



## ECONOMIC IMPLICATIONS OF PASTORALISTS -FARMERS' CONFLICTS ON AGROFORESTRY FARMING IN NORTH CENTRAL NIGERIA

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### ABSTRACT

*This study examines the escalating conflict between the farmers and the pastoralists in the North Central region of Nigeria. The conflicts have reached an alarming rate in recent times as examined. It has not only led to social disorder but has also left an unfortunate indelible mark on the agroforestry farmers in terms of their productivity. The study examines the pastoralists-farmers' conflicts in north central Nigeria with regard to the economic implication the conflicts specifically have on the agroforestry farmers as well as their productivity in general. North Central Nigeria was purposely selected for the study because of the severity of the prevailing conflicts between the farmers and the pastoralists (Abugu and Onuba, 2015). Out of the six states that make up the North Central in Nigeria, three (3) states: Benue, Nasarawa and Plateau states were purposely chosen being the most affected states (Abugu et. al., 2015). One hundred and eighty (180) questionnaires were prepared and administered to the selected agroforestry farmers within the region. The questionnaires solicited for the following information: demographic characteristics of the respondents, causes of farmer- pastoralist conflicts, economic implication of farmer- pastoralist conflicts, frequency of conflict, among others.*

**Keywords:** Economic Implication, Pastoralist, Farmers, Conflict

### INTRODUCTION

Conflicts between farmers and nomadic cattle herders have become a common feature of economic livelihood in West Africa. In recent times, Nigeria has witnessed series of violent clashes arising from the activities of the farmers and nomadic herdsmen, who move about on a daily basis with their cattle in search of water and green pastures the heat generated from these activities has culminated in economic disadvantage to the middle belt and southerners from financial, social and economic point of view. Between 2005 and 2010, about 280 death cases were recorded; 7,000 hectares of farms were destroyed and 7,000 communities were deserted. Moreover, post-conflict economic renders women and girls even more vulnerable to economic predation (International Crises Group, 2017). In Nigeria and the sub-Sahara Africa in general. In Nigeria, between 2005 and 2010, about 280 death cases were recorded; 7,000 hectares of

farms were destroyed, 1300 cattle were lost and 7,000 communities were deserted. In Shaki, Oke-Ogun area of Oyo State and Kwara State, the clashes between pastoralist and farmers decimated a lot of lives which resulted in the vacation of some settlements and destruction of crop farms which were essentially the source of income for the victims. Conflicts and violent clashes between farmers and pastoralists have been a common feature of economic livelihood in West Africa (Tonah, 2006).

Moreover, Okeke (2014) opined that damages frequently done to farmers during conflicts range from overgrazing and unsustainable land for farming, loss of fertile lands, destruction of crops, loss of yields, hardening of soils resulting in increased labour in pre-farming activities, fights, rape, burning of rangelands, destruction of irrigational facilities to infrastructural damages. The

herdsmen and farmers' clashes disrupt and threaten the sustainability of pastoral farming and crop production in West Africa (Moritz, 2010). These clashes reinforce circles of extreme poverty and hunger, and destroy social status, food security and affect mostly the most marginalized groups that include women and children of a teeming population like Nigeria. The conflicts between pastoralists and agroforestry farmers in Nigeria, especially in the North central, usually leads to huge losses in terms of human, agricultural and material resources (Ofuoku and Isife, 2009 Adekunle and Adisa 2010; Blench 2010; Odoh and Chigozie 2012; Solagberu 2012; Audu 2013, 2014; Bello 2013; McGregor 2014). Focus on examining the effect of pastoralist activities on the productivity of agroforestry farmers would be of good advantage in examining the aftermath of nomadic activities on arable crop farms financially, socially and economically and more so, it would be a viable tool in policy making towards food security among farm households. The main objective of the paper is to examine the effect of pastoralist-farmers' conflict on the productivity of agroforestry farmers in North central, Nigeria.

