultism, and organized crime, all of which had led to low agricultural productivity, high food prices, and deep poverty among rural dwellers. The insecurities caused unbearable socio-economic burdens, including stress, displacement, and loss of livelihood to farming communities.

Moreover, Akinde and Adekunle (2024) emphasized that conflicts, particularly farmer-herder conflicts, adversely influenced the technical efficiency of cassava farmers in Ogun State, Nigeria, confirming that insecurity leads to unfavourable farm performance. Furthermore, Jike *et al.* (2024) indicated that socio-economic and infrastructural challenges combined with insecurity greatly influenced food insecurity among rural farmers in Delta State.

Therefore, in as much as the body of research has been increased in terms of the impacts of insecurity to agriculture, not much has been done in terms of empirical research into the impacts of insecurity to the extent of production of major arable crops in Delta State especially after the heightened security crisis that was experienced in 2023. The majority of existing studies address either one of the three following areas: food security, technical efficiency, or socio-economic resilience without explicitly

capturing the specific outcomes of the insecurity on the farm-level activity and the harvest of crops. Since crop production is the main venture in provision of food security and economic sustainability to the households in the Delta State, therefore, it is important to explore on the direct, impact of insecurity on crop production and output levels. The study hence seeks to fill this void through examination of the most affected agricultural practices as a result of insecurity and the yield levels of major arable crops yam, cassava, plantain, maize, and vegetables during the peak period of insecurity in 2023.

### Objectives of the Study

- Describe the socio-economic characteristics of the respondents
- Determine the farming activities affected by insecurity in the study area.
- Assess the level of arable crop output (yam, cassava, plantain, maize, and vegetables) during the 2023 insecurity period.

### Research Hypothesis

HO<sub>1</sub>: There is no significant difference within the assessed level of output of yam, cassava, plantain, maize, and vegetable by the rural arable farmers.

## METHODOLOGY

### Research Design

This study adopts a descriptive survey research design, which is appropriate for ascertaining the effects of Insecurity on farming activities and level of output of Arable crops among rural dwellers in Delta State, Nigeria. The descriptive approach is effective for gathering data on how farmers experience and respond to insecurity events and how these events impact their livelihoods and

agricultural activities. By employing both qualitative and quantitative data collection, the study aims to identify patterns, and relationships between the occurrence of insecurity and its effects on cassava production, as well as farmers' adaptive strategies and well-being.

### Study Area

The study area for this study is Delta State. Delta State has three agricultural zones, namely Delta North, Delta South and Delta central. Delta State is located in the south – south geographical zone of Nigeria, with population of 6,037, 667 as at 2020 (Nigeria Population Commission (NPC), 2021). The state lies approximately between longitude 5°00 and 6°45' East and latitude 5°00 and 6°30 North of the equator. The total land area of the state is 7,440sq km and about one third of this is swampy and waterlogged. It is bounded in the North and West by Edo State; to east by Anambra, Imo and River State, South East by Bayelsa State and on the south by Benin which covers about 160 kilometers of the state's coastline. The state is made up of 25 local Government Areas namely; Aniocha North, Aniocha South, Bomadi, Burutu, Ethiope West, Ethiope East, Warri South West, Warri North, Warri South, Uvwie, Ukwuani, Ughelli North, Ughelli South, Udu, Patani, Sapele, Okpe, Oshimilli South, Oshimilli North, Ndokwa East, Ndokwa West, Isoko North, Isoko South, Ika South & Ika North. Delta State is endowed with many rivers and waterways. The major rivers are the Niger, Ase, Forcados, Warri, Ethiope, Jamiesson, Benin, Escravos and Ossiomo. The State has a tropical climate marked by two distinct seasons, the dry and rainy season. Arable and permanent crops are cultivated in the various communities in the state, fish and livestock production are also farmed in the agricultural zones of Delta State (NPC, 2021).

