



THE IMPACT OF INSECURITY ON AGRICULTURAL FOOD LOSS IN NIGERIA

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Abstract

This research examined the impact of insecurity on agricultural food loss in Nigeria using the time series data from 2011 –2020. Regression analysis was employed to evaluate the impact of insecurity on agricultural food loss in Nigeria. The relationship examined was between the dependent variable: Agricultural gross domestic product (AGDP) which serves as a representative of agricultural food production. The explanatory (independent) variables are poverty rate, unemployment rate, crime rate, and federal government expenditures on internal security in Nigeria. The result indicated an R² value of 0.42 which implies that 42% of the proportion of variation in AGDP was explained by the independent variables. Also, the result revealed that CIR and UNEMP were negatively related to Agricultural productivity (AGDP) i.e. contribution to food loss whose coefficients indicate (-0.27) and (-0.67) respectively. It is therefore recommended that Government and policymakers should make an unrelenting effort to improve the agricultural sector with the aid of modern mechanised equipment in order to reduce the level of unemployment, poverty, and crime rate in Nigeria and solve issues of insecurity in the country.

Keywords: Insecurity, Agricultural productivity, Food loss, Sustainable development, Crime rate.

Introduction

Agriculture in Nigeria was the main source of income before the discovery of oil. The main national priority in Nigeria is to make food secure when considering the vast majority of its 198.1 million population (FMARD, 2016). The Nigerian government has made strides to revive the agricultural sector; to diversify its economy in order to match up with other developed countries in the world. Despite the favorable agro-ecological endowments, Nigeria still has low productivity in food production. Only about 32 million hectares or 34.63 percent are used for cultivation out of the total landmass of 92.4 million hectares, which is Nigeria. Therefore, Nigeria lacks both the capacity and capability to cater for the food and nutrition requirements of its teeming population. As such, food loss and prevalence of under-nutrition in Nigeria are among the worst globally (Fadare, Akerele, Mavrotas & Oggunniyi, 2019).

Before the discovery of oil in the 1970s, Nigeria was self-sufficient in food production and a major exporter of cash and food crops like yam, maize, cassava, cotton, rubber,



cocoa, and palm products. In the 1970s, agriculture was the primary foreign exchange earner and it contributed significantly to Nigeria's GDP. However, the focus of Nigeria on agriculture have reduced and the nation known as food-independent is now battling with underinvestment, lack of access to credit facility by the farmers, high rate of crime, climate change, increasing religious conflicts, environmental degradation, and mostly insecurity in the country.

Conflict among groups across Nigeria has been on the rise as about 77, 000 people have been killed and 2.6 million displaced in the recent past five years. The activities of Fulani herdsmen, kidnappers, bandits, and Boko Haram in Nigeria have displaced farming communities, destroyed markets, and increase agricultural food loss as most farmers abandoned their farmlands and moved to other regions for safety. Farmers now have low access to regional markets and even find it difficult to go to their farms due to fear of being kidnapped or killed. This implies that some of these unemployed farmers may eventually turn to criminal acts to escape poverty.

Boko Haram has accounted for the killings of about 32.8 thousand people in Borno State alone. The state with the largest wheat production in the country is Brono State. Borno's production accounts for 30% of the overall national wheat production. The state now contributes almost nothing to the total of about 420,000 tonnes of national wheat production, which is 4.5 million tonnes reduction from the overall national consumption.

The Fulani herdsmen have also contributed a major threat to food production in Nigeria through their violent harassment of farmers, especially in states like Benue, Gombe, and Taraba. The Fulani herdsmen attacked farmers in the communities in Taraba State and killed about 732 people within the period of four days in June 2017. The Institute for Economics and Peace named them as terrorists. This is due to their engagement in violence, killings, and unrest. These herdsmen do not only invade and destroy farms and farm produce; they intentionally allow their cows to graze on crops that farmers have worked hard to cultivate. This resource-driven conflict between farmers and herdsmen has also resulted in decreased access to land for food production which has contributed greatly to agricultural food loss in Nigeria.

