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Assessing the Economic and Social Consequences of Crop Farmer-Herder Conflicts on Crop Production in Benue State

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Abstract

The herder-farmer conflict poses a significant threat to the sustainable food security and livelihoods of smallholder farmers in Nigeria. The study examined the economic and social consequences of farmers-herdsmen conflicts on crop production in Benue State, Nigeria. The findings reveal a widespread incidence of conflict, with 77% of farming households having experienced attacks from herdsmen, and about 34% reporting the loss of lives as a result. Farmers-herder induced conflicts had a significant negative effect on crop yields, with actual output falling short of expected harvest across most crops. Age, farm size, distance to herdsmen's settlements and security posts, household size, and physical injuries are critical factors that influenced farm productivity in the study area. Younger and economically active farmers, larger farm sizes, and proximity to security posts were associated with increased productivity. Conversely, injuries from attacks and proximity to herdsmen's settlements adversely affected farm output. Moreover, the study showed that female farmers, farmers within certain age brackets, and those with farms located far from security infrastructure are more vulnerable to conflict. The study recommends an urgent need for the government to establish more security posts within farming communities, particularly in areas far from current installations, to deter attacks and provide a rapid response to conflict situations. Non-governmental organisations may initiate dialogue platforms between farmers and herdsmen, traditional conflict mediation, and joint land-use agreements to reduce tension and foster coexistence. Given the high level of injuries and fatalities, mental health services, medical support, and rehabilitation programs should be introduced by the government for affected households to restore their well-being and farming capacity.

Keywords: Crop Farmers; Herdsmen; Productivity; Conflict; Tobit Regression

Introduction

Agriculture remains the pillar on which most countries' economies rest. Its contribution to the Gross Domestic Product (GDP) of most developing countries has made it one of the key sectors of their economies, with no exception to Nigeria. The agricultural sector's contributory capacity to the Nigerian economy in recent times is dwindling in terms of GDP and employment, with about 24.4% and less than 40%, respectively as against 63% GDP and over 60% in the 1960s [1,2]. The quest to diversify the country's economy from over-reliance on oil through the agricultural sector and meeting food expectations is gradually becoming a mirage, particularly in the face of several crises such as; banditry, Boko-haram insurgency, unknown gunmen, Fulani herdsmen and crop farmers' clashes among others

[3,4]. Although some of these conflicts are interconnected [5], there have been different opinions and views on the courses of conflicts and this is sometimes influenced by the version to which one listened or the sides of the parties (Crop Farmers or Herdsmen) involved in the clashes to which the narrator is affiliated. This has further complicated the understanding of the root causes and the approaches deployed to farmer-herder's conflict resolution.

Farmer-herder conflict in Nigeria has become a norm and this made it a top story of most Nigerian dailies. It has become a daily occurrence in the south-west, south-east, south-south, north-west and north-central of Nigeria [6]. Most herdsmen are Fulani who rear cattle, goats and sheep majorly as a means of livelihood. This same group has however been marked with terrorism and reported

by the Global Terrorism Index (GTI) as the 4th most dangerous terrorist group globally [7,8]. The level of damage resulting from farmer-herder conflict differs from country to country and state to state but has metamorphosed from just being a conflict into an insurgency in Nigeria and Mali [9,10].

The incidence in the south-south region of Nigeria has resulted in the loss of over 40 million Naira annually [11,12]. About \$12 billion is being lost to farmer-herder conflict in some states in the North-central including Benue State. Benue State has agriculture as its major source of revenue and prides itself as the “Food Basket of the Nation”. About 70% of its working class is in the agricultural sector [13,14]. Notwithstanding this, it is one of the worst-hit states by the herder-farmer conflict in Nigeria. Benue State Emergency Management Agency [15] reported that over the years, billions worth of assets had been destroyed, and many were displaced and now in refugee camps within/outside the state. Explicitly, the socioeconomic effects of herder-farmer conflict with varying degrees and outcomes on herders and crop farmers include; forced displacement of communities, reduction in quality of social relationships, mobility constraints, stigmatisation, marginalisation, death, reduction in yield, loss of properties and infrastructure and migration of labour [16]. The incessant conflicts have also led to the loss of lives and properties (farm and non-farm), the burning of churches, mosques, markets, health facilities, and businesses, and the destruction of agricultural outputs and livestock [17]. The fear of this conflict has made many farmers leave farming for something else [18].