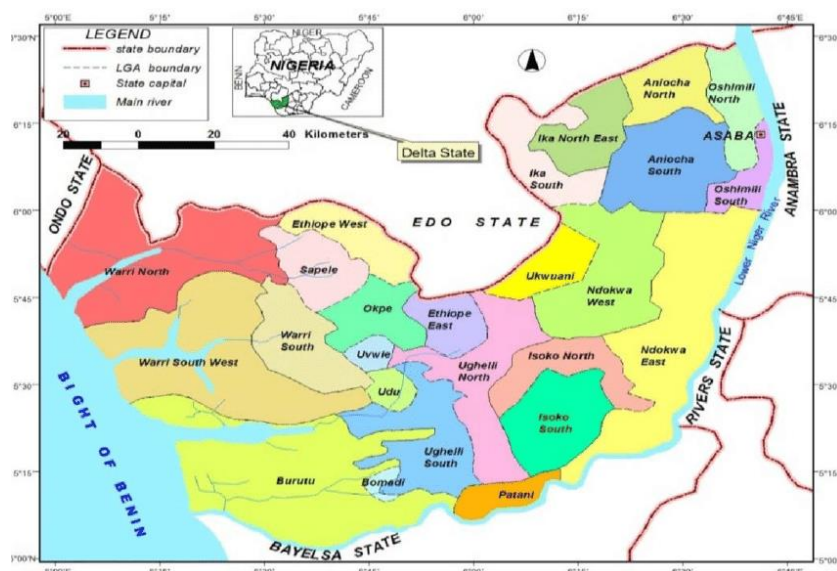


Figure 1 Map of Delta State, Nigeria.

Source: Facts about Delta State of Nigeria

### Sampling Procedure and Sample Size

Simple and multi-stage random sampling techniques were used in selecting the towns and respondents. Local

government area which had issues of insecurity were identified and purposively used for this study. Delta State has 3 senatorial Zone. The three agricultural zones namely Delta South, Delta central and Delta North. From

each senatorial Zone three local government were purposively selected and from each local government two rural communities were identified and purposively used for this study.

**Table 1: Sample size distribution**

Senatorial District	Local Government	Communities	Sample frame	Sample (10% of sample frame)
Delta Central	Ethiope West	Okuoede	94	9
		Irodo	119	11
	Ughelli South	Agbarho	111	11
		Utegbor	96	9
	Udu	Ubogo	132	13
Delta North	Ika North East	Ujevwu	71	7
		Mbiri	116	11
	Ukwani	Ute	94	9
		Ubiaroko	71	7
	Ika South	Umutu	135	13
Delta South	Isoko South	Abavo	111	11
		Ekuku Agbor	98	9
	Warri South	Uzere	90	9
		Aviara	118	11
	Patani	Ogbe – Ijah	132	13
		Ubeji	76	7
		Ohoro	112	11
		Agadama	97	9
Total				180

Farmers were identified by contact farmers in each of the senatorial district. Sixty (60) farmers were randomly and proportionately selected from each of the Agricultural block. In each of the agricultural zone, three local Government were randomly selected and six communities were selected that is two community each from one local Government area.

#### Method of Data collection and Analysis

The data was collected from the selected respondents using well-structured questionnaires and the data were analysed using both descriptive and inferential statistics. Descriptive statistics such as frequency, percentage, mean, and standard deviations were used to describe and summarise the social economics characteristics of farmers, causes of insecurity, and types of insecurity, frequency of insecurity and farming activities affected by insecurity. Inferential statistics such as Analysis of Variance (ANOVA) was employed to test the null hypotheses ( $H_0$ ).

## RESULTS AND DISCUSSIONS

### Distribution of the Respondents according to their Socioeconomic characteristics

The socioeconomic background of the arable crop farmers in Delta State (Table 2) shows the population background of the respondents. The respondents were aged 42 years on average, indicating that the majority of arable crop farmers are in the working-age years this was in agreement with Emaziye *et al.* (2022), which mentioned that cassava production by farmers in Delta State was typical of middle-aged individuals who were capable of engaging in farm activities. The gender mix

was female dominant (60.6%), which represents feminisation of agriculture in the study area and confirms Emaziye *et al.* (2022) that the majority were female cassava farmers in Delta State. Besides, the marital status showed most were married (55%). This can represent stability in household structure, which could contribute to farm and risk management decision-making. The dominance of agriculture (42.2%) as a principal occupation can account for why agriculture is typically practiced on a part-time basis, which may reduce productivity compared to full-time farmers, as reported by Jike *et al.* (2024), who highlighted the challenge of divided attention among rural households.

