

Influence of Armed Banditry on Agro-Food Supply Chain in Niger State, Nigeria

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Abstract

Niger State is an agrarian economy with very high cultivation of agricultural products, especially yams. It has a large concentration of small ethnic groups. The state is facing challenges of ethno-religious conflict, occupational crises between the farming communities and Fulani herdsmen, insurgency, banditry, as well as inter-communal clashes. This has resulted in the loss of lives, destruction of farms and properties, kidnapping of people, and disruption of economic activities. It is on this premise that this paper examines the influence of armed banditry on the supply chain of yam in Niger State. The study examined the extent of armed banditry and the impact of armed banditry on the yam supply chain and agrarian communities. A survey design and simple random sampling techniques were used to sample respondents, while a structured questionnaire was employed to collect data on the influence of armed banditry on the farmers, commercial transport operators, and agro-food marketers in three major yam markets: Garatu, Paiko, and Gwada. Interviews were also conducted with stakeholders in government agencies and non-governmental organizations. The collected data were analysed using descriptive and quantitative techniques. The study revealed that armed banditry has a negative influence on agro-food production, transportation, and marketing in the area, resulting in low agricultural productivity and a high cost of agricultural produce and transportation. It is recommended that the security of lives and properties be given a high priority by the government and communities by establishing training schemes and equipping the local vigilantes and the security agencies with adequate and more sophisticated equipment for the early detection of armed banditry. Vigilantes and security personnel should also be motivated. All these will have positive effects on the production, transportation, distribution, and marketing of yam.

Keywords: *Insurgency, Armed Banditry, Agro-food, Yam, Supply Chain*

1. Introduction

The destructive activities of armed banditry in the northern region of Nigeria have affected the entire society and overall development. This is evident in the kidnappings and killings of humans in communities, the destruction of government and private properties, and other sources of livelihood such as shops and farmlands (Awojobi, 2014). These terrorising events have caught the attention of both the people and the government to seek remedial actions to address the menace. Several studies have highlighted the negative impacts of armed banditry in different economic and social sectors of Nigeria. According to Okoli and Abubakar (2021), armed banditry has created a vacuum in the security setting that is being exploited by criminal masterminds to create territories of highly unlawful activities, making it unsafe for businesses and residents. Insurgency has aggravated the challenge of food security and availability in Nigeria. As Ayinde et al. (2020) pointed out, armed banditry has undoubtedly affected the production and availability of agro-food products in Nigeria, especially in the north-central region.

Niger State, in the north-central region of Nigeria, is an agrarian economy with high agricultural products and is often referred to as a leader in the production of yams; it is the food basket of the nation (Ufondu et al., 2021). The State is a major source of staple food crops such as cowpeas, rice, millet, sorghum, corn, tomatoes, and onions, as well as fish, livestock, etc. (Ajiboye et al.,

2022). The State has a large concentration of small ethnic groups that have experienced the challenges of ethno-religious conflict, occupational crises between the Fulani herdsmen and the farming communities, leading to insurgency and banditry, as well as inter-communal clashes (Umaru, 2020; Dennis, 2021).

The conflicts have resulted in the loss of thousands of lives, the destruction of properties and farms, the kidnapping of people, and the disruption of the free flow of goods from the farm to rural settlements as well as to the markets. The escalation of insurgency and armed banditry has caused many farmers to abandon their farms, fleeing their homes for fear of attacks by bandits and insurgents (Muhammad, 2016). The farmers are now finding it very difficult to produce sufficient agro-food products that will meet the market demands they usually experience. These conflicts have also disrupted the adequate functioning of agro-food production and marketing in northern Nigeria (ACAPS, 2014). The under-cultivation of farm produce and the inability to harvest the already planted ones have only exacerbated the food crisis in neighbouring states, including the Federal Capital Territory (FCT), Kaduna, Kebbi, Kogi, and Zamfara, as well as the Republic of Benin (Asishana, 2021; Dennis, 2021; and Ajiboye et al., 2022).

The agro-food supply chain remains the driving force for efficient agro-food production and distribution (Ajiboye & Afolayan, 2009). However, most agro-food products are not effectively distributed due to high insecurity along travel routes imposed by the unlawful operations of bandits and insurgents. This has caused a hike in food prices in the market, making it difficult for people to afford agro-food products (Udemezue & Kanu, 2019). Trading or marketing of agricultural commodities has been seriously affected, and supplies have become highly irregular (Kay, 2017). Transporters have been forced to avoid certain routes that make transporting agro-food products impossible or, sometimes, take longer transport time (Kay, 2017; Ajiboye et al., 2023). There has been a reduction in the number of vehicles transporting agro-food products, thereby resulting in disruptions to the free flow of goods from farms to rural settlements, as well as to the markets, while markets are forced to close due to threats of attacks by bandits. This has resulted in food scarcity in Nigerian markets, while available ones have become expensive (Onwusiribe et al. 2015).

2. Theories on Insurgency and its Impacts

There have been several theories on the impact of insurgency and armed banditry on agriculture, socio-economic activities, livelihoods, and education, among others, in several parts of the world and, more importantly, in Nigeria. Among the theories are frustration-aggression, routine activity, situational action, queer ladder, and failed state. However, routine activity theory was adopted for this research because of its uniqueness and fitness.

Routine activity theory is one of the major theories in crime science, formulated by Cohen and developed by Felson in 1979, according to Miro-Llinares (2014). It is also a branch of event theory, and the focal point of the theory is the study of crime as an event in relation to time and space, while the emphasis is on the impact on the environment (society) (Morgeson, Terenc, and Liu, 2015). An important thing (whether pleasant/unpleasant) that has taken place within a certain time and place is regarded as an event (Morgeson, Terenc, and Liu, 2015). This could be accidents, attacks, crises, pandemics, shocks, war, or any action that has impacted an organisation or communities, thereby preventing activities from being carried out in the area. The issue of routine armed banditry in almost every part of Nigeria, including the North Central in general and Niger State in particular, is unpalatable to the affected communities. This is regarded as an event that has affected the agro-food supply chain, such as transportation, distribution, and marketing of agricultural products (see Figure 1).

