The Impact of *Boko Haram* Insurgency on Pearl Millet Production in Yobe State, Nigeria
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Abstract

The study examined the impact of Boko Haram insurgency on pearl millet production among farmers in Yobe State, Nigeria. Percentage, logit regression and propensity score matching models were used in the data at 0.1 % significant level. The results showed that majority of the farmers perceived that unemployment was the major cause of Boko Haram insurgency with a means score of 4.7. The nearness neighbour matching reveals that a t-value of -4.31 resulted to an output difference of -627.29kg between affected and non-affected farmers and was significant at 0.1% probability level. A level of living difference of ₦ -177,000 between affected and non-affected pearl millet farmers with a t-value of -9.67 was statistically significant at 1%. Majority (61.2%) of the affected farmers reported high price of inputs as a major constraint faced by pearl millet farmers. Private investors, NGOs and other stakeholders should collaborate to supply farm inputs such as improved seed variety, herbicides and fertilizer at subsidized rates to the affected farmers in order to boost their farming production.

Keywords: *Boko Haram insurgency*, pearl millet production.

Introduction

Pearl millet (*Pennisetum glaucum* L.) is a cereal crop grown in tropical semi-arid regions of the world primarily in Africa and Asia. It is one of the most crops among cereals (Chisi and Peterson, 2019). Pearl millet is the sixth cereal crop in terms of the world's agricultural production, next to wheat, rice, maize, barley and sorghum and also one of the four most important cereals crops after rice, maize and sorghum, grown in the tropics (Kimeera and Sucharitha, 2019). It is an important staple food which serves as a major source of food and income for millions of subsistence farmers living in savannah areas of Nigeria (Champion and Fuller, 2018). Nigeria is one of the major millets producing countries in Africa, with about 1.7 million hectares of cultivable land devoted for the crop, with an average annual production of 1.9 million metric tons in 2018 (National Agricultural Extension and Research Liaison Services, [NAERLS] 2018).

Insurgency refers to a religious or political battle launched among an organized, sponsored and aggrieved set of people to change the government. This situation aimed to enforce a certain principle contrary to the government's will. (Vahyala *et al.,*

2016). The word *Boko Haram* was derived from two words *Boko* and *Haram*. The word *Boko* in the Hausa language means western education and *Haram* in the Arabic language, meaning forbidden. Therefore, *Boko Haram* means "Western Education is forbidden. *Boko Haram* can be understood as a radical insurgent group that has risen from political and religious discontent within Nigeria (Babagana *et al.,* 2018).

The emergence of *Boko Haram* insurgency continues to affects food security of most rural households. Since the escalation of violence in 2013, households have experienced food insecurity and poor production by the farmers (Awodola and Oboshi, 2015). For instance, most farmers were scared of being ambushed on the way to their farms. (Onwuaroh, 2017). The fear of being killed by insurgents, prevented many farmers from going to a far distance. This also limited the level of pearl millet production (Onwuaroh, 2017).

Despite the major role of pearl millet in food provision, economic gain, and nutritional value in Nigeria, the emergence of the *Boko Haram* insurgency and its activities hampered and affected pearl millet production in some parts of Yobe State. The activities of the insurgents send many farmers out of the sources of their livelihood and relocated to other places where there is relative peace to save their lives, thereby making farmers abandon their farmlands. Consequently, this largely affects agricultural activities in such marginal areas; because most farmers have abandoned land meant for farming due to insurgency activities which will consequently affect their farm output (Mukhtar *et al.,* 2018).

Although, different studies have been carried out by different researchers on *Boko Haram* insurgent's activities and their impacts in Yobe State and other parts of the country, there are limited studies on the impact of *Boko Haram* insurgency on pearl millet farmers' production, especially in Yobe State, Nigeria. This creates a knowledge gap. However, it poses a key challenge and calls for an in-depth analysis of the farmer's level of output, income and level of living. Hence, this study intends to fill this knowledge gap by assessing the impact of the *Boko Haram* insurgency on pearl millet production in Yobe State. Based on this background, this study addresses the following research objectives.

Objectives of the Study
The broad objective of the study was to assess the impact of *Boko Haram* insurgency on pearl millet production in Yobe State, Nigeria. The specific objectives of the study were to:
i. ascertains the effect of *Boko Haram* insurgency among pearl millet farmers in the study area;
ii. examine the impact of *Boko Haram* insurgency on the output, income and level of living of pearl millet farmers in Yobe State;
iii. identify the constraints faced by pearl millet farmers on the impact of Boko Haram insurgency in Yobe State.