In recent times, the issue of violent clashes and instability between farmers and pastoralist across the regions in Nigeria has become a major concern to the Nigerian Government, International and National or indigenous development organizations. This to a large extent, if not nipped in the bud, may affect the achievement of Sustainable Development Goal 2 which aims at ending hunger, achieving food security and improving nutrition and promoting sustainable agriculture by 2030.

The clashes, instead of abating have been on the increase exponentially to the dismay of helpless Nigerians. The world's population is growing at a very rapid rate and will lead to a growth in the demand for food. This would constitute the single most important cause of pressure on food resources. Therefore, for Nigeria to transform as one of the 20 leading economies in the world by 2020, considering the present population of over 170 million and estimated population of about 397 million at the current rate of growth in 2050, an agricultural revolution should be the catalyst to its industrialization. The massive destruction of crops

will likely have adverse effect on farmers' income and economy.

As a result of the spate of violent clashes between pastoralists and agroforestry farmers in Nigeria particularly in the North-Central region, adequate social research attention should be given to the economic implications of these clashes considering the tremendous population increase. It is against this background that this study attempts to examine the economic consequence of pastoralists and farmers clashes on agroforestry farmers and their productivity in the North-Central region of Nigeria. Therefore, the aims of study were to identify the causes of pastoralists-farmers' conflicts, examine the frequency occurrence of pastoralists-farmers' conflicts, investigate the implication of pastoralists-farmers' conflicts on farmers' productivity and ascertain the implication of pastoralists-farmers' conflicts on farmers' income.

## MATERIALS AND METHODS

The study area for this research is North central Nigeria. North Central is one of the six geo-political zones of Nigeria. It falls within Latitude  $10^{\circ}20'N$  and Longitude  $7^{\circ}45'E$  (National Geo-Spatial Intelligence Agency). The zone consists of the seven states namely: Benue, Kogi, Kwara, Nasarawa, Niger, Plateau states and Abuja which is the Federal Capital Territory. It is situated geographically in the middle belt region of the country, spanning from the west, around the confluence of the River Niger and the River Benue. The region is a home to many historical and colonial relics. It is also rich in natural land features, and has some of Nigeria's most exciting scenery. Some of the ethnic groups in the region are the Igala, Tiv, Idoma, Nupe, Bassa, Birom, Ankwei, Angas, Lang-tang, Ebira, Okun etc. Minerals such as iron ore, coal and tin are domiciled in this area. The inhabitants of this region are mostly farmers and the crops generally identified with this region are grains such as maize, millet, guinea corn, rice, cowpea, soya beans. Tree crops such as cashew, oranges, locust beans and shea butter trees among others are mostly planted in the region.

The study area for this research is North central Nigeria. North central Nigeria was purposely selected for the study because it was reported to be

the most affected region of Nigeria, as far as farmer-pastoralist conflicts are concerned (Abugu and Onuba, 2015). Out of the seven North central states of Nigeria, 3 states were reported to be most affected in the region. They are: Benue, Nasarawa and Plateau states. Therefore, these states were selected for the study. The local governments that were most affected by farmer-pastoralist conflicts were purposely selected from each state. From Benue state, Agatu, Guma, Makurdi and Gwer - west local governments were purposely selected. 15 agroforestry farmers were randomly selected from each of the local governments making a total of 60 agroforestry farmers.

Likewise, from Nasarawa state the local governments purposely selected include: Akwanga, Awe, Obi and Ikeana. Ten (10) agroforestry farmers were randomly selected from each of these local governments making a total of 40 agroforestry farmers. Plateau state being the most affected state in the region as opined by Abugu et. al, (2015). Bassa, Barkin-Ladi, Riyom and Jos South local governments were purposely selected for the study and twenty (20) agroforestry farmers were randomly selected from each of these local governments making a total of 80 respondents for Plateau state. The summation of selected agroforestry farmers within the zone is one hundred and eighty respondents. Well structure questionnaire was prepared and administered to the respondents. The questionnaires solicited for the following information: demographic characteristics of the respondents, causes of farmer- pastoralist conflicts, economic effect of farmer- pastoralist conflicts, method of conflict resolutions, among others.