Statement of the Problem

Recently, farmers have been kidnapped by gunmen, bandits, and armed Fulani herdsmen across the states in Nigeria. In the conflicts between two communities that took place in October 2018 in Kaduna, almost eighty farmers were injured and killed. Kidnapping in the country has become so rampant. Some northern farmers and communities had to pay

some amounts to bandits to avoid being attacked. There is now limited availability of labour for farming activities as farmers are now afraid of going to their farmlands because of the unusual occurrence of kidnapping in states like Oyo, Ekiti, and Osun. There has also been an increase in the cost of transportation in some communities with the rapid rate of kidnapping cases.

According to the report of Olagunju, Oke, Babatunde, and Ajiboye (2020), the national insecurity issues have led to an increase in food prices in Nigeria which contributed to the rise of agricultural food loss. The prices of some food items such as beans and tomatoes have increased by about 254% and 124% respectively since July 2020. In 2009, the insurgency started by Boko haram had caused an increase in the starvation index. There has also been a 140% increase in Nigeria's food import bill, as the present production levels cannot meet the country's ever-increasing demand for food. In the light of all these pressures of insecurity, many crop farmers and pastoralists were forced to abandon their lands and relocate to the neighboring countries of Niger, Chad, and Cameroun which has drastically caused a reduction in the production of food and skyrocketed prices of foodstuffs. . The impact of investors and entrepreneurs on the agricultural system is to boost the economic stability of a country; in the case of Nigeria, most investors and entrepreneurs are discouraged from venturing into agriculture due to the insecurity issues in the land.

Aim and Objectives of the Study

This study aims to determine the impact of insecurity on agricultural food loss; proffer positive recommendations that will boost agricultural productivity and reduce the level of National insecurity. As a result of this, the following objectives were formed:

1. To identify the sources and causes of national insecurity in Nigeria.
2. To determine the relationship between insecurity and agricultural food loss in Nigeria.

Research Questions

To effectively address the stated problem of the study, the following research questions are therefore formulated:

1. What are the sources and causes of national insecurity in Nigeria?
2. Does any relationship exist between insecurity and agricultural food loss in Nigeria?



Literature Review

Food loss in Nigeria

Food Loss can be defined as the decrease in edible food mass that takes place at production, post-harvest, and processing stages in the value chain before it reaches the consumer (Davies, 2019). According to Dauda (2019), Food Waste is food that is of good quality and fit for human consumption but is later destroyed and not consumed. For most countries in Sub-Saharan Africa, such as Nigeria, the issue of food loss represents the wastefulness of limited natural resources that potentially trigger food and nutrition insecurity and exacerbates poverty. According to research by FAO (2020), about a 690 million people are hungry, representing 8.9 percent of the world's population (this number is estimated to rise to 890 million and 9.8 percent of the global population by 2030, depending on the economic growth scenarios, FAO estimates that between 83 and 132 million more will be undernourished globally). In 2019, nearly about one in ten or roughly 750 million people in the world were exposed to severe levels of food insecurity. Studies have shown that decreasing food loss (and waste) contributes to reducing global hunger and food insecurity, ensuring food safety and nutrition, particularly in developing countries where the most amount of people are considered hungry, food insecure, and malnourished.

FAO estimates that the direct economic cost of food wastage (including food losses) is around USD 1 trillion / year (excluding the cost of social and environmental externalities). The research also shows that agricultural food loss contributes significantly to economic loss when one accounts for the time inputs in the production and supply chain, as well as the effort in preparing the land, the use of fertilizers, and other costs that are involved in agricultural production. Food loss can also aggravate poverty, particularly in developing countries like Nigeria. Studies indicate that a decrease in the quality of food products can lead to a decrease in the quantity available for sale and consequently a decrease in economic gain, especially for millions of smallholder families and low-income farmers in developing countries. According to the World Bank (2018), in Sub-Saharan Africa, a one percent reduction in post-harvest losses could save \$40 million each year, which could be used in alleviating other facets of poverty.