Muhammed et al. found that herders’ search for land and other resources is one of the major causes of farmers’ and herders’ conflict. Also, securing control over grassland has equally generated disagreements between herders and crop farmers, leading to conflicts [19]. The crises have, however, worsened the food insecurity in the country [20]. According to Alabi [21], the instabilities and displacements as a result of conflicts have caused extensive loss of crops, and cattle, and severe threats to farmers’ productivity and their means of survival. Thus, frustrating the source of livelihood for farmers [22,23]. The implication of the conflict on productivity, food security, income, and consumption amongst others has become incontestable but needs more scientific investigations now than ever. And due to the vulnerability of women, children and the aged to disasters both natural and artificial, they are at the receiving end of the conflict.

Aside from the domestic duties being performed by women in Africa, such as water and firewood fetching, cooking etc, they still play a major role in agricultural production from supply of labour to small holdings cultivation, marketing, and processing among others [24]. They have been identified to constitute about 75% of the agricultural workforce [13] and are major stakeholders in the non-oil sector in Nigeria [25]. Despite their roles and contributions of women to the development of agriculture in Nigeria, they have been faced with challenges resulting from conflict which has been affecting their productivity. Governments at various levels,

communities and interest groups are non-relentless at minimizing the menace.

There have been policies and plans directed at mitigating this menace by the government at various levels, institutions, groups and individuals. Amongst these policies was RUGA which was initiated by the current administration to establish cattle colonies across all the states of Nigeria. This was outrightly kicked against by the Governor of Benue State and supported by the Southern Governors because it was viewed as an agenda for Islamisation and Fulanisation. Prior to this, is the traditional method of conflict resolution which has been in place commonly led by the head of the community or clans through hospitality meetings. It was observed to be weak for the current phase and dimensions of the conflicts [26]. There was also an initiation from the National Broadcasting Cooperation (NBC) to maintain and educate a chain of information to the nomads by establishing a nomadic radio. This did not also see the light of the day. Other sponsored but failed bills sent to the House of Assembly were the establishment of the National Grazing Reserves Agency, National Grazing Routes and Reserve Commission and National Grazing Reserve. It has also increased agitations for self-determination in the Southern parts of the country as they have felt neglected and the government’s disposition to this has been viewed to be positive towards the Fulani, especially between 2015 and 2023. These have generated reactions by researchers to investigate more into this problem.

Several works have been done on the effect of crop farmer-herder conflicts in Nigeria [27-33]. Some of these related climate change to conflict and some focused on the socio-economic and political dimension of conflicts among others. Very little attention has been paid to the socio-economic implications of this conflict on crop production from a gender perspective. This paper will be building on the existing scholarly work on herder-farmers conflict, in Nigeria. It will examine the economic and social consequences of crop farmer-herder conflict on crop production in Benue State. Specifically, among the questions this research will address are: what are the factors influencing attacks on crop farmers in the study area? What is the influence of conflict characteristics on crop productivity in the study area?

Examining conflict in the context of MDG and SDG is germane because it has been a big drawback in the conflict-affected areas of the world, especially Nigeria. The conflict has been opined to be one of the major factors causing backwardness in nations, leading to displacement, reduction in Gross Domestic Product (GDP) and even the overall scores of the development goals of the United Nations (UN) [34]. The United Nations Department of Economic and Social Affairs [35] reported that the conflict-related deaths in 2022 increased by 50% and consequently increasing the number of displaced persons. This study will provide researchers, policymakers and all the stakeholders of this conflict with the information needed to make an informed decision that could provide a lasting solution to the menace of the perennial conflict. It will be contributing to the Millennium Development Goal (MDG)

objective 7C1 of ensuring environmental sustainability and target 1 of “integrating the principles of sustainable development into every nation’s policy and programmes and also reverse the depletion of environmental resources”. It was the 7th of the 8 goals of the international development plan to which the countries belonging to the United Nations were committed in the year 2000. It is important to note that, to achieve sustainable development in a country, a more general goal that is the MDG which attempts to address disputes and foster peace and stability, is worthy of consideration. This is built on the premise that “now is a function of then”. This is to corroborate the achievement of the SDG’s goal 16 [35].

Theoretical Framework and Literature Review

Conflict over resources has been explained by researchers using different theories such as frustration-aggression theory, the tragedy of the common, eco-violence theory, resource dependence theory, social identity theory, and conflict theory amongst others. All these theories have elucidated the in-depth rationales behind the conflict of different forms and all agreed that for any conflict, there is the offended and the offender. That conflict results when one feels cheated, extorted, frustrated, boundary crossed or over resources. They agreed that conflict is a product of competition over a common interest. However, for this study conflict theory and social identity theory were employed.