## RESULTS

Table 1 present the socio-demographic characteristics of the respondents. Age 21-30 category was the largest (28.3%) in Benue state while 71-80 years has the lowest (5.0%) In Plateau, both age 31-40 and 51-60 category have the highest respondents (27.5%) while age 21-69 has the lowest of 1.3%. In Nasarawa state, age category 31-40 has the highest (45%) of respondents and the least is 61-70 age category with as low as 2.5%. A larger population of the respondents in the three states is male, 78.3% male farmers in Benue, 71.3% in

Plateau and 80% in Nasarawa. Considering the marital status of the respondents, it was observed that plateau has the highest number of married respondents (82,5%) while Nasarawa followed with 65% and Benue with the least of 55.5%. However, all the three states have more married respondents than singles and widowers. The number of widowers in Benue and singles are both 16.7%. In Plateau, single and widow respondents are 3.8% and 10% respectively while in Nasarawa, single and widow respondents are 17.5% and 12.5% respectively. Majority of the respondents in Benue have secondary educational qualification of 40% and the least 16.7% are illiterate. 30.3% of the respondents in Plateau state also have secondary educational qualification, while 12.5% are illiterates. 35% of the respondents in Nasarawa have secondary educational qualification while just 7.5 have no formal education. Nasarawa state has the highest number (32.5%) of respondents with tertiary education than the other two states.

The highest household size in Plateau and Nasarawa among the respondents is 6-8 people category with 47.5% and 62.5% respectively, while the highest household size among Benue respondents is the 9-11 category with 26%. The least household size across the three states is more than 18people categories (8.3% for Benue, 1.3% for Nasarawa and 0% for Plateau). Table1 reveals that the respondents from the three states are predominantly Christians, 90% from Plateau, 88.3% from Benue and 65% from Nasarawa. Islam and traditional religion make up the remaining few percent.

The result on table 1 reveals that the majority of the respondents are farmers, 63.3%, 66.3% and 77.5% in Benue, Plateau and Nasarawa respectively. This result supports the findings of Ijirshar, Ker. and Terlumun (2015) that Benue, Plateau and Nasarawa State are predominantly agrarian communities and thus, agriculture is perhaps, the oldest occupation of the people of the state.

As per belonging to farmers' association, 50% respondents belong to association in Benue while the remaining 50% do not belong. 55% respondents belong to association in Plateau while the remaining 45% do not belong. In Nasarawa, 70% belong to association while 30% do not.

**Table 1: Socio-Economic characteristics of respondents**

Variables	Benue		Plateau		Nasarawa		Total		Mode
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
<b>Age</b>									
21-30	17	28.3	1	1.3	7	17.5	25	13.9	
31-40	12	20.0	22	27.5	18	45.0	52	28.9	
41-50	12	20.0	26	32.5	7	17.5	47	26.1	<b>31-40</b>
51-60	10	16.7	22	27.5	7	17.5	39	21.7	
61-70	6	10.0	9	11.3	1	2.5	14	7.8	
71-80	3	5.0	-	-	-	-	3	1.7	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Sex</b>									
Male	47	78.3	57	71.3	32	80	136	75.6	<b>Male</b>
Female	13	21.7	23	28.7	8	20	44	24.4	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Marital Status</b>									
Single	10	16.7	3	3.8	7	17.5	20	11.2	
Married	33	55.0	66	82.5	26	65.0	125	69.8	
Widow	10	16.7	8	10.0	5	12.5	23	12.8	<b>Married</b>
Separated	5	8.3	3	3.8	2	5.0	10	4.6	
Divorced	2	3.4	-	-	-	-	2	1.6	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Educational Status</b>									
Illiterate	10	16.7	10	12.5	3	7.5	23	12.2	
Primary	14	23.3	20	25.0	10	25.0	44	25.0	
Secondary	24	40.0	29	36.3	14	35.0	67	37.2	<b>Secondary</b>
Tertiary	12	20.0	21	26.3	13	32.5	46	25.6	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Household Size</b>									
1-5	18	30.0	29	36.3	6	15.0	53	29.4	
6-8	15	25.0	38	47.5	25	62.5	78	43.3	
9-11	16	26.7	8	10.0	7	17.5	31	17.2	<b>6-8</b>
12-18	6	10.0	4	5.0	2	5.0	12	6.7	
>19	5	8.3	1	1.3	-	-	6	3.4	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Religion</b>									
Christian	53	88.3	72	90	26	65.0	151	89.3	
Islam	6	10	7	8.8	9	22.0	22	12.2	<b>Christian</b>
Traditional	-	-	1	1.3	4	10.0	5	2.8	
Free thinker	1	1.7	-	-	1	2.5	2	1.1	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Occupation</b>									
Farming	38	63.3	53	66.3	31	77.5	122	67.8	
Civil Service	6	10.0	14	17.5	3	7.5	23	12.8	
Private	9	15.0	2	2.5	1	2.5	12	6.7	
Sole proprietor	1	1.7	2	2.5	1	2.5	4	2.2	<b>Farming</b>
Schooling	3	5.0	3	3.8	3	7.5	9	5.0	
Others	3	5.0	6	7.5	1	2.5	10	5.6	
Sub Total	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Do you belong to Association?</b>									
Yes	30	50	44	55	28	70	102	56.7	<b>Yes</b>
No	30	50	36	45	12	30	78	43.3	
Sub Total	<b>100</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	

