**Journal of Community & Communication Research**
ISSN: 2635-3318
Volume 10; Number 1. June 2025
Accessible at: https://jccr.sccdr.org

# EFFECT OF INSECURITY ON LIVESTOCK PRODUCTION IN NORTH CENTRAL, NIGERIA

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## ABSTRACT

*This study analyzed the effect of insecurity on livestock production in North Central. The area of study included Benue, Kwara, and Niger States, as well as the Federal Capital Territory. The study employed a sample size of 3285 drawn through a multi-stage sampling technique. Both descriptive and inferential statistics (Binary logistic regression and Binomial statistics) were used to analyze the data. Results showed that the average length of residence, age, household size, and farming experience were 12 years, 35 years, 5 persons, and 8 years, respectively. The total number of livestock was 141,610, with poultry making up the largest portion at 40,415. The livestock comprised adult and non-adult males and females. The farmers indicated that their farm output was rated as average and acknowledged that insecurity has adversely affected them as farmers, significantly lowering their production levels. Before the onset of insecurity and insurgency, the majority of farmers (52.30%) reported an annual increase of 10–14 livestock. However, this trend has shifted, with most farmers (60.06%) now experiencing a reduced annual increase of only 5–9 livestock. The study found that sex, age, education, household size, farming experience, and farmer income significantly affect livestock production outcomes. It is recommended that the government should enhance livestock production by providing farmers with better inputs, encouraging more farmers to enter the business, and thus increasing livestock production for the populace.*

**Keywords: Socio-economic characteristics, farmers, livestock performance, insecurity, insurgency, output/production**

## INTRODUCTION

The most recent comprehensive livestock survey in Nigeria was conducted in 2022 by the National Agricultural Sample Census (NASC), which also covered livestock-related activities (Blench, 2022). Blench (2022) stated that NASC represents a major data collection effort, crucial for addressing a data gap that has persisted for more than two and a half decades. It is worth noting that the escalation of insecurity and insurgency in 2014 may have hindered the ability of the NASC to conduct a fully comprehensive survey. As a result, Nigeria still faces a significant gap in generating adequate, timely, and useful data essential for policymaking in the livestock sector of agriculture (Ambali and Murana, 2017). Blench (2022) opined that the data generated from a survey of livestock production involves the types of animals, sex combination of the animal, age distribution, utility-wise distribution, and purpose of keeping the animals. The author also stressed that other parameters of importance in the survey are census (per head count) of the animals, poultry count, implements, and machinery used for livestock rearing. All of this information is essential for advancing the livestock component of the agricultural sector. However, this goal has been largely hindered by the onset of insurgency, primarily driven by the Boko Haram sect.

Boko Haram sects are the major actors of insurgency in the north-eastern Nigeria. The Boko Haram insurgency has had far-reaching effects, disrupting multiple aspects of life, especially in northeastern Nigeria (Beatrice, 2015). The conflict has led to devastating losses of lives and property, as well as environmental degradation, which has severely impacted agricultural production and contributed to food shortages. According to Usman (2019), the group has displaced 800,000 children from farming communities in the affected areas. Usman (2019) further reported that the sect has claimed over 4,000 lives, displaced countless individuals from their homes, and forced the abandonment of numerous farms. Additionally, their nefarious activities have led to the closure of approximately 2,000 schools across the West African region.

In the northern part of the country, where farming is practically the main livelihood of the residents is not spared by this Sect and their activities have damaged the people's willingness and enthusiasm to develop the region. Almost all the areas are not only known for crop production, livestock production, but also produce a conducive marketing of the products that are produced. The activities of insurgents in the north have, to a large extent, affected the farming activities of both crop and livestock farmers (Abubakar *et al.,* 2017). It is expected that insecurity and insurgency would have an unwelcome effect on animal production, livestock data, and the livelihoods of households. However, the extent this has happened is not known. This study was therefore conceptualized to assess the effect of insecurity and insurgency on livestock production in Nigeria. The specific objectives of the study were to determine the socio-economic characteristics of the livestock farmers in North Central, Nigeria, assess the size and composition of commercially managed livestock holdings, analyse the rate of farmers' livestock output/production, assess extent to which insecurity affected the production level of livestock in the area and analyze the state of livestock performance prior to the escalation of insecurity and insurgency in 2014, and compare it to the situation as of 2023

## METHODOLOGY

The study took place in Benue, Kwara and Niger States including the Federal Capital Territory (FCT) all in North Central Agricultural zone (see Fig 1).