Conflict Theory (Competition over limited land resources)

This theory was propounded by Karl Max who lived between the years 1818 and 1883. He drew this theory from his experience of felt marginalization because of his alienation and revolutionary idea to examine inequality faced under capitalism [36,37]. The argument is that conflict of interest between two opposing parties in a society is obvious. It was later adapted to explain the conflict on land resources which are limited. The land resources include; land, water, crops, grasses, minerals etc. Conflict is known as a fracas between entities. Conflict theory was built on the Malthusian school of thought of a surge in population that will exert pressure on the available resources and also be inadvertently controlled by war, famine, and natural disasters among others. This theory explains the origin of the conflict between herdsmen and farmers in the fight against grazing areas and cropland. It describes the conflict resulting from competition over resources that is, conflict over land either for animal production or crop production. Although, oftentimes, in Nigeria, the conflict mostly arises when the means of livelihood i.e., crops for crop farmers and animals for herders are destroyed. Ekong [38] elaborated the theory on the lenses of one-party exercising pressure over the other to weaken them and take over their resources. Conflict theory is used to validate conflict arising from rivalry over natural resources [39]. The author went further to explain that, whenever there is competition over land resources between the herders and the

farmers, conflict is unavoidable. This is because it usually results in a clash as the victim seeks revenge. The outcome is usually disastrous, marked by the destruction of the means of livelihood, loss of assets, displacements, migration and so on, as each party protects its interest [40].

Social Identity Theory

Social Identity theory, as put forward by Tajfel and Turner [41] has been used to explain the interrelationships between members of an organisation and their behaviours. According to Guan and So [42], the inclination to be part of a social group arises from the security and the companionship that such organisations give and make one behave in some certain way towards the protection of one’s group interests. SIT is built on the premise that common interests and values influence, to a larger extent, the organization to which one belongs and the group within groups to which one associates, that is, ‘We’ versus ‘them’. This is a commonly used theory in Psychology. Contextually, it will help to explain the conflict between crop farmers and herders and the rationale behind protecting the interest of the herders by the Myetti Allah, which is the organisation to which the Fulani herders belong, usually conflicts with the interest of the crop farmers. Farmers are trying to protect their own while the Myetti Allah is doing the same from their side; the outcome is usually a clash, brutality, and damage to resources. Fights over land or animals eating up crop farms are not uncommon in Nigeria.

Methodology

Study area

The study area, which is Benue, is known as the food basket of the nation and is situated in the North-central of Nigeria [43-45]. It lies on the lower river Benue trough in the middle belt region of Nigeria. It is located on the latitude 6° 25’ and 8° 8’ North and longitude 7° 47’ and 10° 0’ East [46-48]. The rainy season in this region lasts from April to October, with annual rainfall in the range of 100-200mm. The dry season begins in November and ends in March. Temperatures fluctuate between 21-37 degrees Celsius in the year (Figure 1). The inhabitants are predominantly smallholder farmers, and they are major producers of arable crops such as yam, rice, beans, cassava, sweet potato, maize, soybean, sorghum, millet, sesame, and cocoyam. The State also boasts of one of the longest stretches of river systems in the country with great potential for the viable fishing industry, dry season farming through irrigation, and an inland water highway [49,50]. The vegetation of the southern parts of the state is characterised by forests, which yield trees for timber and provide a suitable habitat for rare animal types and species.

Data Source/Sampling Techniques

Primary data was used for this study, and the data was collected with the aid of a well-structured questionnaire. Information collected includes demographics of the farmers, farm

characteristics, and conflict issues, among others. A multistage sampling technique was used in selecting the sample for the study. The first stage involved a random selection of three Local Government Areas (LGAs) in the state where farming is the main occupation, and there are frequent clashes between crop farmers and herdsmen. These are Guma, Gwer-East, and Gwer-West LGAs as can be seen in Table 1. In the second stage, purposive and

proportionate selection of 4 villages, 3 villages, and 3 villages from Guma, Gwer-East, and Gwer-West LGAs, respectively. This made a total of 10 villages for the study. Ten (10) villages known for farming and conflicts between farmers and herdsmen were chosen. The third stage involved the random selection of 26 crop farmers from each selected village. This made a total sample size of 260.

Table 1: Sampling selection of respondents.

LGA	No of Villages	No of respondents/village	Total respondent
Guma	4	26	104
Gwer-East	3	26	78
Gwer-West	3	26	78
Total	10	26	260

Source: Field survey, 2019.