Food Loss is still a big challenge for Nigeria due to some different reasons. Most of the Value Chains that are contributing significantly to food loss such as tomato, onion, and beans are not well developed (or advanced) and organised in terms of production and processing techniques, equipment, technology, and governance. Furthermore, there is a poor enabling policy environment to catalyse the development of the Value Chains. The

contributors and investors of the value chains in Nigeria have not taken a good view when proposing interventions or solutions to tackle this issue. To address agricultural food loss in Nigeria, there should be a concentrated effort and a well-planned strategy. For instance, the intervention to prevent food loss in Nigeria should include action on all of the following:

- To ensure financial support to improve roads, energy infrastructure as well as the machinery used in the Value Chains.
- Institutional arrangements and reforms to facilitate access to private sector investment for improved production and value-added processing in the Value Chains.
- To introduce government interventions and policies so as to discourage agricultural food loss.
- Circular economy approach: focus on the causes of food loss as well as the consequences, regional and country differences; ideas and solutions as well as get the stakeholders and actors involved.
- Communication and education campaigns should be targeted to reduce food loss particularly at the farm level, processing sites as well as during transport and distribution.

Even on the level of the individual Value Chains, the government appears ineffective in implementing measures that might strengthen the Value Chains and curb losses. As a result of this, Nigeria had been known to be importing tomatoes from other countries since it cannot meet its consumption demand, majorly due to agricultural losses and wastages. It is therefore noted that the country has become a dumping ground for the production of fresh, paste, juice tomato, which is now centered in countries like Egypt, Luxemburg, Cameroon, Italy, South Africa, the Netherlands, and Iran. The Nigerian Customs Service seized about six containers of unhealthy tomato paste (such as expired and low-quality tomato paste) from Iran, at the Nigerian Ports in July 2019.

The National Security Challenges in Nigeria

Nigeria is not at war in the real sense of the word but the massacres resulting from various forms of insecurity qualifies it to be regarded as conflict-ridden and being at war. Conventionally, the onset required to classify an armed conflict as a civil war is to record 1,000 battle deaths (Dupuy & Rustad, 2018). Nigeria has consistently recorded deaths of over 1,000 from various conflicts unleashed by various groups across the country for decades. Both the Nigeria Security Tracker and the Armed Conflict Location and Event



Data Project (ACLED) had estimated the total number of deaths associated with the Boko Haram Terrorist group alone between June 2011 and June 2018 to be about 34,260 and 37,535 people (Campbell & Harwood, 2018). Apart from the Boko Haram insurgency, there are other sources of violent deaths, which include inter-community conflicts, herdsmen farmers' conflicts, clashes between the security agencies and socio-cultural or religious group conflicts, and other criminal activities, especially kidnappings to request a ransom. There were about 10,665 cases of both injured or deaths from various types of violence in Nigeria, with the highest source of violent deaths resulting from criminal activities in 2018 alone, recording about 3,430 deaths in 1,190 cases (Ukoji, Ayodokun & Eze, 2019).

Also, the deadly activities of the Boko Haram sect in the northeastern geopolitical zone of the country; another major threat to national security with serious implications for food security is the menace of Fulani herdsmen. The inhumane tradition of the Fulani herdsmen has often pitted them against vicinity farmers as a result of destructing their farms. In the past, mainly before 1999, these conflicts were well managed among the herdsmen and farmers that they never extended to the level of recording fatalities. However, when Nigeria returned to democratic rule in 1999, the conflicts between the Fulani herdsmen and farmers gradually took new forms, and the occurrence, complexity, and killings as a result of the traditional dispute mechanisms became inadequately maintained. The lethality of violence unleashed by the Fulani herders led the Institute for Economics and Peace to capture them in the global terrorism index and classify them as a terrorist group as well as name them as the fourth deadliest group in 2014 after having been responsible for the death of 1,229 people (IEP, 2018). This classification was didactic and shows that in the previous year, i.e., 2013, the group has been responsible for only 63 deaths (Burton, 2017).