Table 2 presents the farm characteristics of the respondents. The major farm size classification in two states is 6-10 acres with 38.3% and 45.0% from

Benue and Nasarawa respectively. However, 1-5 acre is the highest category of farm size in Plateau, as indicated by 46.3% of the respondents. For

respondents who planted on 11-15 acres, Benue has the highest which is 25%. For 16-20 acres, Nasarawa has the highest with 7.5%. In all for farmers using more than 20 acres, Benue led with 3.3%. 100% of Benue respondents are melon farmers, 70% maize, 60% cassava and 13.3% cow pea farmers. Majority of the respondents of Plateau are maize farmers (80%), 48.8%, cowpea farmers, 38% melon, 30% cassava, 17.5% Irish potatoes and few others involved in planting spices and vegetables. 100% respondents in Nasarawa are vegetable farmers, 50% melon and cowpea, 47.5%

maize farmers, 32.5% cassava, 52.5% are rice and sorghum farmers while 2.5% are involved in planting spices. 30% of Benue respondents planted cashew trees, 28.3%, mango and 25% planted citrus. Majority of the respondents in Plateau practice agroforestry with citrus trees, followed by 37.5% using mango tree. There are few that planted teak and gmelina with about 2.5% jatropha tree agroforestry farmers. In Nasarawa, majority of the respondents (45%) planted gmelina, 15% jatropha agroforestry farmers, with the least (2.5%) using cashew tree for agroforestry.

**Table 2: Respondents' Farm Characteristics**

Variables	Benue		Plateau		Nasarawa		Total		Mode
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
<b>Farm Size (acres)</b>									
1-5	17	28.3	37	46.3	10	25.0	64	35.6	
6-10	23	38.3	31	38.8	18	45.0	72	40.0	
11-15	15	25.0	9	11.3	9	22.5	33	18.3	<b>6-10</b>
16-20	3	5.0	2	2.5	3	7.5	8	4.4	
>20	2	3.3	1	1.3	-	-	3	1.7	
<b>Sub Total</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Crop Types</b>									
Maize	42	70.0	65	80	19	47.5			
Cassava	36	60.0	24	30	13	32.5			
Melon	60	100	3	3.8	20	50			
Cow pea	8	13.3	39	48.8	20	50			
Vegetables	-	-	12	15	40	100			
Pepper	-	-	9	11.3	1	2.5			
Tomatoes	-	-	10	11.3	-	-			
Onions	-	-	3	3.8	-	-			
Others	-	-	14	17.5	21	52.5			
<b>Tree Species</b>									
Citrus	15	25	37	46.3	4	10			
Cashew	18	30	10	12.5	1	2.5			
Mango	17	28.3	30	37.5	14	35			
Teaks	-	-	4	5.0	4	10			
Gmelina	-	-	3	3.8	18	45.0			
Jathropha	-	-	2	2.5	6	15.0			
Others	-	-	9	11.3	7	17.5			