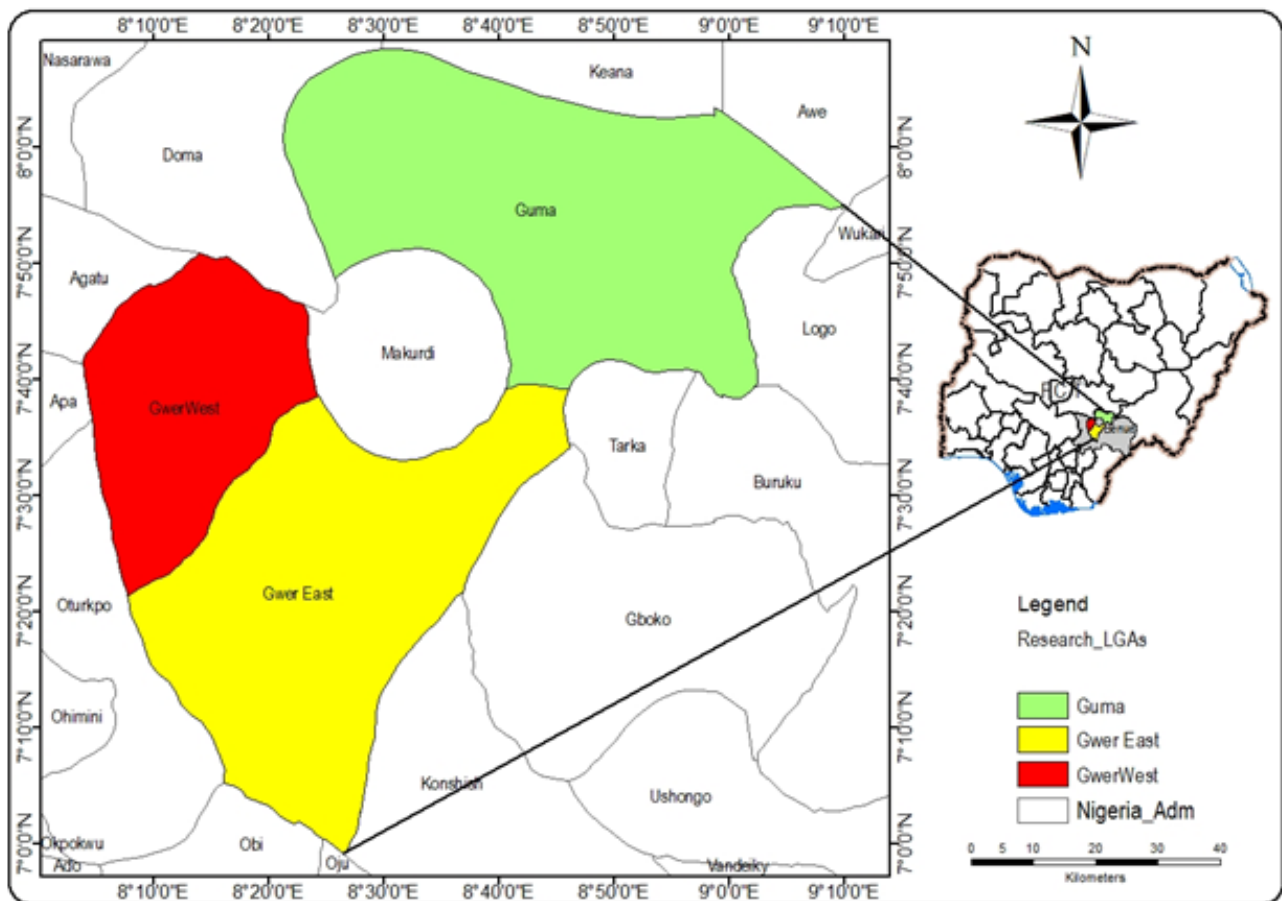


Figure 1: Map of study area (Guma, Gwer East and Gwer West) in Benue State.

Analytical technique

Descriptive statistics

Descriptive statistics (frequency distribution, charts, mean and standard deviation) was used to profile the socioeconomic characteristics of farmers by farmer-herder conflict variables.

Estimation of agricultural productivity

From cost theory, total factor productivity (TFP) is the inverse of average variable cost.

$$AVC = \frac{TVC}{Y} \dots \dots \dots (1)$$

$$TVC = \sum P_i X_i \dots \dots \dots (2)$$

$$TFP = \frac{Y}{TVC} = \frac{1}{AVC} \dots \dots \dots (3)$$

Where:

Y=quantity of output produced (kg)

TVC=Unit price of ith variable input*quantity of ith input used (N)

Logistic regression

Logistic regression was employed to determine the factors influencing conflict in the study area. The model is given as:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \varepsilon_1 \dots \dots \dots (10)$$

Where Y represents conflict status in the last cropping season (affected=1; not affected=0); X_1 represents household size category (number); X_2 represents age category (years); X_3 represents distance from farm settlement (km); X_4 represents distance from security post (km); X_5 represents sex of the respondent (Male=1; Female=0); β represents parameter to be estimated

Tobit regression

Tobit regression was used to determine the influence of conflict characteristics on crop productivity in the study area. This was done by using the model in eq. 2:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \varepsilon_1 \dots \dots \dots (5)$$

Where Y represents total factor productivity index ($0 < Y < 1$); x_1 represents age category (years); x_2 represents farm size (ha); x_3 represents distance to Fulani settlement (km); x_4 represents distance to security post (km); x_5 represents household size category (number); x_6 represents death occurrence (Yes=1; No=0); x_7 represents body injuries (Yes=1; No=0); β represents estimated parameter; ε represents error term.