Since 2014, the Fulani herdsmen are still deadly as they are still responsible for various forms of attacks, especially getting ransom for kidnappings and militia expeditions against farming communities by destroying their farmlands. What must have triggered the level of attacks by the Fulani herdsmen is the nonchalant attitude of the Nigerian government despite the international classification of these herdsmen as terrorists. The support of some socio-cultural groups such as Miyetti Allah Kautal Hore, Miyetti Allah Cattle Breeders Association of Nigeria, and the Fulani Nationality Movement as well as the silent support of the Nigerian President, Muhammadu Buhari, is the source of courage for the Fulani herdsmen. Despite the view of Nigerians that the Presidency is protecting the herdsmen killers and those sponsoring them, nothing has been done to



curtail the activities of these herdsmen (The International Crisis Group, 2017 & Amnesty International, 2018).

The courage of the Fulani herdsmen could be seen in the type of hard weapons at their disposal. Before, they only carried and relied on weapons like long clubs, machetes, bows and arrows. But now, they go around with the Soviet assault rifle, Avtomat Kalashnikova (AK47). With these weapons, they have been unleashing terror on farming communities across Nigeria. For instance, the Fulani herdsmen have been responsible for the killing of about 80 people in comparison to 1,230 people that were killed in 2014 alone. Recently, it was identified that more than 10,000 persons have lost their lives in the past decade due to the terrors unleashed by Fulani herdsmen on the farming communities. Also, more than 6,000 persons were found to have been injured, or dead in the past two years (Kwaja & Ademola-Adelehin, 2018).

Empirical Review

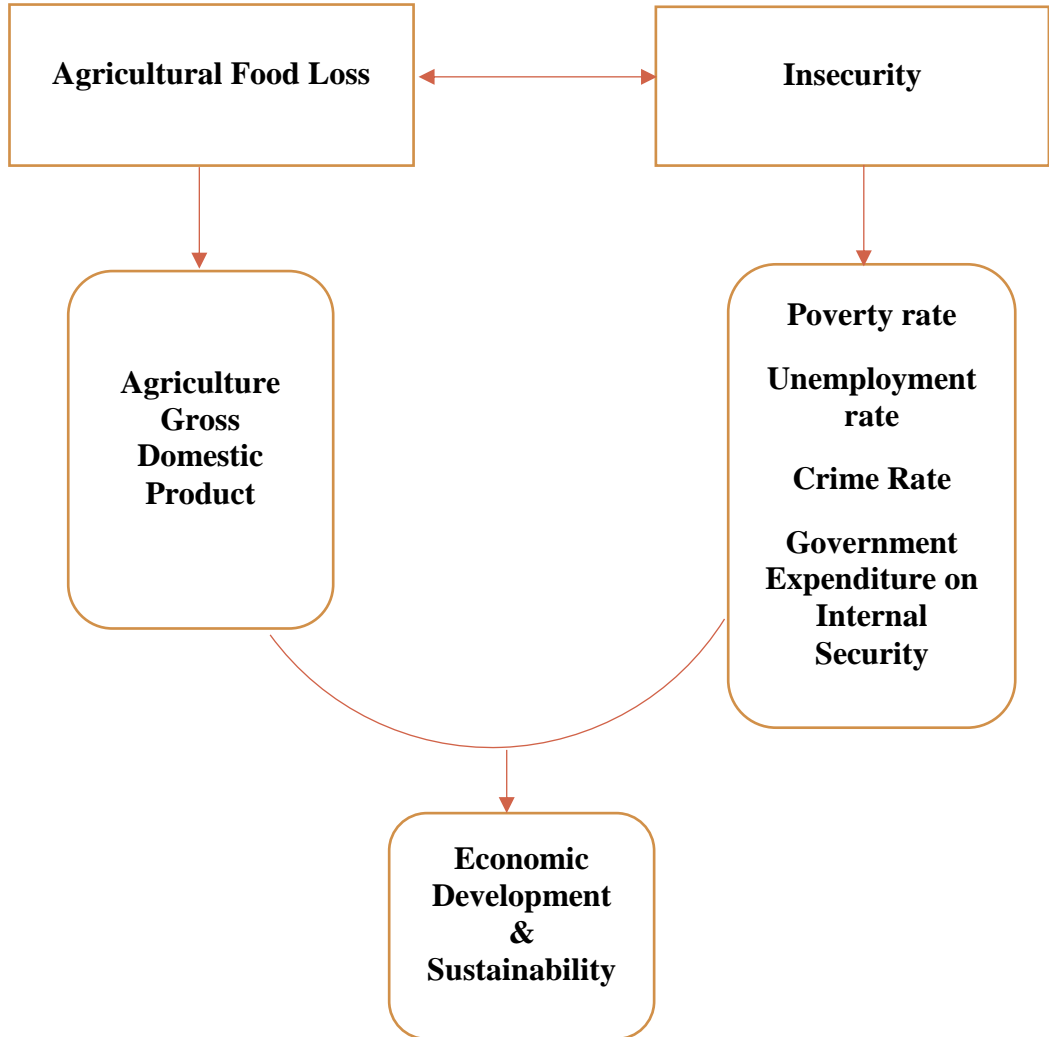
In a study carried out by Adebisi and Okotie, (2017) on an appraisal of Boko Haram's insurgency in the agricultural sector in Nigeria. They adopted a time series data analysis research approach, while descriptive statistics and t-tests were used to analyse the secondary data before and during the national insurgency. The result of their findings showed that agricultural value added to the GDP was high before the Boko Haram disruption and has reduced during the period of insurgency. According to their findings, they recommend that government should take legal and justifiable actions to make sure that the incidence caused by the Boko Haram on agricultural food loss is addressed, and the farmers are encouraged with better incentives to go back to their farmlands.