Table 3 presents the causes of the conflicts, the ones identified in the study area are crop damage (59.15), low level of compliance to stock route (47.8%), farm fragmentation (41.2%), ethnic rivalry (49.85), depleting soil fertility (42.8%), indiscriminate bush burning (45.35%), little or no respect for traditional

rulers (49.20%), stealing of crops (49.10%), farm encroachment (40.9%), low awareness of stock route (42.25%), deliberate hostility by pastoralists (54.65%), declining influence of traditional rulers (52.0%) and low/ poor government intervention (52.25%).

**Table 3: Distribution on Causes of Conflict**

Variables	No Contribution	Low Contribution	Moderate Contribution	High Contribution	Weighted score
Crop damage.	9 (5.0)	20 (11.1)	47 (26.1)	104 (57.8)	59.15
Low level compliance to stock route.	39 (21.7)	37 (20.6)	47 (26.1)	57 (31.7)	47.8
Farm fragmentation.	43 (23.9)	62 (34.5)	51 (28.3)	24 (13.3)	41.2
Ethnic rivalry.	25 (13.9)	46 (25.6)	48 (26.7)	61 (34.5)	49.85
Depleting soil fertility.	54 (30.3)	37 (20.8)	50 (28.1)	37 (20.8)	42.8
Indiscriminate bush burning.	42 (23.6)	43 (23.9)	45 (25.3)	48 (27.0)	45.35
Little or no respect for traditional rulers.	45 (25.1)	36 (19.6)	29 (16.2)	70 (39.1)	49.2
Stealing of crops.	43 (24.0)	21 (11.7)	53 (29.1)	63 (35.2)	49.1
Farm encroachment.	40 (22.3)	39 (21.8)	62 (34.6)	29 (15.6)	40.9
Low awareness of stock route.	50 (27.9)	39 (21.8)	63 (34.6)	28 (15.6)	42.25
Deliberate hostility by pastoralists.	20 (11.2)	25 (14.0)	49 (27.5)	86 (47.2)	54.65
Declining influence of traditional rulers.	54 (30.2)	22 (12.3)	48 (26.8)	55 (30.7)	52.0
<b>Low/poor government intervention.</b>	21 (11.7)	26 (14.6)	62 (34.4)	71 (39.9)	52.25

Table 4 revealed that Benue state has the highest percentage of the size of destroyed or affected farmland which is 15% and Nasarawa has the least which is 2.5%. The result established Benue state as the state most affected by the conflict in terms of farm land. In terms of loses in monetary terms, the result from the table 3 reveals that the respondents from Nasarawa have the least amount of monetary

loses, 100% of them lost less than N500,000, while Plateau state has the highest amount of loses in monetary terms which is between 2,000,000 and 2,500,000 (2.6%). However, we have the largest percentage of monetary loses, between 500,000-2,000,000 in Benue state which in totality is 76.7% in comparison to a total of 17.6% in Plateau state.

**Table 4: Loses of Agroforestry Farmers as a result of the Conflict**

Variables	Benue		Plateau		Nasarawa		Total		Mode
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
<b>Size of Farmland Destroyed (acres)</b>									
<1	8	13.3	25	31.3	13	32.5	46	25.6	
1-3	15	25.0	27	33.8	18	45.0	60	33.5	
4-6	19	31.7	16	8.8	7	17.5	42	23.5	<1
7-9	8	13.3	7	8.8	1	2.5	16	9.0	
>10	9	15.0	5	6.3	1	2.5	15	8.4	
<b>Sub Total</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	
<b>Amount of Loss (Naira)</b>									
<500000	13	21.7	64	80	40	100	117	65	
500000-1000000	37	61.7	11	13.8	-	-	48	26.7	
>1000000-1500000	5	8.3	2	2.5	-	-	7	3.7	<500000
>1500000-2000000	4	6.7	1	1.3	-	-	5	2.8	
>2000000-2500000	1	1.7	2	2.6	-	-	3	1.7	
<b>Sub Total</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>180</b>	<b>100</b>	

Table 5 summarizes the findings of the economic effects of conflict on the respondents. Factors such as reduction in farm output, loss of properties, reduction in income, inability to service loan, loss of produce in storage, loss of farm lands, scarcity of food items, destruction of soil nutrients due to inferno, destruction of farm produce and reduction

in manpower. According to the result of the findings, the effect is felt in the following order reduction in farm output (62.75%), reduction in income (61.15%), scarcity of food items (60.80%), destruction of farm produce (60.65%) and loss of properties (59.7%).