Results and Discussion

Socioeconomic characteristics of respondents

Table 2 reveals the socioeconomic characteristics of the farmers interviewed. About 70 per cent of the respondents are male. This indicates that farming has male dominance. This could

be associated with the strenuous nature of farming activities. It agrees with the findings of Adeloye et al. [51], Adisa [52] Adisa et al. [53] that most crop farmers in the area were male-dominated. The majority (35.4%) of the farmers have an age range of 48-57 years. This is followed by the 38-47 years age category (34.2%). The average age of the farmers is 48 years. This suggests that they are still economically active but ageing gradually. The age of farmers could reduce their efforts on farms, thereby affecting the quantity and quality of farm produce [54].

Most (80.4%) of the farmers have a family size of 5-8 members. The average household size is about 7 members. This is above the national average household size of about 5 members [55]. The implication is that a relatively large family size means more people to feed and care for, but more available hands to do farm works [56]. More than half (about 55%) of these farmers only attained a primary level of education. Only 1.9 percent of the respondents do not have a formal education. This indicates most of these farmers are educated. This could translate to better decision-making on farming operations and improved productivity [57,58].

More than half (about 56%) of the farmers have 11-20 years of farming experience. The mean farming experience is 20 years. This suggests that they are new to farming activities and could help them with risk management associated with farming [59]. The average farm size cultivated by the farmers is about 2.5 hectares. This indicates that most of these farmers are smallholders with the majority (62.3%) cultivating 2.03-4.05 hectares. This is in line with the findings of [60]. More than half (55%) of the farmers are members of the farmer association. This could aid credit access, the flow of agricultural information, and better performance of agricultural output [61,62]. Almost all (98.1%) farmers got their land ownership through inheritance.

Distribution of farming households by attacks from herdsmen

Figure 2 reveals that most (77%) of these crop farmers have experienced an attack from herdsmen. The implication is that more than half of the crop farmers in the study area have experienced one form of attack or the other from herdsmen. This is in line with the result of Obi-Egbedi et al. and Soomiyol and Fadaio [63] that the majority of the crop farmers had experienced conflict with herdsmen.

Death Experience from herdsmen

Table 3 shows the causes of death in the face of attacks from herdsmen. It revealed that about 34% of the crop farmers had witnessed the death of one or more persons resulting from herdsmen's attack. This implies that about 1 in 3 farmers has experienced death. This could have a devastating effect on food production as many families are losing their breadwinners to death which could scare people away from farming and even pull them into poverty. This conforms with Adisa and Adekunle [64], Jacob and Tanko [65], Kasarachi [66], Musa et al. [67], Okwori and Gbough [68] that some people had witnessed a reasonable portion of the households had experienced conflict caused by herdsmen.

Table 2: Distributions of the socioeconomics of crop farmers.

Variables	Frequency	Percentage
Sex of respondent		
Male	182	70.1
Female	78	29.9
Total	260	100
Age of crop farmers (years)		
18-27	3	1.2
28-37	37	14.2
38-47	89	34.2
48-57	92	35.4
58-67	34	13.1
68-77	4	1.5
>77	1	0.38
Total	260	100
Mean =48; std=10		
Household size		
≤4	18	6.98
8-May	209	80.38
12-Sep	31	12
>12	1	0.64
Total	260	100
Mean=6.7; std=1.8		
Class of education of crop farmers		
No formal education	5	1.9
Primary	143	54.8
Secondary	73	28
OND/NCE	34	13
HND/BSc	5	1.9
Total	260	100
Farming experience (years)		
≤10	26	10
20-Nov	145	55.7
21-30	57	21.9
31-40	29	11.2
>40	3	1.2
Total	260	100
Mean=20.1; std=1.0		
Farm size (ha)		
0.41-1.62	82	31.5
2.03-4.05	162	62.3
4.06-6.50	16	6.2
Total	260	100

Mean=2.47; std=1.0		
Association membership		
Member	143	55
Non-member	117	45
Total	260	100
Land ownership		
Inheritance	258	98.1
Leased/Rent	2	1.9
Total	260	100

Source: Field Survey, 2019.