Ojogho and Egware (2015), also examined research on the impact of the national insurgency on agricultural development and productivity in Nigeria. Using a time-series data, collected on Nigerian agricultural share of GDP, infant mortality rate, CO2 emission from fuel combustion, and level of food production as proxies for agricultural transformation for the years, 1960-2011 the Nigerian civil war, Boko-Haram, Niger-Delta, Fulani herdsmen insurgences were used as proxies for the insurgency. They were able to discover from the result that any unit decrease in agricultural food production in a particular year would increase the share of agriculture to GDP by 4.30% in the following year while a shift from non-violence to violence in any year caused by Boko-Haram, Niger-Delta and Fulani herdsmen reduced the contribution of the share of agricultural production to GDP with about 17.60%, 19.50%, and 17.50% respectively. They also inferred from the result that agricultural development should be all-embracing since its component elements have a long-run equilibrium relationship, that insurgence indirectly



impacts agricultural development through its effect on the change in food production level, the share of agriculture to GDP, CO₂ emission from fuel combustion and infant mortality, and that attempt at ignoring the insurgence by any aspect, any region, be it religious, cultural, or communal, are also a challenge to agricultural development.

Theoretical Framework



Research Methodology

This aspect is concerned with addressing the method and procedures employed in carrying out this study. This research adopts the use of a quantitative research approach. Hence, this research does an in-depth case study. It uses a single-method approach, because the data that is used includes an analysis of existing statistical data, as well as some reports on this topic. The data used for this research is extracted from the database of the World Development Indicator. The time-series data from 2011-2020 is used while regression analysis will be employed for the purpose of this study in order to evaluate the impact of insecurity on agricultural food loss in Nigeria. The variables examined are therefore between the dependent variable: Agricultural gross domestic product (AGDP) which is a representative of agricultural food production and the explanatory (independent) variables: poverty rate, unemployment rate, crime rate, and government expenditures on internal security in Nigeria.

The model can be specified as:

$$AGDP = F(POVR, UNEMP, CIR, GEXIS)$$

$$AGDP = \beta_0 + \beta_1(POVR) + \beta_2(UNEMP) + \beta_3(CIR) + \beta_4(GEXIS) + \mu_i \text{ ----- (1)}$$

Where: AGDP = Agriculture gross domestic product

β_0 = Intercept of the model

POVR = Poverty rate

UNEMP = unemployment rate

CIR = Crime Rate

GEXIS = Government Expenditure on Internal Security

$\beta_1, \beta_2, \beta_3, \beta_4$ are the Coefficients of the explanatory variable (Poverty rate, Unemployment rate, Crime rate and Government expenditure on internal security) respectively.