With regards to the level of education, the category with the highest frequency and percentage were the secondary education (38.9%), and those below secondary level were 26.1%. Such a level of education will tend to affect the up-take of farm innovations and coping strategies in ways of insecurity as justified by Akporise (2024), who found that education played an important role in farmers' response to agricultural problems like flooding and insecurity. Also, 98.9% of the respondents had stayed in the community for a duration of less than five years, averaging three years. The short duration might indicate displacement or migration due to the influence of insecurity or in search of better livelihood opportunities, as seen by Akinde and Adekunle (2024), where they stated that conflict and economic insecurity would tend to force cassava farmers to displace, thus disrupting production activities. It may also indicate a developing trend of insecurity that has made most rural areas insecure and not habitable or cultivatable in the long run.

**Table 2: Socioeconomic characteristics of the respondents**

Variable	Frequency	Percent	Mean/Mode
<b>Age (years)</b>			
18 – 30	1	0.6	42 years
31 – 40	21	11.7	
41 – 50	58	32.2	
51 – 60	64	35.6	
61 and above	36	20.0	
<b>Gender</b>			
Male	71	39.4	Female
Female	109	60.6	
<b>Marital Status</b>			
Married	99	55.0	Married
Single	17	9.4	
Divorced	54	30.0	
Widowed	7	3.9	
Separated	3	1.7	
<b>Secondary occupation</b>			
Transportation	27	15.0	Civil servant
Trading	38	21.1	
Civil servant	76	42.2	
Artisan	36	20.0	
Student	1	0.6	
Others	2	1.1	
<b>Education</b>			
No formal education	5	2.8	Secondary
Primary	27	15.0	
Secondary	70	38.9	
Below secondary	47	26.1	
NCE/OND	31	17.2	
<b>Years residing in the community</b>			
Less than 5 years	178	98.9	3 years
5 – 10 years	2	1.1	

**Farming activities affected during 2023 Insecurity**

Table 3 findings show a grand mean of 2.6, implying that on average, farming operations with regard to arable crop production among residents in Delta State rural regions were negatively affected by insecurity. All the farm operations from land preparation (mean = 2.8) up to harvesting (mean = 2.5) recorded mean scores of 2.5 and above. This is an indication that insecurity had a negative impact on all the most important arable crop production processes. Specifically, land preparation was most impacted in order to show that farmers were most vulnerable to insecurity for this process involving land preparation. Similarly, weeding, planting, and checking all recorded a mean of 2.6, showing that insecurity reduced field checking and compromised early agronomic intervention necessary for optimal arable crop production.

These aspects are consistent with reports by Akinde and Adekunle (2024) and Ijeoma and Wonah (2022) that

growing violent farmer-herder conflicts enhanced inefficiency among farmers growing arable crops countrywide because they were forced to encroach on land owing to lack of displacement, and physical insecurity. Continuous cattle raid activities and crop devastation forced out some farmers in the Delta State who had to leave their farms resulting in decreased production and wastage of farm produces. Na-Ndubueze-Ogaraku *et al.* (2017) also testified that insecurity of Niger Delta region and in particular, Delta State led to a low level of farm productivity in fear, stress and agricultural cycle interruptions. The near relation of available research and the grand mean (2.6) depicts how rampant and complex insecurity has currently become a real threat to the livelihood of the rural community and the production of cassava in the region that influences food adequacy and economic stability.