North Central Nigeria, commonly referred to as the Middle Belt, is one of the six geopolitical zones of the country. It consists of six states which are: Benue, Kogi, Kwara, Nasarawa, Niger, and Plateau—as well as the Federal Capital Territory (FCT), Abuja (Omachonu & Dalhatu, 2018). According to the authors, the region is renowned for its ethnic and religious diversity, as it lies between the predominantly Muslim North and largely Christian South. The people of North Central Nigeria are celebrated for their resilience and hospitality. They represent a wide array of ethnic groups, including the Tiv, Idoma, Nupe, Gwari, Igala, Berom, and Ebira—each with its own language, traditions, and cultural heritage. The region enjoys fertile soil and a favorable climate, which supports its thriving agricultural activities. Residents engage in the cultivation of various crops such as yam, cassava, maize, rice, and soybeans, as well as in animal husbandry and fishing (Matemilola & Elegbede, 2017). In addition to agriculture, states like Plateau and Kogi are endowed with abundant mineral resources, including tin, limestone, and iron ore.

Amah (2017) emphasized the political importance of North Central Nigeria, noting that it is home to the nation's capital, Abuja, also known as the Federal Capital Territory. As the seat of government and administration, Abuja hosts numerous national and international institutions, reinforcing the region's strategic relevance. Despite this significance, the area faces several challenges, with ethnic and religious conflicts being among the most pressing. These tensions often stem from disputes over land ownership, political power, and access to resources (Tuki, 2024). Tuck (2024) further explained that these conflicts have frequently escalated into violence, especially in areas where farming and herding communities collide. Additionally, parts of the region remain underdeveloped due to limited access to quality education, widespread poverty, inadequate infrastructure, and insufficient healthcare services. Despite these challenges, North Central Nigeria holds significant potential to shape the country's future, thanks to its strategic location, abundant natural resources, and rich cultural diversity.