μ_i = Error term



Results and Analysis

Table 1 Analysis of Unit Root and Co-Integration Results

To test for the unit root, we employ the Augmented Dickey-Fuller (ADF) test. The results are shown in the table below.

Variable	Variable at the level form			Variable at difference form			Order of integration
	ADF Stat.	Lag	5%	ADF Stat.	Lag	5%	
POVR	-1.102289	1	-2.9499	-3.875567	1	-2.9527	1 (1)
UNEMP	-1.611799	1	-2.9499	-5.866815	1	-2.9527	1 (1)
CIR	-0.568639	1	-2.9499	-3.580889	1	-2.9499	1 (1)
GEXIS	-2.467834	1	-2.9499	-3.458945	1	-2.9527	1 (1)
(RESIDUAL)	-3.613971	1	-1.9510	NA	NA	NA	1(0)

The results show that all the variables are integrated of order one 1(1) (differenced once to attain stationarity). In other words, all the variables have unit roots but are stationary after being differenced. This is because the ADF statistics for each of the variables are less than the critical levels at 5%. In other words, the null hypothesis for unit root is accepted for all the variables at the level form. On the other hand, the ADF statistics for each of the variables when differenced are higher than their critical values at 5% which implies that the null hypothesis of unit root is rejected. However, though the variables are not stationary, there is a tendency for a long-run relationship between the dependent variable and the independent variables.

Thus, we proceeded to examine their long-run equilibrium relationship using co-integration ADF (CADF) test after which we examined the adjustment to short-run discrepancies when co-integration was established. As already shown in table 1 above, the error term (residual) is stationary at its level form. This implies that there exists a long-run relationship between dependent and independent variables.

Table 2: Regression Results**Dependent Variable: LOG(AGDP)**

Variable	Coefficient	Std. Error	t-statistics	Prob.
C	-4.678150	19.73132	-0.232531	0.7189
LOG(POVR)	2.624450	4.554716	0.600356	0.4562
LOG(UNEMP)	-0.670974	0.813870	-0.713841	0.4750
LOG(CIR)	-0.269294	1.306497	-0.290314	0.7651
LOG(GEXIS)	1.213422	0.583023	2.064108	0.1446
R-squared	0.520995			
Adjusted R-squared	0.284641			
S.E. of regression	1.246601			
Sum squared resid.	25.77654			
Log-likelihood	-32.52206			
F-statistic	3.182017	Durbin-Watson stat	0.827100	
Prob. (F-statistic)	0.048579			

The multiple regression results in table 2 above revealed that none of the coefficients of the variables are stationary at a 5% level of significance. The positive impact of poverty rate (POVR) as shown by its coefficient from the regression result negates the a priori expectation stated in chapter four regarding the expected impact of poverty rate on AGDP. This implies that the poverty rate (POVR) in Nigeria has not impeded agricultural productivity; rather, it is the poor performance of the agricultural sector that increases poverty. While an increase in GEXIS will improve agricultural productivity within a secured environment.

Furthermore, the regression result indicated that unemployment and crime rate had a negative relationship with AGDP as shown by their coefficients which are represented by -0.67 and -0.27 respectively. Indicating that a unit increase in unemployment and crime rate will decrease AGDP by 0.67 and 0.27 respectively. Besides, the regression result as contained in table 2 showed that the coefficient of the determinant (R²) was 0.52%. This implies that 52% of the total variation observed in AGDP (the dependent variable) was explained by the explanatory variables (i.e POVR, UNEMP, CIR, and GEXIS) in the model while 48% of the variation in AGDP was explained by other external factors (variables) that weren't captured in the model. The adjusted R² shows 28% indicating that the estimated model still has a goodness of fit after the model was adjusted considering that AGDP as a representative for agricultural productivity is influenced by other variables not captured in the model.