Methodology
The study was carried out in Yobe State. The State is located in the northeastern part of Nigeria between latitudes $9^0 56'$N and $13^0 00'$N and longitudes $9^0 30'$E and $12^0 45'$E. It is made up of 17 Local Government Areas, which vary considerably in size. It has a total land mass area of 47,153 square kilometres (Ali *et al.,* 2014). The population of the State was 2,321,339. (National Population Commission) (NPC, 2006), while the

projected population for the State as of 2019 was 3, 496, 026 (NPC, 2019). The multi-stage sampling procedure was used for the study. The first stage, was involved the selection of two Local Government Areas. Namely; (Geidam and Gujba LGAs) that were purposively selected from the affected mostly by Boko Haram insurgency and the selection of two LGAs (Yusufari and Machina LGAs) that were not affected by Boko Haram, given a total of four LGAs. The second stage, involved the selection of 3 communities from the four selected LGAs, given a total of 12 villages were used for the study. The third stage involved the adoption of Slovian's formular (1967) to calculate the sample size with 95% confidence level and 5% sampling error assumption. The formula is expressed as follows: $n_o = \dfrac{N}{1+N(e^2)}$

Where; n= Sample size, N= Total number of observations, 1= Statistical constant, e= Level of significance which is set at 0.05. Hence, $n_o = \dfrac{572}{1+572(0.05^2)}$ $n_0 =$ 235/572=0.410837=41%.

Lastly, 41% of affected and non-affected pearl millet farmers were randomly selected from each village, giving a total of 121 farmers from affected farmers and 114 farmers from non-affected farmers. Therefore, a total of two hundred and thirty-five 235 farmers was used for this study as a sample size. This information was collected in the years 2019.

Data were collected using a questionnaire administered to farmers, while data for the study were analysed using both descriptive and inferential statistics. Descriptive statistics such as (means, frequency distribution, percentages and standard deviation) were used, while inferential statistics such as (propensity score matching) was used for the study.

Model Specifications

Propensity score matching
The most common evaluation parameter of interest is the Average Treatment Effect on the Treatment (ATT), which is defined as;
ATT = E $(Y_1 - Y_0/P = 1)$ = E $(Y_1/P = 1)$ − E $(Y_0/P = 1)$
The propensity score matching is the probability of output, income and level of living if given as $X = x_i$ of characteristics, P(X) = Pr $(P = 1/X = xi)$, ATT = $1/N_1(Y_1 - Y_0)$.

Results and Discussions

Farmers' Perception on the Causes of *Boko Haram* insurgency

The results in Table 1 show that unemployment (4.678) ranked 1st, poverty (4.562) ranked 2nd and ignorance (4.033) ranked 3rd as the causes of *Boko Haram* insurgency. These three items were found to be above the threshold of 3 which was the cut-off mean. The implication is that if unemployment, poverty and ignorance continue to exist among people in the study area, then there would be no ending in the insurgents' activities. The study agrees with the finding of Joseph (2015) who reveals that, the current insurgency in Northern Nigeria was caused by the high level of poverty, unemployment and illiteracy prevalent in North-East Nigeria. However, the farmers disagreed that porous border (2.876), ethnicity (2.595) and religious bigotry (2.479)

which were below the threshold of 3. Also, this finding is in consonance with the findings of Kolo (2017) revealed that ethnicity was not the cause of Boko Haram insurgency in the study area.

Table 1: Farmers' perception on the causes of *Boko Haram* insurgency

Perception	Mean	Std. Deviation
Unemployment	4.67	0.4867
Poverty	4.56	0.6310
Ignorance	4.03	1.0160
Porous Border	2.87	0.8997
Ethnicity	2.59	0.9624
Religious bigotry	2.47	0.7648

Impact of *Boko Haram* insurgency on the output, income and level of living of Pearl millet Farmers

Effects of *Boko Haram* insurgent on the levels of farmers output

The result in Table 2 indicates that the most reduced bias among the four matching algorithms was kernel matching algorithms with -7.09 Kg of bias reduction with a t-value of -4.31 which was significant at 1% level of probability. This means that the pearl millet farmers that were not affected by *Boko Haram* Insurgency had -627.29 Kg of output more than the affected pearl millet farmers in the study area. Therefore, based on the above result it was found that the *Boko Haram* insurgents' activities had significant impact on affected pearl millet farmers' output at 1% level of probability in the study area. The implication is that there could be food insecurity which could lead to hunger and disease outbreaks in the study area.