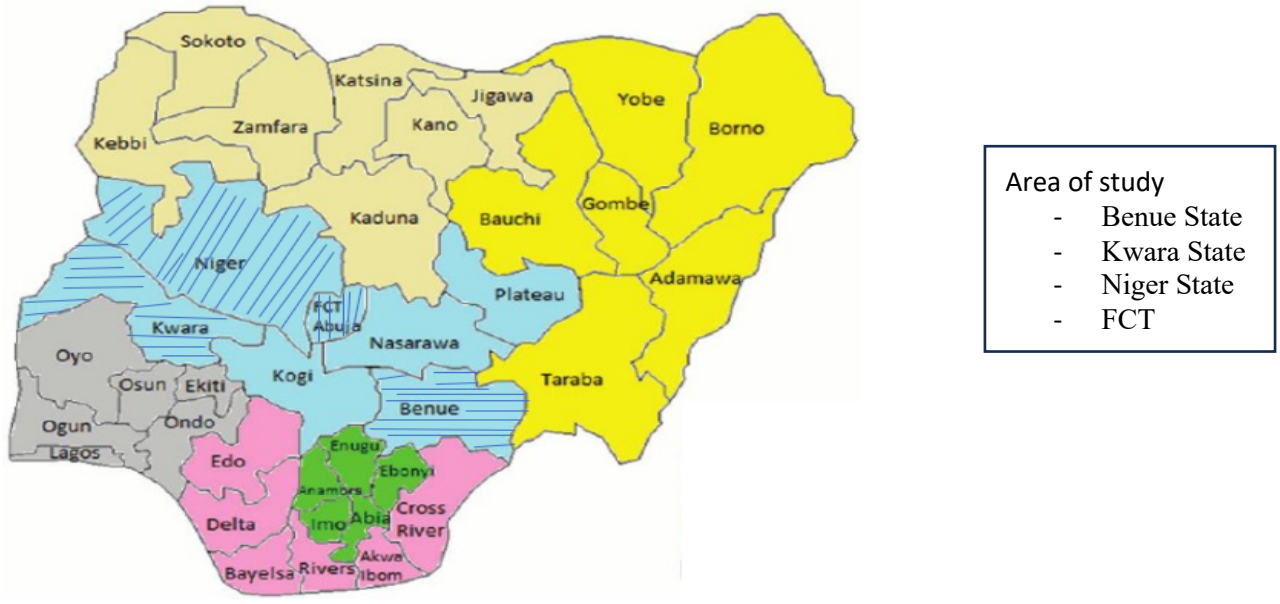



**Figure 1: Shaded portions show the area of study:**

**Sampling technique and sample size**

The study involved a purposive sampling technique of some worst-hit States in the North Central agricultural zone. The States involved: Benue, Kwara, Niger States and the Federal Capital Territory (FCT), Abuja. (Stage 1). Next, all three (3) agricultural zones in each state were purposively selected (Stage 2), resulting in a total of nine (9) agricultural zones along with the FCT Local Government Councils (LGCs). In Stage 3, three (3) Local Government Areas (LGAs)/councils were randomly selected from each agricultural zone in every state and the FCT, totaling thirty (30) LGAs/LGCs for the study. Stage 4 involved the random selection of four (4) towns/communities within each LGA/council, yielding a total of 120 towns/communities. Finally, in Stage 5, thirty (30) livestock farmers were randomly selected from the chosen towns/communities, and this made it a total of three thousand, six hundred (3,600) respondents used for the study. The returned question instruments that were properly filled by the respondents were 3285 (i.e., 91.25%), and these were the ones used for the study.

**Sources of data and research instruments**

The study engaged the usage of primary and secondary data. The former were sourced from the livestock farmers, while the secondary data were sourced from the Internet and other documented sources. Questionnaire and interview schedules were the research collection instruments. They were respectively administered to literate and illiterate respondents. The questions in the instruments were closed-ended questions for the ease of coding and analysis. The data collection instruments were administered by trained enumerators to the respondents. Retrieval of the question instrument was also done through the same channel.

**Analytical techniques of the study**

The data put together from the study were analysed using descriptive and inferential statistics. Descriptive statistics were used to analyze all the objectives of the study. Extent to which insecurity/insurgency affected production level of livestock (objective 4) was measured on a zero, low, average, high and very high rating scale, while livestock performance prior to the escalation of insecurity and insurgency in 2014, and compare it to the situation as of 2023 was analysed using same percentage and mean. The study's hypotheses were analyzed with the use of inferential statistics. Hypothesis one was analyzed with Binary logistic regression. The variables in the model were specified as;

Y = Rate of livestock output/production (High = 1; Low = 0)
$X_1$ = Gender (dummy: male = 1; female = 0)
$X_2$ = Age (years)
$X_3$ = Education (pri. educ. = 1, sec. educ. = 2 and tertiary educ. = 3)
$X_4$ = Marital status (single = 1, married = 2, divorced = 3 widow(er) = 4)
$X_5$ = Livestock farming experience (years)
$X_6$ = Household size (number of persons living and feeding together)
$X_7$ = Length of residence (years)
$X_8$ = Religious affiliation (Christian = 1; Muslim = 2; Traditionalist = 3)

Hypothesis two was analyzed with the use of Binomial statistics. It was used to determine the significant difference between the number of farmers affected in terms of livestock performance and those not affected by insecurity/insurgency in the area of study.

Binomial distribution is expressed as: b(x;n,p) = nCx*px *(1-p) n-x
Where b = binomial probability;
x = total number of successes (high or low)
p = probability of success on an individual trial, n = number of trials