Discussion of the Findings

From table 1, the result of the analysis above revealed that none of the variables were stationary at a 5% level of significance. The value of the Durbin- Watson revealed that there is a presence of serial correlation which needs the use of Bruesch-Godfrey Serial Correlation LM Test to tackle the serial correlation challenge, in order to ensure that data used in this study are free from the spurious result.

The findings in table 2 showed that poverty rate (POVR) and Government expenditure on internal security (GEXIS) have a positive relationship with the agricultural gross domestic product (AGDP) at a 5% level of significance, with their respective coefficients values of 2.62 and 1.21. Meaning that, a unit increase in POVR and GEXIS will lead to 2.62 and 1.21 increases in the agricultural gross domestic product (AGDP). The poverty rate (POVR) shows a positive impact by its coefficient from the regression result, meaning that, the poverty rate has not hindered agricultural food loss in Nigeria.

GEXIS was also found to have a positive impact on AGDP as shown by its coefficient (1.21). A unit increase in GEXIS will increase Agricultural productivity by 1.21. This means that as government invests more in internal security, the Agricultural productivity tends to increase because the state of insecurity in Nigeria such as Boko Haram activities and Farmers with Herdsmen clashes will be reduced or stopped. When there is a peaceful atmosphere for socioeconomic development, there will be confidence and trust in the internally displaced persons, farmers, and especially the agricultural investors. It was also identified that the crime rate (CIR) has a negative relationship with AGDP by the coefficient of -0.26 which means that the crime rate has a negative impact on agricultural productivity in Nigeria i.e. it contributes greatly to agricultural food loss. This relationship is absolutely representative of the current state of agriculture in Nigeria. It was also identified that unemployment has a negative relationship to AGDP with its coefficient of -0.67 which means that the higher the rate of unemployment, the more people will engage in insecurity activities and the more insecurity will contribute to agricultural food loss.

The coefficient of determination (R^2) showed a value of 0.52%, indicating that the 52% of the total variation observed in Agricultural gross domestic product was explained by the explanatory variables (POVR, UNEMP, CIR, and GEXIS) in the model. The adjusted R^2 value of 28% also indicates that the estimated model still had the goodness of fit after the model was adjusted considering that the dependent variable is influenced by other independent variables not captured in the model. The joint statistical value of F-statistic 3.182017, shows the influence of the independent variables in explaining the dependent

variable with a P-value of 0.048579 revealing that the independent variable is statistically significant to the dependent variable at a 5% level of significance. The Durbin-Watson statistic value of 0.827100 indicates that there is no presence of serial correlation in the model estimated.

Conclusion and Recommendations

Based on the finding in the analysis obtained above, in this study, on the impact of insecurity on agricultural food loss in Nigeria, we were able to reveal that insecurity greatly affects the rate of agricultural productivity in Nigeria. Although there is an ongoing effort by the government through the instrumentality to reposition the agricultural sector and make it the engine of Nigeria's economic growth, however, the effort can only yield expected dividends if the government does the needful concerning insecurity.

There is no way the country can promote productivity or achieve competitiveness where symbolically, physically, and psychologically people feel unsafe. Insecurity has caused serious disruptions in Nigeria's agricultural activities. While millions of farmers have been uprooted and displaced from their ancestral farming communities, others are perpetually afraid for their lives and as such cannot optimally engage in farming activities. The direct implication is declining productivity with attendant shortfalls; both of which further deepen the contradictions surrounding agricultural production in Nigeria and the prospects of food loss. However, the following recommendations were identified:

- i. The Government should invest in and equip the security personnel through proper training, upgrading of security gadgets, and adequate funding.
- ii. Government and policymakers should make an unrelenting effort to improve the agricultural sector with the aid of modern mechanised equipment, to reduce the rate of unemployment and poverty.
- iii. Religious and ethnic leaders should continuously educate and enlighten their ethnic groups by preventing inter-ethnic or religious conflicts.

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