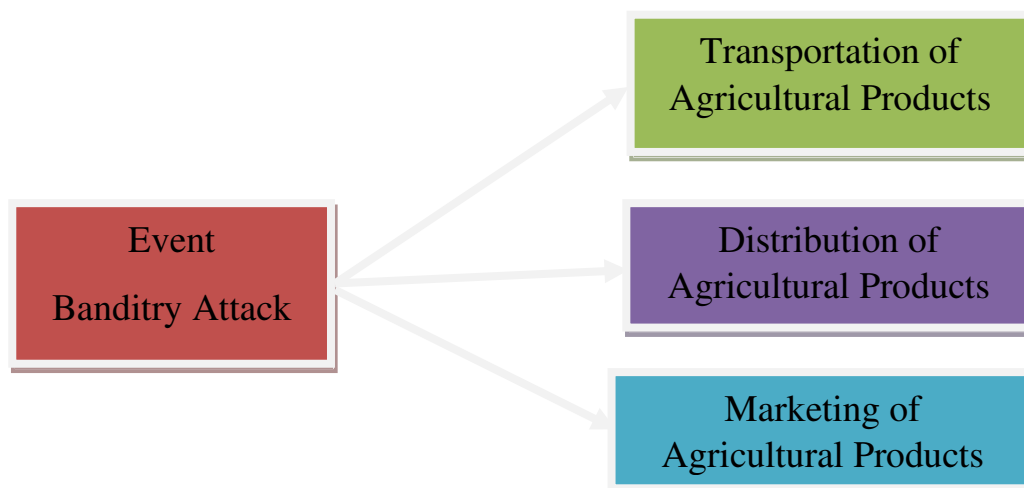


Figure 1: Conceptual framework of the Study

Source: Author's field survey, 2022

Armed banditry is regarded as a group of organised criminal gangs who use violence and threat to commit crimes such as robbery, kidnapping, murder, rape, rustling of cows and cattle, exhorting, and maiming, while the person that is involved in the act is regarded as a bandit (Ajiboye et al., 2022). Armed banditry has caused a huge decline in the quality and quantity of food people need for daily nourishment (Onwusiribe et al., 2015). The prevailing crisis in Nigeria has been attributed to the widespread killing of innocent persons, the destruction of properties and farms, the unwilling migration of residents to places of safety, and the restriction of socio-economic activities, among others (Onwusiribe et al., 2015; Gadzama et al., 2018; Okoli & Ugwu, 2019). The situation has led to significant rising concerns, stirring several studies by scholars on the history and development of armed banditry and occurrences in society; as well as the impacts on social and economic endeavours of citizens, and possible solutions to the prevailing menace of insurgency and armed banditry in Nigerian communities.

3. Literature Review

Several studies have developed around insurgency and impacts. Kah (2017) studied the effects of Boko Haram on food insecurity in the north-eastern part of Nigeria and the northern part of Cameroon. Insurgency induces the state of refugees among affected people, causes environmental destruction, cripples agricultural labour, and undermines networks for food supply from farms to the market (Kah, 2017). Without conflicts in an area, most people will likely devote their time and energy to something productive. He further outlined that the conflict between Boko Haram insurgents and government forces (both local and international interventions) has increased food insecurity in northern Nigeria. In the same vein, Odalonu and Obani (2018) tried to understand and analyse the impacts of militancy, insurgency, and forced displacement on the Nigerian economy. Their study revealed that inequality, marginalization, persistent injustice, poverty, and radical ideology were the reasons for the forced displacement, insurgency, and militancy, which have threatened the economic development, sovereignty, and unity of the country. They recommended that both the state and federal governments should explore the causes of armed banditry in northern and eastern Nigeria so as to end the forced displacement.

Ladan & Matawalli (2020) explained the impacts of banditry on food security, highlighting government efforts in tackling banditry to improve food security Katsina State, amongst others. Focus group discussions, involving two groups of five persons each from the state LGAs (namely

Batsari, Dandume, Faskari, Jibia, and Safana), affected by banditry activities, were used to acquire data for the study. The result of their research showed that the activities of the banditry in Katsina State were the blocking of access ways used for local trading, burning and looting of the stored grain in the silos, destruction of properties and farms, driving farmers from their farms, and kidnapping and killing of farmers, which has resulted in food insecurity in the State. Their study further showed that several efforts have been made by the Katsina State and Federal governments to tackle the activities of banditry with the aim of improving food security in the State. However, these efforts are still ongoing and are yet to achieve the desired results. Hence, it was recommended that the government should put more decisive measures in place to tackle banditry for improved food security in the State.

In another study by Umaru (2020), the threats of rural banditry to human and food security in Niger State, Nigeria, were analysed. A descriptive survey method was adopted in the study, and respondents were taken from three local government areas that were highly affected by insurgency and banditry. Primary data was used in the study, collected by means of questionnaires and physical interviews with respondents, while routine activity theory was used to explain the rural banditry in the state. The results of the study show that the forceful acquisition of farmlands, collection of farm products, kidnapping of innocent people for ransom payment, and engaging in illegal mining activities were the root causes of banditry in the area, while the major impacts of rural banditry were depression among the people, destruction of farms and properties, and loss of lives, amongst others. The study recommended that high-tech equipment be provided in the rural areas of Niger State in order to allow for early detection of the arrival and camping of bandits in the forests. Furthermore, the constant supply of adequate and sophisticated ammunition and arms to the security agencies operating in the state must be improved in order to stand against the insurgents and enhance food and human security.

In Zamfara State, Bello & Abdullahi (2021) examined farmer-herdsmen conflict, cattle rustling, and banditry in Anka and Maradun local government areas. Their study examined the effects of farmer-herdsman conflicts on cattle rustling, and exploratory research was used. In order to collect primary data from the respondents, key informant interviews and focus group discussions were used, while the study adopted the environmental resource scarcity and frustration-aggression theories. The outcome of the study revealed that farmers-herdsmen conflict usually triggers acts of armed banditry and cattle rustling in the area, which has contributed to the conflicts between the herdsmen and farmers in Zamfara State. It was concluded in their study that the combination of armed banditry, cattle rustling, and conflicts among the farmers and herdsmen had caused great risk to the security and safety of the people living in the area, thereby constituting a major challenge to the nation's security.

National insecurity and food security are inseparable, as achieving food security is highly impaired by insecurity, particularly in developing countries like Nigeria. Ladan & Badaru (2021) examined national insecurity and its effects on food security in order to propose solutions to avert an impending food crisis in Nigeria. The methodology applied for the study was based on secondary sources of data, and according to their findings, there were a large number of incidents of national insecurity recorded from October 2020 to September 2021, along with others already in place, that have negatively impacted food security. This has influenced the continued rise in the cost of food items across the nation and the inability of many families to adequately purchase food items to feed themselves.