Table 3: Distribution of crop farmers by cases of death from herdsmen attack.

Death cases	Frequency	Percentage
Households with death cases	88	33.8
Households without death case	172	66.2
Total	260	100

Source: Field survey (2019)

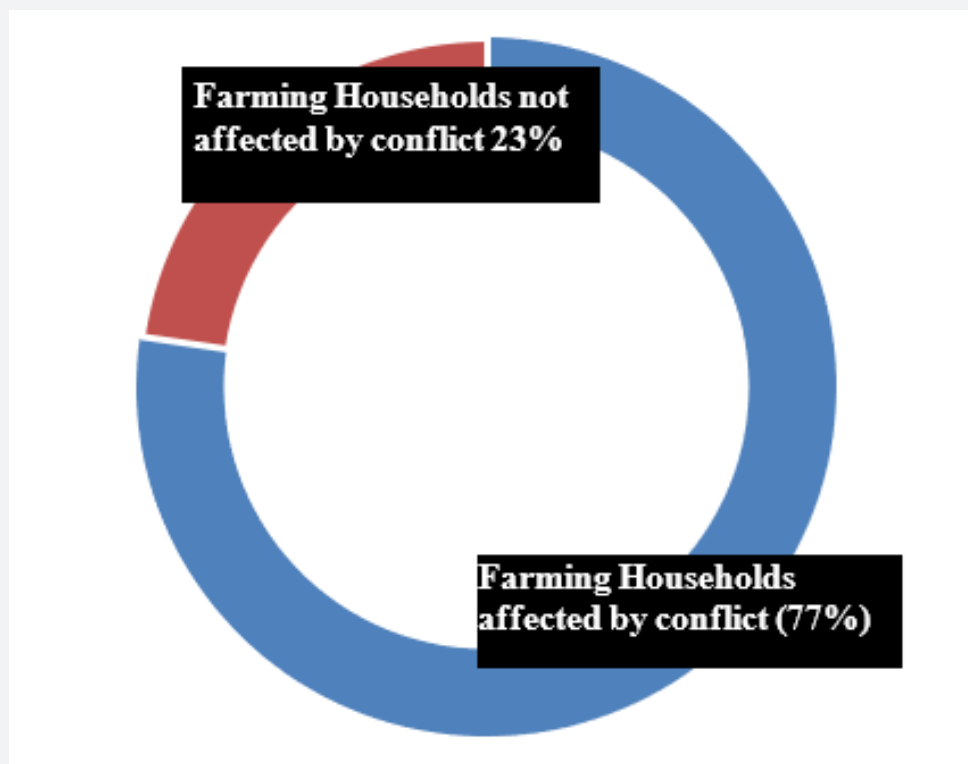


Figure 2: Distribution of farmers affected by conflicts.

Attack on family members

Table 4 shows that children (59.3%) are the most affected family members of crop farmers. This is followed by mothers (24%). This indicates that children and women are the most

vulnerable to herdsmen attacks in the area. This study is in agreement with the findings of Karareba et al. [69], Uroko [70], Vanger and CAMPUS [71] that the majority of people who were murdered were women and children in herdsmen conflict with crop farmers.

Table 4: Distribution of Household member affected by attacks.

Family members	Frequency	Percentage
Father	44	16.7
Mother	62	24
Children	154	59.3
Total	260	100

Source: Field survey (2019)

Comparison of the expected and actual output of selected crops

Results in Table 5 show that the average harvested yield was significantly lower than the expected yield across all the selected crops. Only the flax crop did not show any statistically significant difference between the expected and average harvested yields.

The implication of this is that conflict has a significant negative effect on the yields of the crops of affected farmers. This is consistent with the many findings Adelaja and George [72], Bello [73], Chandra et al. [74], Clausen et al. [75], Sillero-Zubiri and Switzer [76]) that conflict has a significant negative impact on the yield of farmers.

Table 5: Equality Test of Crop Outputs as a Result of Conflicts.

Crops	Expected mean (kg)	Harvested mean (kg)	p-value
Maize	279.15	164	0.014**
Beans	451.65	270.91	0.004***
Guinea corn	219.56	126.99	0.002***
Flax	68.84	43.22	0.175
Yam	427.74	50.4	0.080*

Note: *, **, *** represent 10% and 5%, 1% level of significance, respectively.

Table 6: Distribution of respondents by productivity.

Productivity	Frequency	Percentage
≤2.0	51	19.62
2.1-4.0	180	69.22
>4.0	29	11.16
Total	260	100
Mean =2.9; std =0.1		

Source: Authors' computation (2019)

Estimation of agricultural productivity

Results in Table 7 reveal that most (69.2%) of the farmers have

a level of productivity range of 2.1-4.0. The mean productivity is about 3.0. This indicates that most of the farmers are productive.