Table 1: Socio-economic characteristics of the respondents. n = 3285

| Socio-economic Variables | Categories | Freq | % | Mean |
|---|---|---|---|---|
| Length of residence (range) | <5 | 219 | 6.67 | |
| | 5-9 | 742 | 22.59 | |
| | 10-14 | 1729 | 52.65 | |
| | 15-19 | 375 | 11.42 | |
| | >=20 | 219 | 6.67 | 12 |
| Sex | Female | 1223 | 37.2 | |
| | Male | 2062 | 62.8 | |
| Marital status | Single | 707 | 21.5 | |
| | Married | 2055 | 62.6 | |
| | Divorced | 201 | 6.1 | |
| | Widow | 252 | 7.7 | |
| | Widower | 70 | 2.1 | |
| Age range (years) | <25 | 411 | 12.52 | |
| | 26-34 | 1388 | 42.28 | |
| | 35-44 | 864 | 26.32 | |
| | 45-54 | 573 | 17.45 | |
| | >=55 | 47 | 1.43 | 35 |
| Education | No formal education | 186 | 5.7 | |
| | Primary educ. | 524 | 16.0 | |
| | Secondary educ. | 1218 | 37.1 | |
| | Post-secondary educ. | 1357 | 41.3 | |
| | Total | 3285 | 100.00 | |
| Religion | Christianity | 2582 | 78.62 | |
| | Muslim | 393 | 11.97 | |
| | Traditional | 192 | 5.85 | |
| | Others | 117 | 3.56 | |
| Household size range | 1-3 | 662 | 20.15 | |
| | 4-6 | 1914 | 58.26 | |
| | 7-9 | 662 | 20.15 | |
| | 10-12 | 37 | 1.13 | |
| | 13 & above | 10 | 0.30 | 5 |
| Farming status | Part-time | 1697 | 51.7 | |
| | Full-time | 1588 | 48.3 | |
| Farming experience range (years) | <5 | 304 | 9.3 | |
| | 5-9 | 2229 | 67.9 | |
| | 10-14 | 614 | 18.7 | |
| | 15-19 | 76 | 2.3 | |
| | >=20 | 62 | 1.9 | 8 |

*Source: Field survey, 2023*

**Size of commercially managed livestock holdings**

The size of the animals was determined by first taking the mid-class of every class range. Table 2 shows the various livestock reared by the farmers in the various areas of the study and they include: Cattle, Goats, Sheep, Pigs, Poultry, Other birds, Horses, Camels, Dogs, Cats, Donkeys, Rabbits and other animals The number of size of the various livestock in the area of study are as follows: Cattle (14,915), Goats (15,890), Sheep (7,230), Pigs (24,575), Poultry (40,415), Other birds (9,675), Horses (1,505), Camels (390), Dogs (8,650), Cats (4,185), Donkeys (1,735), Rabbits (3,750) and other animals (8,695). This brought the total of the livestock to 141,610.

**Table 2: Size of commercially managed livestock holdings**

| | <=10 | | | 10-19 | | | 20-29 | | | 30-39 | | | >=40 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X5 | | | X15 | | | X25 | | | X35 | | | X45 | | | |
| **Livestock** | **Freq** | **F. X5** | **%** | **Freq** | **F.X 15** | **%** | **Freq** | **F.X25** | **%** | **Freq** | **F.X35** | **%** | **Freq** | **F.X45** | **%** | **Total** | **Mean** |
| Cattle | 1814 | 9070 | 55.22 | 118 | 1770 | 3.59 | 121 | 3025 | 3.68 | 21 | 735 | 0.64 | 7 | 315 | 0.21 | 14915 | 7 |
| Goats | 2247 | 11235 | 68.40 | 209 | 3135 | 6.36 | 9 | 225 | 0.27 | 1 | 35 | 0.03 | 28 | 1260 | 0.85 | 15890 | 6 |
| Sheep | 488 | 2440 | 14.86 | 232 | 3480 | 7.06 | 2 | 50 | 0.06 | 0 | 0 | 0.00 | 28 | 1260 | 0.85 | 7230 | 10 |
| Pigs | 922 | 4610 | 28.08 | 609 | 9135 | 18.54 | 394 | 9850 | 12.00 | 28 | 980 | 0.85 | 0 | 0 | 0.00 | 24575 | 13 |
| Poultry | 643 | 3215 | 19.58 | 551 | 8265 | 16.78 | 560 | 14000 | 17.05 | 275 | 9625 | 8.37 | 118 | 5310 | 3.59 | 40415 | 19 |
| Other birds | 623 | 3115 | 18.96 | 128 | 1920 | 3.90 | 125 | 3125 | 3.81 | 42 | 1470 | 1.28 | 1 | 45 | 0.03 | 9675 | 11 |
| Horses | 292 | 1460 | 8.89 | 3 | 45 | 0.09 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 1505 | 5 |
| Camels | 67 | 335 | 2.04 | 2 | 30 | 0.06 | 1 | 25 | 0.03 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 390 | 6 |
| Dogs | 1598 | 7990 | 48.65 | 44 | 660 | 1.34 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 8650 | 5 |
| Cats | 730 | 3650 | 22.42 | 34 | 510 | 1.04 | 1 | 25 | 0.03 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 4185 | 5 |
| Donkeys | 251 | 1255 | 7.64 | 32 | 480 | 0.97 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 1735 | 6 |
| Rabbits | 450 | 2250 | 13.70 | 96 | 1440 | 2.92 | 1 | 25 | 0.03 | 1 | 35 | 0.03 | 0 | 0 | 0.00 | 3750 | 7 |
| Other animals | 1372 | 6860 | 41.77 | 74 | 1110 | 2.25 | 29 | 725 | 0.88 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 8695 | 6 |
| Total | 11497 | 57485 | | | 31980 | | | 31075 | | | 12880 | | | 8190 | | 141610 | |