Food security means having access to a sufficient food supply at all times to meet the dietary needs of the family, to the extent of ensuring their productivity and healthy living (Abang, 2021). He worked on the architecture and rural development framework of Nigeria's security against the

backdrop of achieving food security in ten (10) years. This study covered several states in Nigeria affected by insurgency and armed banditry and their negative impact on rural development and food security. The study found that northern states of Benue, Katsina, and Zamfara were faced with high insecurity, which has resulted in farmers and people abandoning their farms and comfort zones for fear of being kidnapped for ransom or even killed. The people who produce agro-food products like beans, cassava, guinea corn, groundnuts, maize, millets, and yam, among others, in which they earn their livelihood and provide for their families, now have their ambitions placed on hold. These disruptions in food production have had a significant effect on food pricing.

The study, however, concluded that the instability in the price of foodstuffs has put great pressure on food security across the nation, where many depend on the market for their daily supply of foodstuffs, were now vulnerable to high costs. According to Akani (2019), the Boko Haram insurgency has led to the rising cost of basic food items like beans, beef, maize, onions, tomatoes, yam, and other agricultural products. This is as a result of the scarcity caused by the forced displacement of a large number of farmers and the concomitant loss of valuable farming seasons. Hence Imaseun (2015) observed that what is related to high food prices in most communities in Nigeria is the high level of insurgency and armed banditry.

The insurgency has severely reduced food production in the northern states of Nigeria, resulting in the distortion of the supply chain of agricultural products within and outside farming localities (Gwary et al. 2017). Onwusiribe et al. (2015) argued that the crisis experienced in the North as a result of insurgency and armed banditry has reduced the supply of food items such as beans, beef, carrots, onions, fish, groundnuts, potatoes, vegetables, water melon, and yams to the southern states of Nigeria. As Olaniyan & Yahaya (2016) reported, there has been additional difficulty in the transportation of agricultural products from farms to markets within the local government areas of Borno State due to fear of Boko Haram (a terrorist group) attacks. This case has been complicated further by the number of checkpoints mounted on the roads by the security agencies in order to control the movement and activities of the armed insurgents. The result of this is a short supply of foodstuffs in the market as well as an increase in market prices due to higher transport costs and the low productivity of farmers. These have imposed a high financial burden on citizens, especially low-income citizens, and this condition is similarly experienced by the North-Central States of Nigeria (Ayinde et al., 2020; Emmanuel & Muhammad, 2021).

Haven seen the adverse consequences of armed banditry in the socio-economic structures of some societies, which have no doubt raised concerns, as the food security of the country is at stake, there is a need to examine the response from all stakeholders in tackling this menace. Further, while there are several studies done on the impact of insurgency and armed banditry on agriculture and the livelihood of the people, there are fewer studies in the area of the agro-food supply chain, especially on yam and in Niger State. This study will therefore explore some key questions. What are the impacts of armed banditry on yam production? How has armed banditry influenced yam transportation and distribution? Does armed banditry have effects on yam marketing in the study area? It is on this foundation that the paper examines the influence of armed banditry on the yam supply chain in Niger State, North Central Nigeria, by investigating the extent to which armed banditry has impacted the production, transportation, and marketing of yam products in Niger State, by engaging the people and interests affected, with a view to drawing relevant recommendations.

4. Study Area

The study area is Niger State, which is situated in the north-central region of Nigeria. It lies on Latitude 3.200 East and Longitude 11.300 North, sharing an international boundary with the Benin Republic on the west and state borders with the Federal Capital Territory (FCT) on the

south-east, Kwara on the south-west, Zamfara on the north, Kebbi on the north-west, and Kaduna on the north-east. Major towns in the state include Minna (the state capital), Bida, Suleja, Mokwa, and Kantogora. Niger State is considered a highly agrarian region known for the cultivation of arable crops such as cereals and tubers such as yam and cassava, while crops such as cowpea, beans, soya beans, groundnuts, maize, and guinea corn are also being planted.