**Table 3: Mean Response to farming activities affected by insecurity**

Farming activities	Mean	Std. Dev.	Remark
Land preparation	2.8	0.733	affected
Crop selection	2.5	0.743	affected
Brushing	2.5	0.697	affected
Planting	2.6	0.734	affected
Weeding	2.6	0.729	affected
Disease and pest control	2.5	0.772	affected
Crop monitoring	2.6	0.795	affected
Harvesting	2.5	0.750	affected
<b>Grand mean</b>	<b>2.6</b>		

Mean value  $\geq 2.5$  affected,  $< 2.5$  is not affected

#### Assessment of yield of Arable crops during 2023 Insecurity

The grand mean of 2.91 in Table 4 captures a general moderate level of severity of yield loss for arable crops during the 2023 insecurity period. This echoes the conclusions from several empirical studies, such as those of Akinde and Adekunle (2024), which presented how conflict severely disrupts agricultural productivity, particularly for crops like cassava, whose highest mean yield loss was 4.16 in the table. The destructive impact on cassava and yam (3.24) mirrors the overall issues evident in Delta State, where insecurity issues such as clashes between farmers and herdsmen have led to low farm output (Umukperu *et al.*, 2025 ;Ijeomah & Wonah, 2022; Emaziye *et al.*, 2022). The high mean in the middle indicates that though some crops experienced a high impact, others such as vegetable (2.41) and plantain (1.66) did not get as affected and this could be attributed to a difference in the cultural methods or topographical resilience as seen in studies regarding floods coping

strategies (Akporise, 2024) and vulnerability analysis (Ukpe *et al.*, 2016).

The difference in the severity between crop-specific draws greater attention to the complexity of the effects of insecurity on agriculture. As an example, the drastic decrease in yield of maize (3.08) supports the findings of Jike *et al.* (2024), who admitted infrastructural issues and corruption as the main factor increasing food insecurity and that had a specific implication in the staple crops. The less severe impact on vegetables and plantain can be attributed to either their briefer growth periods or tolerance for upland farming, an adaptive strategy Emaziye *et al.* (2022) noted as the most common insecurity-solving strategy. But though the resulting overall moderate grand mean shows that none of the crops was entirely exempt, it highlights the need for particular interventions, such as increased security arrangements, subsidy, and credit access, as proposed by Ndubueze-Ogaraku *et al.* (2017) and Mani *et al.* (2019). The table hence shows a comprehensive outline of how insecurity differentially impedes food production, necessitating context-specific policies to reverse its effect.

**Table 4: Assessment of yield of selected arable crops during 2023 Insecurity**

Arable Crop	Mean	SD	Remarks
Cassava	4.16	1.29	Severe
Maize	3.08	1.10	Severe
Vegetable	2.41	1.73	Not Severe
Plantain	1.66	0.97	Not Severe
Yam	3.24	1.27	Severe
<b>Mean</b>	<b>2.91</b>		

Mean value  $\geq 2.5$  Severe,  $< 2.5$  is not Severe

#### Assessment of level of output of yam, cassava, plantain, maize and vegetable during 2023 Insecurity

The ANOVA test in Table 5 shows statistically significant difference in the extent of output evaluation with yam, cassava, plantain, maize, and vegetable crops grown by rural dwellers during 2023 Insecurity in the study area ( $F = 96.308$ ,  $p < 0.001$ ). This means that average of these crops yields is not the same and variation among groups is much higher than within a group. The magnitude of the difference in the yield, as stated by

Emaziye *et al.* (2022), shows that insecurity severely interferes with the food production systems. Correspondingly, Jike *et al.* (2024) discovered that corruption and conflicts increases the level of yield among the cassava farmers. Post Hoc LSD tests also explain these differences in a better way. For instance, production of cassava overwhelmingly exceeds that of maize, vegetables, and plantain ( $p = 0.000$ ), but not significantly different from yam ( $p = 0.821$ ). This is in line with a study by Akinde and Adekunle (2024), who