A similar result was found by the National Agricultural Extension and Research Liaison Services (2017) who stated that the decrease in the output of millet crop in 2017 compared with the 5-years average (2012-2016) may be attributed to so many things that have intensified within the last five years including the destabilization and displacement of farmers in the North Eastern Nigeria by *Boko Haram* insurgency.

Table 2: Effects of *Boko Haram* insurgent on the levels of farmers output

Matching Algorithm	Affected farmers	Non-Affected farmers	t-value
Nearest Neighbour	121	48	-2.12**
Radius	121	101	-7.44***
Kernel	121	101	-4.31***
Stratification	121	101	-3.09***

***P≤0.01, **P≤0.05

Impact of *Boko Haram* insurgency on the income of pearl millet farmers

The result in Table 3 reveals that the most reduced bias among the four matching algorithms was the stratification method with ₦ -1284.4 of bias reduction with a t-value

-2.95 which was the significant at 1% level of probability. This means that non-affected pearl millet farmers had ₦ -109000 more than the affected pearl millet farmers. This means that pearl millet farmers not affected by the Insurgency were earning more income ₦ -109000 than affected pearl millet farmers. This could be associated with the increase in output obtained by pearl millet farmers not affected by the Insurgency in the study area. The implication is that, this could lead to a poor level of living among the farmers affected by the insurgency in the study area. Hence, it can be concluded that *Boko Haram* insurgency had a significant impact on the income of the affected pearl millet farmers. This finding corroborates with Onwuaroh (2017) who reported that *Boko Haram* insurgent activities had an impact on income of farmers and was statistically significant at 1% level of probability.

Table 3: Impact of *Boko Haram* on the income of farmers

Matching Algorithm	Affected farmers	Non-Affected farmers	t-value
Nearest Neighbour	121	48	-1.92*
Radius	121	101	-7.41***
Kernel	121	101	-3.81***
Stratification	121	101	-2.95***

***P≤0.01, **P≤0.05

Impact of *Boko Haram* insurgency on level of living of pearl millet farmers
The result in Table 4 reveals that the most reduced bias among the four matching algorithms was the stratification method with ₦ -0.04 of bias reduction with a t-value of 0.23 which was not statistically significant. This means that affected farmers had only ₦ 0.48 as their level of living income compared to non-affected farmers with about ₦ 2.77 as their level of living income. Thus, *Boko Haram* insurgency had significant impact on levels of living of the affected pearl millet farmers in the study area. This result was not in line with Onwuaroh (2017) who reported that the famers level of living given their socioeconomic characteristics was between2009 and 2015 which suggests that insurgency was not statistically significant on farmers' level of living.

Table 4: Impact of *Boko Haram* on the levels of living of farmers

Matching Algorithm	Affected farmers	Non-Affected farmers	t-value
Nearest Neighbour	121	48	1.03
Radius	121	101	-1.51
Kernel	121	101	-0.09
Stratification	121	101	0.23

***P≤0.01, **P≤0.05

Constraints faced by farmers in pearl millet farming.

Constraints of high prices of farm inputs: The result in Table 5 shows that the high price of farm inputs as the major constraint faced by the farmers in the study area. The result reveals majority 61.2% of the affected farmers reported high price of input as the major constraint to pearl millet production in the study area. This could be as a result of *Boko Haram* insurgent attacks which cause farm input scarce owing to the disruption of marketing activities. This implies that prices of pearl millet seeds, herbicides and fertilizer were costly and farm produce was skyrocketed as a result of the high prices of farm inputs. The result was in agreement with the finding of Onwuaroh (2017) who revealed that 50% of the farmers attributed high prices of input scarcity as a major obstacle to farming activities.

Constraints of inadequate access to credit: Table 5 also shows the result of the lack of access to credit by the farmers in the study area. The result reveals that 51.2% of the affected farmers do not have access to credit as a result of the insurgency. Inadequate access to credit could reduce the production of pearl millet in commercial quantities in the study area. This is in line with the finding of Gwary *et al.* (2013) who reported that 46.7% of the respondents reported that inadequate access to credit was the second major constraint in the study area.