*Source: Field survey, 2023*

The mean shows that Poultry livestock had the highest (mean = 19). The reason may be attributed to the fact that poultry farming does not need huge capital to start it, and its consumption and use are not restrained by any tradition or religion. The size of poultry reared is respectively followed by Pigs (mean = 13), Other birds (mean = 11), Sheep (mean = 10), Cattle (mean = 7), Rabbit (mean = 7), Goats (mean = 6), Camels (mean = 6), Donkeys (mean = 6), Other animals (mean = 6), Horses (mean = 5), Dogs (mean = 5) and Cats (mean = 5). The result implies that there are various livestock in the area. Through personal communication, some of the respondents noted that it is not all the animals that are eaten by them. Rather, some of them, especially Dogs and Cats, are used for other purposes. They indicated that while Dogs are used to alert residents in case of any attack, Cats are used to secure their goods against rodents.

**Composition of commercially managed livestock holdings**

The composition of livestock is carried out in terms of its differentiation based on sex and maturity (see Table 3). A study of livestock on this basis plays a significant role in agricultural production, management, census, production, and research. The composition was considered, first, in terms of sex differentiation of the livestock into males and females, and secondly, into the maturity of the animals. The maturity is considered in terms of those who are adults and those who are non-adults. In considering the livestock based on sex, result shows that the most (94.90%) respondents indicated that they have a combination of both males and females of the livestock reared by them. Few of them (2.50%) indicated that they have only males, while the same fraction (2.50%) indicated that they have only females. The farmers keeping both males and females dominate the livestock production, and this may be because they use them mainly for the purpose of commercialization.

**Table 3: Composition of the livestock reared by respondents. N = 3285**

| Composition of livestock | Category | Frequency | Percent |
|---|---|---|---|
| Differentiation of animals based on sex | Male | 83 | 2.5 |
| | Female | 83 | 2.5 |
| | Male and female | 3119 | 94.9 |
| Differentiation of animals based on maturity | Adult | 96 | 2.9 |
| | Non-adult | 46 | 1.4 |
| | Adult & Non-adult | 3143 | 95.7 |

*Source: Field survey, 2023*

Differentiation of the animals on the basis of maturity shows that farmers who had a combination of adult and non-adult dominated (95.70%) amongst them all. Very few (2.90%) of them had only adult animals, while about 1.40% of the farmers had only adults. The dominance of farmers with both adult and non-adult is an indication that they are rearing the animals for production and commercial purposes.

**Farmers' Rate of Livestock Output/Production**

Table 4 shows the rate of livestock output/production, and results revealed that most (48.55%) of the farmers rated their output/production to be of an average level. About 34.73% and 16.71% rated their output/production level to be fair and high, respectively. On general consideration, the result implies that the respondents are not performing well in their livestock production. The low performance may be attributed to the insecurity/insurgency taking place in the area. This assertion is in line with the findings of Abubakar *et al*. (2017) that stated, insecurity constituted by Boko Haram in Adamawa state, just like in other states of Nigeria, has, to a large extent tampered with the rate of production level of tens of thousands of people whom major activities is farming.