Table 7: Tobit regression result.

Productivity	Coefficient	Standard error
Age category (18-27)	-1.077*	0.614
Age category (28-37)	-0.049	0.249
Age category (38-47)	-0.371*	0.211
Age category (48-57)	-0.107	0.209
Age category (68-77)	-0.515	0.544
Age more than 77	0.8816	1.036
Farm size (ha)	0.258***	0.066
Distance to Fulani settlement (1-5) km	-0.407	0.299

Distance to Fulani settlement (6-10) km	-0.395*	0.219
Distance to security post (1-5) km	-0.083	0.188
Distance to security post (11-15) km	0.566***	0.194
Household size (1-4)	-0.457*	0.264
Household size (5-8)	-0.458*	1.019
Death (yes)	-0.155	0.139
Body injuries (yes)	-0.245*	0.131
Prob>chi2 = 0.0058		
Log likelihood = 368.0106		

Note: *, **, and *** represent 10%, 5%, and 1%, respectively.

Source: Authors' computation (2019)

Determinants of farmers' productivity

Table 7 shows the results obtained from the Tobit regression model for the factors influencing the productivity of farming households in the area. The diagnostic result shows that the model is statistically significant ($p < 0.01$). This implies that the included explanatory variables in the model well explained the dependent variable. Out of the fifteen independent variables included, eight were statistically significant at various levels. The younger age category of 18-27 years increased agricultural productivity. Farmers' age in the category of 38-47 had a positive influence on productivity. This suggests that age categories which are still economically active contributed positively to agricultural productivity in the study area. This is in line with the findings of Westelius and Liu [77], Van Ours and Stoeldraijer [78] that the younger the age of a farmer, the higher the productivity.

The coefficient of farm size was significant and positively related to farm productivity. This implies that an additional increase in the hectares of farm size leads to a 0.26 increase in productivity. This could be associated with the advantage of large-scale production. This aligns with the findings of Yee et al. (2004); Savastano and Scandizzo [79]; Sheng et al. (2019) that, an increase in farm size also has a consequential increase in agricultural productivity. However, Ansoms et al. (2008); Thapa [80]; Holden and Fisher [81] reported an inverse relationship between farm size and productivity. This was attributed to the proper monitoring of the use of farm inputs (including labour) by the smallholder farmers when compared to the large farms.

The distance of the farm site (6-10km) to the herdsmen's settlement was negatively related to farm productivity. This could mean that herdsmen destroy farm products close to their settlements. However, those whose farm site's distance is 11-15km from security posts have increased productivity. Farmers with 1-4 household size had decreased productivity whereas those whose family members were 5-8 had increased productivity. This may be attributed to the fact that larger families (5-8 members) had more hands to carry out farm work. This agrees with the findings

of Holden and Fisher [81]; and Thapa [80] that family size has a positive relationship with productivity. Farmers with body injuries had farm productivity reduced by 0.24. This was because injured farmers would not be able to go to farms thereby affecting productivity. This agrees with the findings of Coury et al. (1999); Rushen et al. (2008) that injuries could result in musculoskeletal disorders result which could have a serious influence on the farmer's productivity.

The distance of the farm site (6-10km) to the herdsmen's settlement is negatively related to farm productivity. This could mean that herdsmen destroy yields of farms whose distance is far from their settlements. However, those whose farm site's distance is 11-15km from security posts have increased productivity. Farmers whose household size is 1-4 family members have decreased productivity whereas those whose family members are 5-8 increased productivity. This is likely because those with larger families (5-8 members) have more hands to do their farm work. Thus, helping their productivity. This concurs with the findings of Holden and Fisher [81]; Thapa [80] that family size has a positive relationship with productivity i.e. the more members a family has, the higher the productivity. This they observed could be a result of more use of family labour in the farm. Farmers who sustained body injuries have their farm productivity reduced by 0.24. This is because injured farmers will not be able to go to farms thereby affecting productivity. This agrees with the findings of Coury et al. (1999); Rushen et al. (2008) that injuries could result in musculoskeletal disorders result which could have a serious influence on the farmer's productivity.

Determinants of conflicts between crop farmers and herdsmen

Table 8 shows the factors influencing conflicts between crop farmers and herdsmen in the study area using logistic regression. The model is statistically significant ($p < 0.01$). This indicates that the explanatory variables explained the variations in the dependent variable. Crop farmers with the age category of 38-47 years were more likely to experience conflicts with herdsmen.