Inadequate access to extension services: The result shows that 33.9% of the affected farmers had inadequate access to extension services. This implies that, there will be poor yield which will affect the income and level of living of the affected pearl millet farmers in the study area. This is in agreement to Danwud *et al.* (2017) who reported that the lack of adequate extension service is one of the constraints faced by the farmers in their study area.

Table 5: Constraints experienced by the affected pearl millet farmers

Constraints	Percentage (%)	Rank
High prices of inputs	61.2	1st
Inadequate access to credit	51.2	2nd
Inadequate access to extension services	33.9	3rd
Reduction of farm size	28.9	4th
Shortage of farm labour	24.8	5th
High cost of farm labour	19.0	6th
Lack of market for produce	11.6	7th
High cost of transport	7.4	8th
Inadequate access to improved seeds	5.0	9th

* Multiple responses

Conclusion and Recommendations
Unemployment and poverty were the major causes of *Boko Haram* insurgency in the study area. Also, *Boko Haram* insurgents' activities significantly affected pearl millet farmers' output and income but had no impact on their living level. Some of the

constraints experienced by the respondents were; high prices of inputs, inadequate access to credit, inadequate access to extension services, and reduced of farm size and shortage of farm labour.

Government, the international community, NGOs as well as influential people should intensify efforts in assisting people of the area. This can be achieved through training people in entrepreneurial skill acquisition and giving out soft loans to enable people with good business ideas to start up and build more industries that will help in employing people. Government should identify victims of these attacks and assist them financially and materially. Assisting the people will help arrest different forms of frustration amongst them which, if not, may result on several aggressions which could rebirth other forms of insurgencies in future.

References

Ali, A., Hudu, M. I. and Ojeleye, O. A. (2018). Economics of Millet Production in Funakaye Local Government, Gombe State, Nigeria. *Publication of Nasarawa State University, Keffi,* 14(2): 50-57. www.patnsukjournal.net/currentissue.Retrieved on 27th 4, 2019.

Babagana, M., Ismail M., Mohammed, B. G., Dilala, M. A., Hussaini, I. and Zangoma, I. M. (2018). Impacts of *Boko Haram* Insurgency on Agricultural Activities in Gujba Local Government Area, Yobe State, Nigeria. *International Journal of Contemporary Research and Review,* 9(12): 20268-20282.

Champion, L. and Fuller, D. Q. (2018). New Evidence on the Development of Millet and Rice Economies in the Niger River Basin: Archaeobotanical Results from Benin. In Plants and People in the African Past. Springer, Champ, Pp. 529-547.

Chisi, M. and Peterson, G. (2019). Breeding and Agronomy. In: *Sorghum and Millets.* American Association of Cereal Chemists International Press. Pp. 23-50.

Gichangi, A., Birachi, E., Wambua, S., Kavoi, J., Karanja, D., Muriithi, F. and Mutua, M. (2019). Factors Influencing Smallholder Farmers' Inputs Use in Major Bean Production Corridors in Kenya. *Journal of Agriculture and Food Science.* Volume 17 Number 1, pp 136-147.

Mukhtar, U., Mohammed, Z., Shamsuddin, M. N., Sharifuddin, J. and Muktar, B. G. (2018) .An Assessment of Socio-Economic Determinants of Pearl Millet Production in Northwestern Nigeria: An Ordinary Least Square Analysis. *Asian Journal of Social* Sciences *and Humanities,* 7(1): 48-57.

National Agricultural Extension and Research Liaison Services. (2018). Agricultural Performance Survey Report of 2018 Wet Season in Nigeria, NAERLS, Ahmadu Bello University Zaria Press.

National Population Commission (2019). *Population and Development Review.* 33(1): 206-210.

Tijjani, H., Umar, B. F., Abubakar, B. Z. and Aliyu, U. (2018). Socio-Economic Determinants of Adoption of Improved Millet Production Practices by Farmers in Borno State, Nigeria. *Agrosearch,* 18 (2): 84–98.

Ukwuru, M. U., Muritala, A. and Iheofor, A. O. (2018). "Cereal Utilization in Nigeria". *Research Journal of Food and Nutrition,* 2(3): 01-12.

Walsh, A. (2012). Critical theories: Marxist, conflict, and feminist. In Criminology: *The Essentials. Serial Analysis of Gene Expression,* 93-110.

Zubairu, S. A. (2015). Critical Analysis of *Boko Haram* Insurgency. An unpublished MSc. Thesis presented to the Faculty of the U.S. Army Command and General Staff College University of Abuja, Abuja.