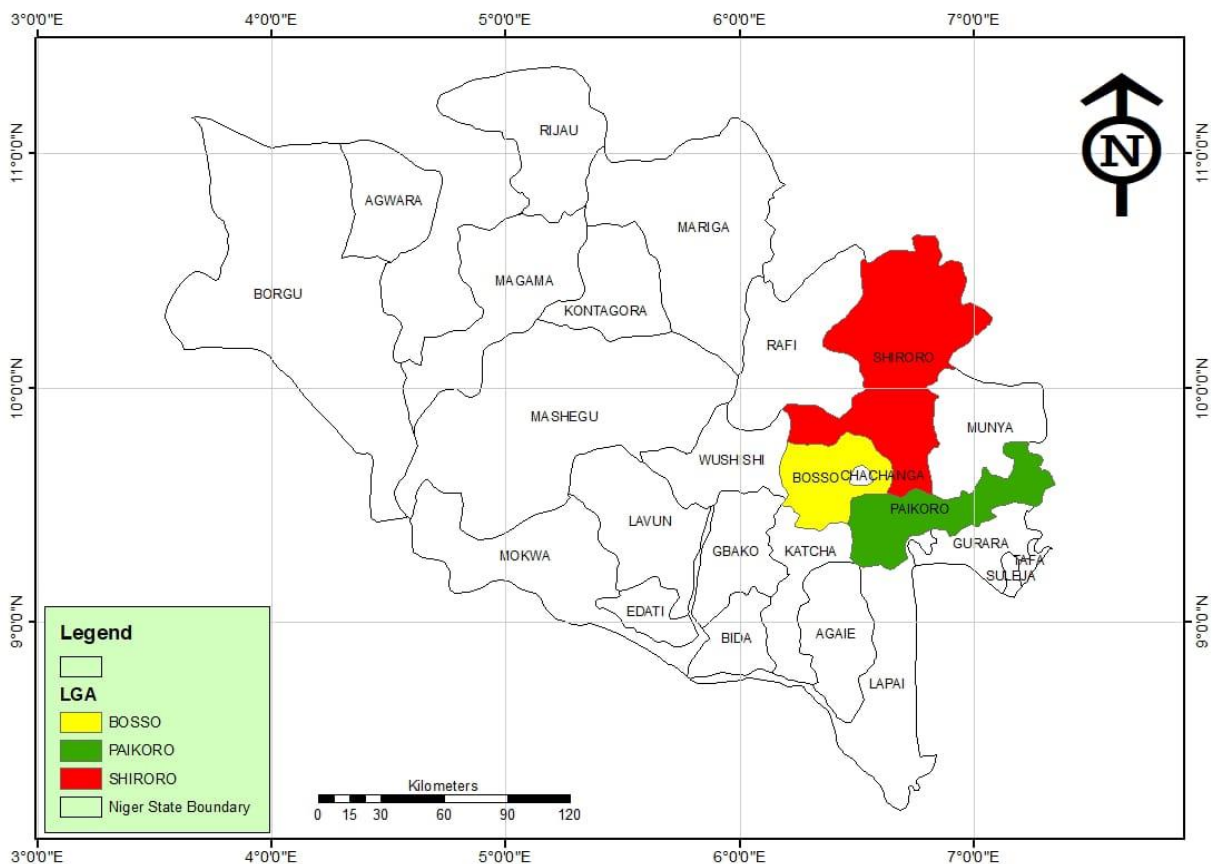


Figure 2: Selected LGAs in Niger state

Source: Author's compilation:2022

It has been reported that Niger State has the highest yam production and the largest yam cultivated area in Nigeria, and that yam cultivation has excessively expanded over time in Niger State (Ufondu, Maziya-Dixon, and Okonkwo, 2021). Among the major yam-producing local government areas are Bosso, Paikoro, and Shiroro (Figure 2). Niger State is the home for the Nupes, Gbagyis, Kamukus, Kambaris, Gungawas, Hausas, and Koros, which form the majority of numerous indigenous tribes in the state, while Gbagyis/Gwari are the major yam farmers/producers in the state (Ministry of Information, Minna, n.d.). Niger State is one of the major yam-producing states in the Federation, and it produces about 2.3 metric tonnes of yam annually, which represents about 10 percent of the total yam production in Nigeria (Ufondu et al., 2021). Yam markets are very common in Niger State, and they vary in size, based on their location, accessibility, transport infrastructure, and level of production (Ajiboye et al., 2022). However, there are several major yam markets in the state, including Garatu, Paiko, Gwada, Lapai, Lambata, and Munya, among others. This paper is focused on Garatu, Paiko, and Gwada yam markets, which are in Niger East Senatorial District (Figure 3), and are the major yam-producing areas in the state.

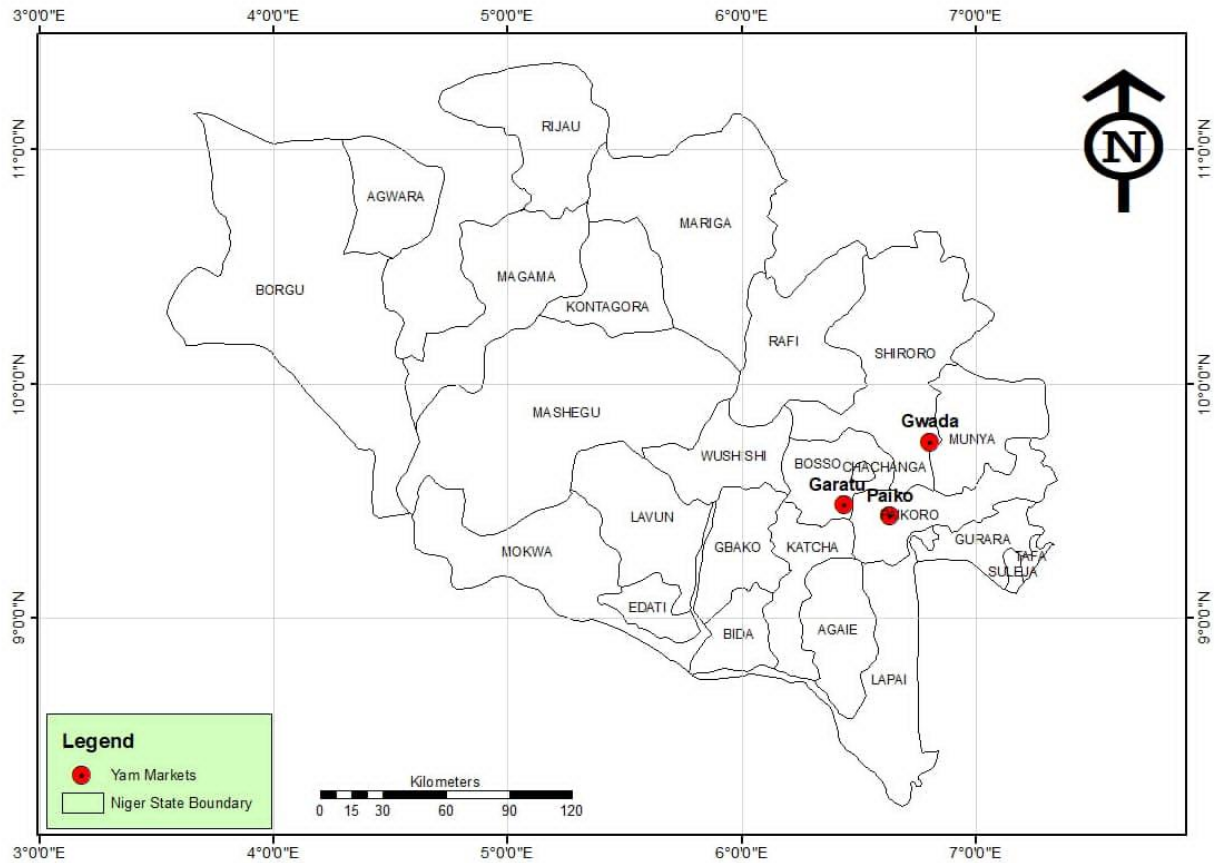


Figure 3: Selected Yam Markets in Niger state
Source: Author's computation, (2022)

5. Methodology

A survey research design was adopted in this study because it helps in measuring the views and experiences of the respondents. A questionnaire was designed to obtain information on a range of questions regarding yam production, transportation, and marketing. Three major international yam markets in the states of Garatu (Bosso), Paiko (Paikoro), and Gwada (Shiroro) (Figure 3) were purposefully selected for this study using the market size, scale of activities, and state of security in the area. Before the interview was conducted with the respondents, the researcher had a discussion with the leadership of the markets, the leaders of the trade unions, and the respondents on ethical related issues. Some 300 respondents, consisting of farmers, transporters, and traders, were randomly selected from the three selected yam markets in the state, while interviews were conducted with some stakeholders: the Niger State Emergency Management Agency (NSEMA), the National Emergency Management Agency (NEMA), and non-governmental organisations (NGOs). The same number of questionnaires was distributed in each market area selected because population data for the targeted study population was unavailable and it was impossible to set a standard ratio. A total of 191 questionnaires were recovered and considered valid for this study. The data obtained from the survey were analysed with the statistical software SPSS. Descriptive statistical figures were derived, and a multiple regression statistical test was conducted.