This is because they are economically active, productive and has physical strength to face any challenges that might come their way. This disagrees with the findings of De-Graft [82]; and Adisa and Adekunle [64] that as the farmer gets older, the likelihood of being attack increases. Moreover, crop farmers within a distance of 1-5km from Fulani settlement had a reduced likelihood of conflict with the herdsmen. This is because the close distance in settlements could be linked to facial identity. This is in line with Adelaja and George [72], that the intensity of conflicts increases as

the distance between farms and security posts increases. Hence, herdsmen would prefer farms with far distance. Crop farmers whose farm sites are far away (11-15km) from security posts are less likely to experience conflicts with herdsmen. Finally, crop farmers who are women were more likely to experience conflicts with herdsmen. This is because they were more vulnerable to attacks such as rape than their male counterpart in the area. This is in consonance with the findings of Mbah et al. (2021), that women and children are more vulnerable to conflict.

Table 8: Logistic regression results.

Conflict	Coefficient	P>/Z/
Household size (1-4)	-0.532	0.158
Household size (5-8)	-0.433	0.613
Age category (18-27)	-1.46	0.139
Age category (28-37)	-1.249	0.139
Age category (38-47)	0.000*	0.065
Age category (48-57)	-1.664**	0.021
Age category (58-67)	-0.442	0.612
Distance from herdsmen settlement (1-5)	-1.652**	0.02
Distance from herdsmen settlement (6-10)	0.257	0.542
Distance from security (1-5)	-0.432	0.414
Distance from security post (11-15)	-1.523**	0.024
Sex of farmer	-1.172**	0.073
No of obs =260		
LR Chi2 (10) =13.75		
Prob>chi2 =0.002855		
Pseudo R ² = 0.0545		
Log likelihood = 125.84		

Note: *, ** represent 10% and 5%, respectively.

Source: Authors' computation (2019)

Conclusion and Recommendations

This study investigated the economic and social consequences of crop farmer-herder conflicts on crop production in Benue State. The findings reveal a widespread incidence of conflict, with more than half of farming households having experienced attacks from herdsmen, and less than half of the farming households reported loss of lives. These tragic experiences did not only inflicted emotional trauma but also threatened the survival and sustainability of farming households, reducing their willingness and ability to engage in agricultural production. The analysis further shows that herder-induced conflicts had a negative effect on crop yields, with actual output falling short of expected harvest across most crops. The implications of these yield losses are severe, as they threaten household food security and local economies dependent on agriculture. Age, farm size, distance to herders'

settlements and security posts, household size, and physical injuries were critical factors that influenced farm productivity in the study area. Younger and economically active farmers, larger farm sizes, and proximity to security posts were associated with increased productivity.

Conversely, injuries from attacks and proximity to herdsmen's settlements adversely affected farm output. Moreover, the study showed that female farmers, farmers within certain age brackets, and those with farms located far from security infrastructure are more vulnerable to conflict, highlighting gender and spatial dimensions to farmer-herder clashes. Overall, the study underscores the multifaceted impacts of conflict on rural livelihoods-ranging from physical harm to reduced productivity and long-term food insecurity. The study recommends an urgent need for the government to establish more security posts within

farming communities, particularly in areas far from current installations, to deter attacks and provide rapid response to conflict situations. Non-governmental organisations may initiate dialogue platforms between farmers and herders, traditional conflict mediation, and joint land-use agreements to reduce tension and foster coexistence. Given the high level of injuries and fatalities, mental health services, medical support, and rehabilitation programs should be introduced by the government for affected households to restore their well-being and farming capacity.

Implications of the study

The findings of this study carry significant implications for agricultural policy, rural development, food security, and conflict management in Nigeria, particularly in Benue State—a region known as the “food basket” of the nation. The consistent reduction in actual crop yields due to herder-farmer conflicts highlights a direct threat to food availability at both local and national levels. This exacerbates hunger, malnutrition, and rising food prices, undermining efforts toward achieving Sustainable Development Goal 2 (Zero Hunger). With over three-quarters of farmers experiencing attacks, the agricultural sector is facing productivity shocks, loss of human capital (deaths and injuries), and reduced investment in farming activities. These conflicts threaten to stifle rural economic growth and discourage younger generations from pursuing farming. The higher likelihood of female farmers experiencing conflict points to systemic vulnerabilities and gender-based risks. This may result in a further marginalisation of women in agriculture, reduce their income-earning potential, and deepen gender inequality. Deaths, injuries, and destruction of crops increase household vulnerability to poverty. Many affected households may abandon farming altogether, leading to increased rural-urban migration, with long-term socio-economic implications for both rural and urban centres.

Conflict of interest

There is no conflict of interest among the authors.

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