established that cassava farmers face inefficiencies due to conflict, yet cassava is a resilient crop. On the other hand, plantain has the lowest productivity among all the crops, which might indicate its vulnerability to environmental shocks and insecurity-induced disturbances, as pointed out by Ndubueze-Ogaraku *et al.* (2017). The striking disparities between yam and the rest of the crops (except cassava) indicate that yam production could be less vulnerable to insecurity or more valued, perhaps because of government interventions or market demand, as suggested by Okpala *et al.* (2023). The ANOVA table rejects  $H_{01}$  which asserted that there is no significant difference at the level of yam, cassava,

plantain, maize, and vegetable output by the rural dwellers because the calculated p-value (0.000) is lower than the requisite alpha value of 0.05. This corroborates that there exist significant differences in the levels of output among crops. The proof corroborates with empirical studies such as Ijeomah and Wonah (2022), who documented how insecurity differentially influences crop production, and Ukpe *et al.* (2016), who emphasized that vulnerability determinants like farm size and income volatility vary in their effect on output across crops. Thus, the null hypothesis is rejected, establishing that insecurity and socio-economic problems differentially affect crop productivity in Delta State.

**Table 5: Difference within the assessed level of output of yam, cassava, plantain, maize and vegetable by the rural dwellers during 2023 insecurity**

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4695.593	4	1173.898	96.308	0.000
Within Groups	10909.139	895	12.189		
Total	15604.732	899			
Post Hoc Tests Multiple Comparison (LSD)					
Category	Category	Mean Difference	Std. Error	Sig.	
Cassava	Maize	2.078*	0.368	0.000	
	Vegetable	4.517*	0.368	0.000	
	Plantain	5.494*	0.368	0.000	
	Yam	-0.083	0.368	0.821	
Maize	Cassava	-2.078*	0.368	0.000	
	Vegetable	2.439*	0.368	0.000	
	Plantain	3.417*	0.368	0.000	
	Yam	-2.161*	0.368	0.000	
Vegetable	Cassava	-4.517*	0.368	0.000	
	Maize	-2.439*	0.368	0.000	
	Plantain	0.978*	0.368	0.008	
	Yam	-4.600*	0.368	0.000	
Plantain	Cassava	-5.494*	0.368	0.000	
	Maize	-3.417*	0.368	0.000	
	Vegetable	-0.978*	0.368	0.008	
	Yam	-5.578*	0.368	0.000	
Yam	Cassava	0.083	0.368	0.821	
	Maize	2.161*	0.368	0.000	
	Vegetable	4.600*	0.368	0.000	
	Plantain	5.578*	0.368	0.000	

\* is significant at 1%

## CONCLUSION AND RECOMMENDATIONS

Due to the presence of insecurity in Delta State, arable crops cannot be well produced as there are disruptions at various ends of farming activities, right on the land preparation phase to harvesting. The results indicated that crops such as cassava, yam and maize were the worst hit with relatively low yield dampening on vegetables and plantain. Statistical inference established the presence of significant differences in levels of production between the crops, attesting to the fact that insecurity driven by socio-economic and infrastructure problems indeed threatens food security and rural livelihood. The study attests that insecurity not only limits access to land for agriculture but also deters farming activities, ultimately

affecting productivity and economic resilience in rural regions. Recommended on the basis of findings are:

- Nigeria Police Force, Civil Defence Corps, local vigilante, and the Ministry of Agriculture should collaborate more effectively to enhance rural security through harmonized patrols and information-sharing mechanisms intended to protect farms and farming communities.
- The National Orientation Agency, state government officials, community leaders, and peace NGOs must establish community-based platforms of conflict resolution and early warning systems to mediate farmer-herder conflicts and diffuse tensions at the local level.

- iii. The Federal Ministry of Works and Housing, State Ministries of Agriculture, and other development partners such as IFAD and FAO would make investments in rural road reconstruction and constructing agricultural extension services for the purpose of offering timely delivery of innovations in agriculture, market access, and security updates.
- iv. The Nigerian Agricultural Insurance Corporation (NAIC), microfinance institutions, and Agricultural Development Programmes (ADPs) can promote availability of low-cost crop insurance and education to farmers on risk management approaches for enhancing their resilience to future insecurity-related shocks.

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