6.Results

6.1 Socio-economic characteristics of respondents

The socio-economic characteristics of the respondents in the study were analysed. Figure 4 shows that 56.5% of the respondents are males and 43.5% are females. This shows that the majority of the respondents are males; this is because most of the farmers and transporters of yam in Niger State are men, while traders are mostly women.

In Figure 5, the majority of the respondents are those between the ages of 41 and 50, accounting for 33.0% of the respondents, followed by those above 50 years of age (26.7%), 31 and 40 years of age (22.0%), 21 and 30 years of age (15.2%), and finally those less than 20 years of age (3.1%). This result implies that the production, transportation, and marketing of yam produce in Niger State are carried out by the elderly group of the populace.

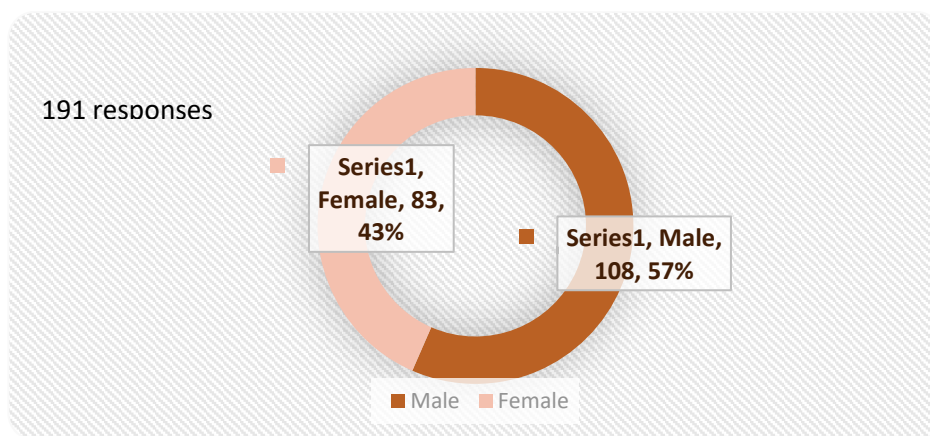


Figure 4. Respondents' Gender

Source: Author's computation, (2022)

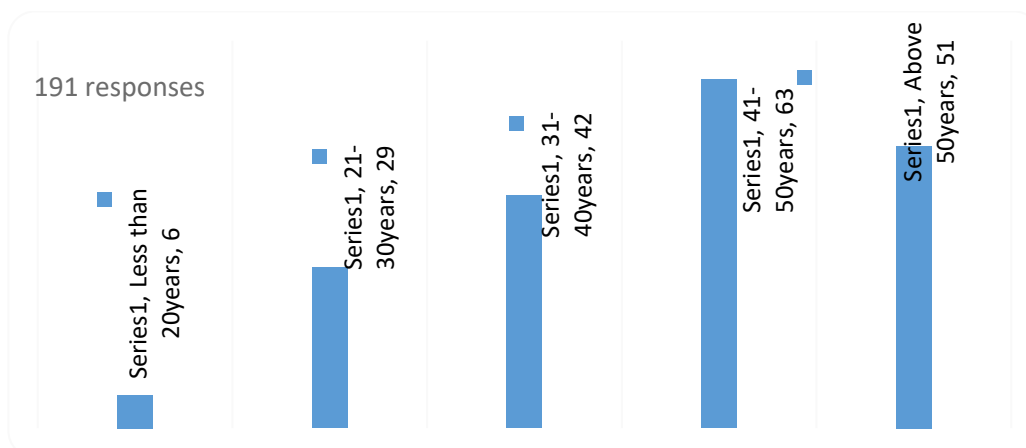


Figure 5. Respondents' Age Groups

Source: Author's computation, (2022)

Regarding the marital status of the respondents, Table 1 shows that 9.9% of the respondents are single, 74.9% are married, 9.4% are widows or widowers, and 5.8% of the respondents are

divorced. It can be deduced that the majority of the respondents are married, and just a small proportion of the single population is engaged in the supply chain of yam in the study area.

Table 1. Marital Status of Respondents

| Variable | Frequency | Percent (%) |
|-----------|-----------|-------------|
| Single | 19 | 9.9 |
| Married | 143 | 74.9 |
| Widow(er) | 18 | 9.4 |
| Divorced | 11 | 5.8 |
| Total | 191 | 100.0 |

Source: Author's computation, (2022)

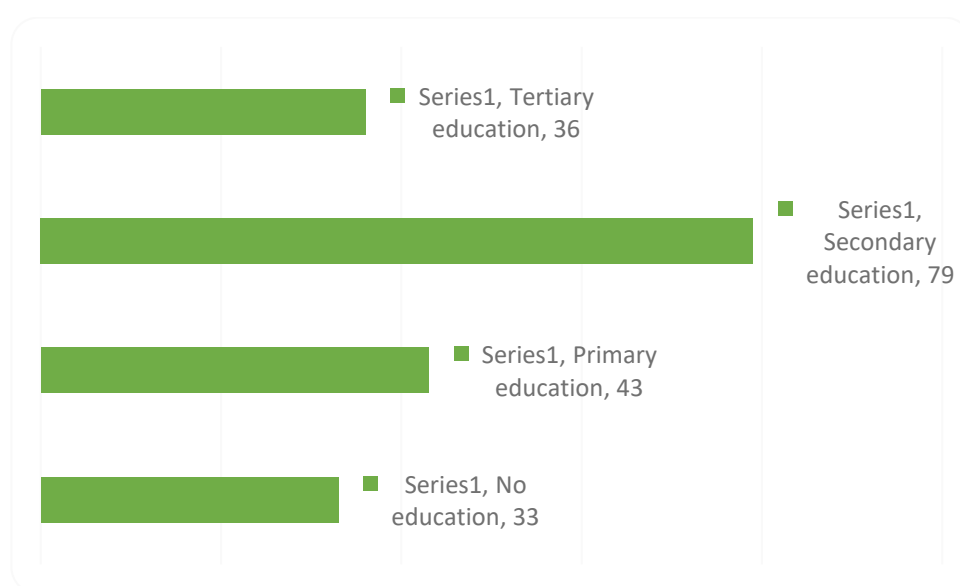


Figure 6: Respondents' Educational Qualification

Source: Author's computation, (2022)

Figure 6 shows that 17.3% of the respondents have no formal education, 22.5% have primary level of education, 41.4% have secondary level of education while 18.8% have tertiary education. It can be said that the majority of the people engaged in the yam supply chain in the study area are those with secondary school education, which makes their transactions easy with non-local buyers.