**Table 4: Farmers' rate of livestock output/production**

| Variables | Categories | Freq | % | Mean |
|---|---|---|---|---|
| Rating of farm output | Poor | 0 | 0.00 | |
| | Fair | 1141 | 34.73 | |
| | Average | 1595 | 48.55 | |
| | High | 549 | 16.71 | |
| | Very high | 0 | 0.00 | |
| | Total | 3285 | 100.00 | Average |

*Source: Field survey, 2023*

**Extent to Which Insecurity/Insurgency Affected the Production Level of Livestock**

The extent to which insecurity/insurgency has affected the production of livestock is shown in Table 5. The results revealed that all the respondents (100%) indicated that insecurity/insurgency affected their production of livestock in the area. In accordance with the extent of insecurity/insurgency impact on livestock production, a larger fraction (83.84%) indicated that insecurity affected their livestock production to a very high extent. About 12.42%, 3.47%, and 0.27% indicated that insecurity/insurgency affected their livestock production to a high, average, and low extent, respectively.

**Table 5: The extent to which insecurity/insurgency affected the production level of livestock.N = 3285**

| Variables | Categories | Freq | % | Mean |
|---|---|---|---|---|
| Insecurity affected the production level | No | 0 | 0.00 | |
| | Yes | 3285 | 100.00 | Yes |
| | Total | 3285 | 100.00 | |
| The extent of insecurity's impact on production | Zero extent | 0 | 0.00 | |
| | Low | 9 | 0.27 | |
| | Average | 114 | 3.47 | |
| | High | 408 | 12.42 | |
| | Very high | 2754 | 83.84 | Very high |
| | Total | 3285 | 100.00 | |

*Source: Field survey, 2023*

The result implies that insecurity/insurgency has really affected the production of livestock to a very high extent, and this may also impact the income drive from their farms. The findings of Jare and Bunu (2021) are in tandem with this result. They lamented over the extent to which the activities of insurgency drastically declined the farming output and general farming activities in the study area.

**Livestock Performance Before the Escalation of Insecurity/Insurgency and the Situation as of 2023**

Table 6 analyzes the data provided on livestock performance before the escalation of insecurity/insurgency in 2014 and the situation as of 2023. The data presented were from two sets. The first set represents livestock performance before the escalation of insecurity/insurgency in 2014, while the other data represents livestock data after the escalation of insecurity/insurgency till 2023.

**Table 6: Livestock performance before and after the incidence of insecurity/insurgency**

| Variables | Categories (on a per annual basis) | Freq | % | Mean |
|---|---|---|---|---|
| Livestock performance before insecurity | Increase by <5 animals | 177 | 5.39 | |
| | Increased by 5-9 animals | 1118 | 34.03 | |
| | Increased by 10-14 animals | 1718 | 52.30 | |
| | Increased by 15-19 animals | 272 | 8.28 | |
| | Increased by 20 & more animals | 0 | 0.00 | |
| | Total | 3285 | 100.00 | 10 |
| Livestock performance after insecurity | Increase by <5 animals | 1973 | 60.06 | |
| | Increased by 5-9 animals | 1100 | 33.49 | |
| | Increased by 10-14 animals | 212 | 6.45 | |
| | Increased by 15-19 animals | 0 | 0.00 | |
| | Increased by 20 & more animals | 0 | 0.00 | |
| | Total | 3285 | 100.00 | 5 |

*Source: Field survey, 2023*

In comparing livestock performance before and after insecurity/insurgency, before insecurity, the majority (52.30%) of livestock performance increases at a rate of 10 – 14 animals on an annual basis. On the other hand, the majority (60.06%) of the respondents had their livestock increase by a range of 5 – 9 livestock after insecurity/insurgency on the same basis. There is a noticeable and corresponding increase from "<5 animals" to "5 – 9 animals" and then to "10 – 14 animals" category before insecurity. On the other hand, there was a decline from "<5 animals" to "5 – 9 animals" and a greater decline "10 – 14 animals" category after insecurity. The average rate at which the farmers were performing in terms of increase on per annual basis in their livestock was 10 and 5 livestock before and after insecurity/insurgency, respectively. The increase, but at a decreasing rate of livestock produced after insecurity, could be indicative of several factors, such as limited resources, displacement, or damage to infrastructure affecting livestock care and breeding, which perhaps have been due to insecurity/insurgency in the area. This finding totally agrees with Onwuaroh *et al*. (2017), who stated that insurgent activities have had a negative impact on farmers' production level, resulting in the decline of incomes and increasing poverty levels.