Table 2. Occupation of Respondents

| Variable | Frequency | Percent (%) |
|-------------|-----------|-------------|
| Farmer | 57 | 29.8 |
| Transporter | 37 | 19.4 |
| Trader | 97 | 50.8 |
| Total | 191 | 100.0 |

Source: Author's computation, (2022)

From Table 2, 29.8% of the respondents are yam farmers, 19.4% are transporters of yam while 50.8% are yam traders. This shows that the majority of the respondents used for this study are yam traders. This can be a result of conducting the survey only in the market areas. Farmers, transporters, and traders are used in this study because they are considered by the researcher to be key players in the supply chain of yam. However, it holds that the opinions of these players can adequately represent the present condition of the yam supply chain as regards the influence of insurgency and armed banditry in the study area.

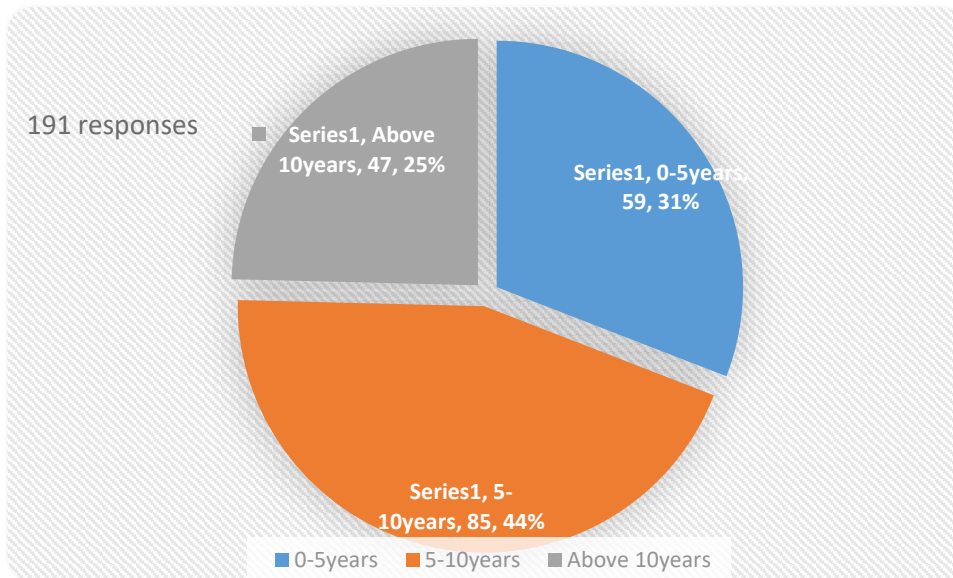


Figure 7: Respondents' years of business experience

Source: Author's computation, (2022)

Figure 7 shows the years of experience of the respondents in the supply chain of yam in the study area. It shows that 30.9% of the respondents have about 0–5 years of experience in the supply chain of yam in the study area, while 44.5% have about 6–10 years, and 24.6% have spent over 10 years in the business of yam. This means the majority of the respondents have over 5 years of experience in yam farming, transporting, and marketing.

6.2 Yam production

To ascertain the influence of armed banditry on yam production in the study area, the perceptions of the respondents on the activities of bandits were looked into. Table 3 shows the mean score of respondents' perceptions of the influence of armed banditry on yam production in the study area.

From Table 3, respondents perceive highly that farmlands have been attacked and yam planted were destroyed by armed bandits (Mean=4.71, Std. D=0.577) in the study area. Insecurity imposed by armed bandits has limited access to farmlands by farmers, transporters, and traders in Niger State (Mean=4.69, Std. D=0.730). Lack of access to farmlands due to fear of armed bandits demotivates and limits the capacity for yam production in Niger State (Mean=4.70, Std. D=0.600). Lack of proper storage of yam produce due to the destruction of storage facilities by armed bandits has led to increased spoilage and wastage of yam produce in Niger State (Mean=4.72, Std. D=0.634). The productivity of yam has declined due to armed banditry attacks on farmers and farmlands in Niger State (Mean=4.29, Std. D=0.812). Armed banditry has negatively influenced yam production in Niger state (Mean=4.92, Std. D=0.270). These results indicate that respondents, particularly farmers, have been negatively influenced by the brutal operations of the armed bandits. Based on the respondents' responses, there is no doubt that armed banditry has affected the production of yam in Niger State.

Table 3. Respondents' Perception on Yam Production in Niger State

| | N | Min | Max | Mean | Std. Dev |
|--|-----|------|------|------|----------|
| Farmlands have been attacked and yam planted were destroyed by armed bandits | 191 | 3.00 | 5.00 | 4.71 | 0.577 |
| Insecurity imposed by armed bandits has limited access to farmlands by farmers, transporters and traders in Niger state | 191 | 3.00 | 5.00 | 4.69 | 0.730 |
| Lack of access to farmlands due to fear of armed bandits demotivates and limit the capacity for yam production in Niger state | 191 | 3.00 | 5.00 | 4.70 | 0.600 |
| Lack of proper storage of yam produce due to the destructions of storage facilities by armed bandits has led to the increased spoilage and wastage of yam produce in Niger state | 191 | 3.00 | 5.00 | 4.72 | 0.634 |
| The productivity of yam has decline due to armed banditry attacks on farmers and farmlands in Niger state | 191 | 3.00 | 5.00 | 4.29 | 0.812 |
| Armed banditry has negatively influenced yam production in Niger state. | 191 | 4.00 | 5.00 | 4.92 | 0.270 |

Source: Author's computation, (2022)

6.3 Yam Transportation

The influence of armed banditry on the transportation activities of yam produce in Niger State was also evaluated. Table 4 shows respondents' perceptions of yam transportation and the operations of armed bandits in the study area. From the table, respondents perceive that the transportation of yam produce has become highly ineffective as a result of armed banditry in Niger State (Mean=4.69, Std. D=0.602). Due to the fear of armed bandits, transporters no longer visit interior farmlands and storage centres to convey yam produce to the market (Mean=4.63, Std. D=0.600). Armed bandits attack and destroy vehicles transporting yam produce being transported in Niger State (Mean=4.66, Std. D=0.583). Operations of armed bandits on highways have denied transporters safe access to routes regularly utilised for the transportation of yam produce in Niger State (Mean=4.28, Std. D=0.660). Armed banditry has led to a higher cost of transporting yam produce in Niger State (Mean=4.16, Std. D=0.365) and armed banditry has negatively influenced the transportation of yam produce in Niger State (Mean=4.76, Std. D=0.425). These results indicate that yam transportation has been negatively impacted by the events of armed bandits' attacks on transporters and their vehicles, which have created severe difficulties in moving yam produce from the farm to home/storage and markets as well.

6.4 Yam Marketing

Table 5 shows the perception of the respondents on the influence of armed banditry on the marketing of yam in the study area. From the table, respondents perceive strongly that the lack of sufficient transportation for yam product due to armed banditry has led to diminishing market availability of yam produce in Niger State (Mean=4.48, Std. D=0.639), market price of yam has increased due to low production caused by armed banditry in Niger State (Mean=3.48, Std.

D=0.813) and bandit attacks on markets have distorted smooth trading of yam produce in Niger State (Mean=4.29, Std. D=0.637). Furthermore, market men and women have lost their lives, money, and other valuable properties to brutal attacks by armed bandits (Mean=4.64, Std. D=0.590) and armed banditry have negatively impacted the marketing of yam produce in Niger State (Mean=4.87, Std. D=0.332). These results indicate that yam marketing in Niger State has been negatively influenced by armed banditry attacks on farmers, transporters, and traders.

Table 4. Respondents' perception on yam transportation in Niger State

| | N | Min | Max | Mean | Std. Dev |
|---|-----|------|------|------|----------|
| The transportation of yam produce has become highly ineffective as a result of armed banditry in Niger state | 191 | 3.00 | 5.00 | 4.69 | 0.602 |
| Because of the fear of armed bandits, transporters no longer visit interior farmlands and storage centers to convey yam produce to the market. | 191 | 3.00 | 5.00 | 4.63 | 0.600 |
| Armed bandits attack and destroy vehicles transporting yam produce being transported in Niger state. | 191 | 3.00 | 5.00 | 4.66 | 0.583 |
| Operations of armed bandits on highways have denied transporters safe access to routes regularly utilised for the transportation of yam produce in Niger state. | 191 | 3.00 | 5.00 | 4.28 | 0.660 |
| Armed banditry has led to higher cost of transporting yam produce in Niger state. | 191 | 4.00 | 5.00 | 4.16 | 0.365 |
| Armed banditry has negatively influenced the transportation of yam produce in Niger state. | 191 | 4.00 | 5.00 | 4.76 | 0.425 |

Source: Author's computation, (2022)

Table 5. Respondents' perception on yam marketing in Niger State

| | N | Min | Max | Mean | Std. Dev |
|---|-----|------|------|------|----------|
| Lack of sufficient transportation for yam produce due to armed banditry has led to diminishing market availability of yam produce in Niger State. | 191 | 3.00 | 5.00 | 4.48 | 0.639 |
| Market price of yam has increased due to low production caused by armed banditry in Niger State. | 191 | 3.00 | 5.00 | 3.48 | 0.813 |
| Bandit attacks on markets have distorted smooth trading of yam produce in Niger State. | 191 | 3.00 | 5.00 | 4.29 | 0.637 |
| Market men and women have lost their lives, money and other valuable properties to brutal attacks by armed bandits. | 191 | 3.00 | 5.00 | 4.64 | 0.590 |
| Armed banditry has negatively influenced the marketing of yam produce in Niger state. | 191 | 4.00 | 5.00 | 4.87 | 0.332 |

Source: Author's computation, (2022)

6.5 Impact of Armed Banditry on yam supply chain

An attempt was made to determine whether or not there is any statistical relationship between armed banditry and the supply chain (yam production, transportation, and marketing) of yam in the study area. For this purpose, a multiple regression analysis was performed to determine the statistical relationship between armed banditry and the overall supply chain of yam in the study area.

The regression model was conceptualised as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \quad \text{.....Eqn. 4.1}$$

Where:

Y = Dependent variable (armed banditry)

β_0 = Constant

β_1 = Regression coefficient of variable X_1

X_1 = Independent variable (yam production)

B_2 = Regression coefficient of variable X_2

X_2 = Independent variable (yam transportation)

B_3 = Regression coefficient of variable X_3

X_3 = Independent variable (yam marketing)

e = residual error

The data for yam production, transportation and marketing were created by summing responses of all items for each of the variable. The results of the multiple regression models are presented in Tables 6, 7 and 8.

Table 6. Regression Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .794 ^a | .630 | .624 | 0.353 |

a. Predictors: (Constant), Yam marketing, Yam production, Yam transportation

Source: Author's computation, (2022)

The results of regression in Table 6 depict that (R=0.794, R-square = 0.630) which is equivalent to 79.4% and 63.0% of the amount of variance explained by the model and shows the strength of the relationship between armed banditry and the yam supply chain. This reveals that armed banditry, as perceived by farmers, transporters, and traders, will contribute 63.0% of the distortion in the supply chain of yam.

ANOVA results in Table 7 reveal that $F=106.194$, $P=0.000$, which indicates a significant relationship between variables. Since $P<0.005$, it can be concluded that there is a significant relationship between armed banditry and the supply chain of yam produce in Niger State. This suggests clearly that increased insecurity triggered by armed banditry invariably leads to an increased distortion and disruption to the yam supply chain system in the study area.