**Relationship of the Effect of Insecurity/Insurgency on Livestock Production and Farmers' Socio-Economic Characteristics.**

The relationship between the effect of insecurity/livestock on livestock production and farmers' socio-economic characteristics is shown in Table 7. Binary logistics regression model shows that the adjusted value of the coefficient of determination was 0.725, indicating that about 72.5% variation in the effect of insecurity/insurgency on livestock production was explained by the explanatory variables (socio-economic variables) included in the model. The F-statistic was 2.713, indicating that the model is significant. The B-coefficients and Standard Error (SE) of the regression show that 6 out of 10 socio-economic variables were statistically significant in the effect of insecurity/livestock on livestock production. The factors were: sex, age, education, household size, farming experience, and farm income. The odds ratio shows by how many times these variables were significant in the effect of insecurity/livestock on livestock production.

The gender of respondents showed a positive and statistically significant relationship with the impact of insecurity on livestock production. The coefficient was 2.012 with a standard error of 0.017, indicating that men, who constituted 62.80% of livestock producers in the study area, are more affected. This suggests that greater male involvement in livestock production is associated with increased exposure to the effects of insecurity and insurgency. Age, on the other hand, had a negative and significant coefficient (-1.311), with a standard error of -0.001 and an odds ratio of 2.912. The negative sign indicates that younger farmers are better able to protect their livestock from the effects of insecurity. The odds ratio suggests that increased participation of young farmers in livestock production could result in nearly three times more effective protection for their animals. This finding supports the work of Offor *et al.* (2018), who observed that older farmers tend to be less effective in safeguarding their livestock, leading to decreased output, particularly in small ruminants.

The educational level of respondents showed an inverse and statistically significant correlation with the impact of insecurity on livestock production. The coefficient was -4.134 with a standard error of -0.011, indicating that an increase in farmers' educational attainment leads to a reduction in the negative effects of insecurity on

livestock production. This suggests that educated farmers are better able to apply knowledge and develop strategies to protect their livestock. The odds ratio of 2.110 further implies that farmers with higher education are twice as effective in mitigating the impact of insecurity compared to their less-educated counterparts. These findings align with Ishaya *et al.* (2018), who observed that increased education enhances farmers' ability to safeguard their agricultural activities, ultimately leading to improved productivity. Household size also showed a significant relationship with the effect of insecurity, with a coefficient of 2.203 and a standard error of 1.005. The result suggests that larger households may deter insurgents, possibly due to the perceived strength in numbers. Additionally, larger families can provide more labour for both farm activities and livestock protection. However, this finding contradicts Offor *et al.* (2018), who argued that increasing household size tends to reduce livestock output, as additional members may place more strain on household resources rather than contribute labour.

Farming experience showed a negative relationship with the impact of insecurity on livestock production, with a coefficient of -2.608 and a standard error of -1.003. This indicates that more experienced farmers are likely to possess better skills and strategies for protecting their livestock, thereby reducing the adverse effects of insecurity and insurgency. The odds ratio of 1.825 suggests that each additional year of farming experience enhances the farmer's ability to protect their livestock nearly twice as effectively as less experienced counterparts. This finding aligns with Ishaya *et al*. (2018), who observed that increased experience improves a farmer's efficiency in safeguarding livestock. Conversely, farmers' income showed a positive and significant relationship with the effect of insecurity, with a coefficient of 3.121 and a standard error of 0.024. The odds ratio of 3.129 indicates that a unit increase in income may lead to a threefold increase in the impact of insecurity on livestock production. This could be because higher-income farmers become more visible targets for insurgents, attracting attacks on both the farmers and their livestock.

**Table 7: Relationship of rate of livestock output/production and farmers' socio-economic variables**

| Socio-economic variables | Unstandardized Coefficients | | | |
|---|---|---|---|---|
| | B | Std. Error | t-value | Odd-ratio |
| (Constant) | 32.172 | 5.082 | 22.103 | 2.018 |
| Length of residence (years) | 4.102 | 2.612 | 2.032 | 0.734 |
| Sex | 2.012 | 0.017 | 1.321 | 1.024* |
| Marital status | 0.815 | 0.302 | 1.612 | 2.223 |
| Age (years) | -1.311 | -0.001 | -1.133 | 2.912* |
| Education | -4.134 | -0.011 | -2.104 | 2.110* |
| Household size (no.) | -2.203 | -1.005 | -1.001 | 1.001* |
| Farming status | 0.912 | 1.017 | 1.270 | 1.208 |
| Farming experience (years) | -2.608 | -1.003 | -1.011 | 1.825* |
| Farmers income | 3.121 | 0.024 | 1.621 | 3.129* |
| Religious affiliation | 3.441 | 2.504 | 0.923 | 0.918 |
| $R^2 = 0.753$ | | | | |
| Adjusted $R^2 = 0.725$ | | | | |
| F-Statistics = 2.713 | | | | |

***Dependent Variable: Output/Production after insurgency or insecurity***

**Proportion of Livestock Farmers that were Affected and Those Not Affected by Insecurity/Insurgency**

The proportion of farmers whose livestock performance was affected and those not affected by insecurity/insurgency was analysed using Binomial statistics, and the result is shown in Table 8. The result revealed that a larger proportion (96.26%) of the livestock farmers had their livestock performance affected by insecurity/insurgency. On the other hand, the smaller fraction of farmers, which represented 3.74%, indicated that their livestock performance was not affected by insecurity/insurgency. From the result, there exists a great difference between the livestock farmers affected by insecurity/insurgency and those that are not affected. Insecurity/insurgency has really contributed to the decline in the performance of livestock reared by the farmers. The result was significant at the 1% level of probability.

For this reason, the alternative hypothesis was accepted, and it states that the number of livestock farmers affected in terms of livestock performance is significantly different from those not affected by insecurity/insurgency in the North Central, Nigeria. The result thus suggests that insecurity/insurgency has affected the performance of livestock output/production to a large extent. The result implies that insecurity/insurgency is contributing to the poor performance of livestock production in the area. The result of this study was in agreement with the findings of Onwuaroh *et al.* (2017), who stated that the activities of insurgents have, to a large extent, negatively impacted livestock production and, by extension, farmers' income.

**Table 8: Relationship of livestock farmers affected by insecurity/insurgency**

| Number of livestock affected by insecurity/insurgency | Frequency | Proportions | Probability level |
|---|---|---|---|
| Livestock farmers affected | 3162 | 96.26 (0.9626%) | 0.001 |
| Livestock farmers not affected | 123 | 3.744 (0.0374%) | |
| Total | 3285 | 100.00 (1.000%) | |

*Source: Field survey, 2023*

## CONCLUSION

The study analysed the effect of insecurity on livestock production in North Central, and the findings revealed that socio-economic variables like sex, age, educational level, farming experience, income, and household size of the farmers were found to be significant variables to rate of livestock output/production. Farmers' rate of livestock output/production was low, and this was attributed to the insecurity/insurgency in the area of study. Consequently, farmers' income was also negatively affected. The livestock produced by the farmers were of different types, and there is still room to scale it up if the issue of insecurity can be reduced to a bare minimum level.

## RECOMMENDATIONS

The government of the nation should put in its best, shorn all sorts of deceit, and face the bandits or insurgents very well so that their activities and their negative impact on livestock production can be brought under control. Doing this will go a long way in helping to upscale production of livestock in the area, and the country, Nigeria, in general.

The farmers also need to be trained by extension agents on how best they can manage their livestock, and in the end, they can become equipped with the necessary skills to manage livestock for better output/production.

The government should also step up production of livestock by simply advancing inputs to the farmers, so that more farmers can feel encouraged to enter into the farming of livestock.

**ACKNOWLEDGEMENTS**

*We, the research team, acknowledged the funding support by the Senate Committee on Research, the Vice Chancellor in particular, and the Management of National Open University (NOUN) for logistics and sponsorship of this research and the subsequent publications coming out of the research. We forever remain very grateful.*

**CONFLICT OF INTERESTS**

The author declares that there is no conflict of interest.

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