Table 7. ANOVA^a Result of the Model

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|---------|-------------------|
| 1 | Regression | 39.734 | 3 | 13.245 | 106.194 | .000 ^b |
| | Residual | 23.323 | 187 | .125 | | |
| | Total | 63.058 | 190 | | | |

a. Dependent Variable: Armed banditry

b. Predictors: (Constant), Yam marketing, Yam production, Yam transportation

Source: Author's computation, (2022)

Table 8 shows the results of fitting regression model to describe the relationship between the variables. The equation of the fitted model derived from the output is:

$$\text{Armed banditry} = 2.352 + 1.017 (\text{yam production}) + 0.450 (\text{yam transportation}) + 0.336 (\text{yam marketing})$$

.....Eqn. 4.2

The interpretation of the above equation is that the slope of the regression line is significantly greater than zero, indicating that insurgency and armed banditry tend to increase as the underlying factor increases. This result indicates that armed banditry has a significant effect on yam production ($\beta = 1.017$, $p = 0.000$), yam transportation ($\beta = 0.450$, $p = 0.000$), and yam marketing ($\beta = 0.336$, $p = 0.000$).

Table 8. Coefficients^a

| | | Unstandardized Coefficients | | Standardized Coefficients | | |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
| Model | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 2.352 | .703 | | 3.347 | .001 |
| | Yam production | 1.017 | .096 | .476 | 10.596 | .000 |
| | Yam transportation | .450 | .048 | .452 | 9.425 | .000 |
| | Yam marketing | .336 | .040 | .396 | 8.314 | .000 |

a. Dependent Variable: Armed banditry

Source: Author's computation, (2022)

7. Discussion

This study presents the findings in aspects of the current practises of yam production, transportation, and marketing in Niger State, North-Central Nigeria. The findings of this study clearly show that armed banditry has significantly negative influence on the performance of the yam supply chain in Niger State, Nigeria. As a result of armed banditry in the communities of Niger State, farmers' productivity, in terms of production capacity, has been reduced over time and is still reducing; transporting vehicles and their drivers have significantly reduced their participation in the supply chain of yam in the study area due to armed banditry attacks on the highways and local routes. Yam trading has also seen trying times as market activities have been impaired by the activities of bandits.

From Table 3, respondents expressed their concerns about the attacks on farmlands and destruction of planted crops by bandits in the study area. The insecurity imposed by bandits limits

their access to farmlands. Lack of access to farmlands due to fear of bandits, and the absence of proper storage of yam produce due to the destruction of storage facilities by bandits, has led to increased spoilage and wastage of yam produce. These situations have caused the productivity of yam to decline, thus negatively influencing yam production in Niger State. As Odalonu& Obani (2018) stated, farmlands have been abandoned by farmers due to forced displacement for safer residencies, caused by bandit attacks on villages. Farmers' kidnapping and killings, and those of family members, have worsened the situation. These results indicate that respondents, particularly farmers, have been negatively influenced by the brutal operations of the bandits. Based on the responses, there is no doubt that armed banditry has negatively impacted the production of yam in Niger State.

Table 4 revealed respondents' concerns about the transportation of yam supplies in Niger State. As outlined by the respondents, the transportation of yam produce has become highly ineffective as a result of armed banditry in the state. Because of the fear of bandits, transporters no longer visit interior farmlands and storage centres to convey yam produce to the market, and other outer regions. Transporting agro-food in the state has also become impossible as bandits attack and destroy vehicles transporting agro-food within and even outside the state. As highlighted by Umaru (2020), the operations of bandits on highways have denied transporters safe access to routes regularly utilised for the transportation of agro-food items in Niger State. This is found to be true in this study, as transporters expressed gloom in their inability to enjoy safe roads to carry out their business. It can be clearly seen that armed banditry has led to a higher cost of transporting yam produce in Niger State, as Odalonu& Obani (2018) similarly discovered. It can therefore be inferred that armed banditry has negatively influenced the transportation of yam produce in Niger State. These results indicate that yam transportation has been negatively influenced by bandits' attacks on transporters and their vehicles. According to the respondents, this has created severe difficulties in moving yam produce from the farm to home/storage and markets as well.

From Table 5, respondents perceive strongly that the lack of sufficient transportation for yam produce due to armed banditry has led to diminishing market availability of yam produce in Niger State. According to Kah (2017), the attacks on markets carried out by bandits have scared many people who supplied or bought food items in the markets across northern Nigeria. Bandit attacks on markets and market days have distorted the smooth trading of yam produce in Niger State, such that market men and women have lost their lives, money, and other valuable properties to brutal attacks by bandits. Because of the negative effects of armed banditry, there have been reports of produce scarcity in the market and exorbitant prices placed on the produce. For some, they will not even think of visiting the market area; they would rather pay a higher price in the local small market than visit the larger market to get produce at lower prices, as compared to the small market.

The results show clearly that if there is continuous armed banditry in the communities of Niger State, especially in the rural areas where farming activities are more prominent, farmers would not be able to produce to full capacity or even think of expanding production; transporters will not have safe roads to convey produce around to consumption centres, thereby limiting the transportation of yam. Finally, agro-food items will become scarce in the market, and as a multiplier effect, prices of produce will go high and many people will not be able to afford it. Consequently, these situations would have negative effects on the supply chain of yam produce and, by extension, agro-food items in Niger State and the wider society.

8. Conclusion and Recommendations

Routine activity theory has an application to armed banditry, which, as an event, has encroached on the productivity of agriculture in Nigeria, causing a significant decline in food production, increasing difficulty in the movement of agro-food products within localities and in the country at large. As a consequence, there has been astronomical rise in food prices. Specifically, the activities of bandits in the study area have led to the destruction of farmlands and planted crops, limiting farmers' access to farmlands, inadequate storage, increased spoilage and wastage of farm produce, an ineffective transportation system for agro-food products. There are unsafe market environments, diminishing market availability of yam produce, and by extension, agro-food generally. This study has thus revealed that armed banditry has a negative influence on the agro-food supply chain (production, transportation, distribution, and marketing), resulting in low agricultural productivity and a high cost of agricultural produce and transportation.

It is recommended that the security of lives and properties be given a high priority by the governments and host communities. The governments should support the host communities to establish the local vigilantes and equip them with modern arms and equipment. They should be well trained on the use of arms, while everyone in the state and, more importantly, in the affected areas, should be more security conscious. Modern and sophisticated security surveillance should be mounted in troubled areas for early detection of the armed banditry, while both the vigilantes and the security personnel should be well motivated to do their duties faithfully by prompt payment of salaries and allowances, beside equipping them with sophisticated and modern arms and ammunition. All these, if implemented, will invariably have positive effects on the yam supply chain (i.e., production, transportation, distribution, and marketing of yam) in the study area. While the study has been exploratory, detailed research on internal and external linkages in armed banditry could be conducted, in order to get a fuller picture of the issues.

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