**Table 5: Economic Effects of the conflicts on the Agroforestry Farming Enterprise**

Variables	No effect	Low effect	Moderate effect	High effect	Weighted score
Reduction in farm output.	2 (1.1)	11 (6.7)	41 (22.9)	125 (69.3)	62.75
Loss of properties	6 (3.4)	9 (5.0)	45 (25.1)	120 (66.5)	59.7
Reduction in income	2 (1.1)	10 (5.6)	53 (29.6)	114 (63.7)	61.15
Inability to service loan	14 (7.8)	11 (6.1)	47 (26.3)	108 (59.8)	59.25
Loss of produce in storage	10 (5.7)	25 (14.2)	66 (36.4)	79 (43.8)	54.6
Loss of farm lands	25 (13.9)	18 (10.1)	43 (24.0)	94 (52.0)	55.65
Scarcity of food items	9 (5.1)	8 (4.5)	49 (27.7)	114 (62.7)	60.8
Destruction of soil nutrients due to inferno	21 (11.8)	21 (11.8)	69 (38.2)	69 (38.2)	52.2
Destruction of farm produce	5 (2.8)	11 (6.2)	50 (27.5)	113 (63.5)	60.65
Reduction in manpower	8 (4.5)	15 (8.5)	75 (41.2)	82 (45.8)	55.75

The result of the correlation analysis for the relationship between the causes of conflict and frequency of conflict occurrence is presented in table 6. The result shows that causes like crop damage ( $r=0.2065$ ;  $p=0.0120$ ) farm fragmentation ( $r=0.1667$ ;  $p=0.0457$ ), ethnic rivalry ( $r=0.2015$ ;

$p=0.0161$ ), indiscriminate bush burning ( $r=0.2328$ ;  $p=0.0051$ ), stealing of crops ( $r=-0.2234$ ;  $p=-0.2234$ ) and low/poor government intervention ( $r=0.2468$ ;  $p=0.0009$ ) are significantly related to frequency of conflict.

**Table 6: Correlation analysis of relationship between the causes of conflict and frequency of conflict occurrence**

Variables	Spearman's r	p- value	Remark
Crop damage.	0.2065	0.0120	Significant
Low level compliance to stock route	0.0962	0.2529	Not Significant
Farm fragmentation.	0.1667	0.0457	Significant
Ethnic rivalry.	0.2015	0.0161	Significant
Depleting soil fertility.	0.1086	0.1966	Not Significant
Indiscriminate bush burning.	0.2328	0.0051	Significant
Little or no respect for traditional rulers.	-0.0055	0.9476	Not Significant
Stealing of crops.	-0.2234	-0.2234	Significant
Farm encroachment.	0.0565	0.1622	Not Significant
Low awareness of stock route.	0.1170	0.1622	Not Significant
Deliberate hostility by pastoralists	-0.0630	0.4545	Not Significant
Declining influence of traditional rulers.	-0.0395	0.2409	Not Significant
Low/poor government intervention.	0.2468	0.0009	Significant

The result of the correlation analysis for relationship between the frequency of conflict and farmers' productivity is shown in Table 7. The dependent variable in the hypothesis i.e. farmers' productivity was tested against the frequency of

conflicts using Spearman's rank correlation. Result revealed that the farmers' productivity is significantly related to the frequency of conflicts ( $r=0.183$   $p=0.025$ ).

**Table 7: Correlation Analysis for Test of Relationship between the Frequency of Conflict and Farmers' Productivity**

Variables	Spearman's r	P- value	Decision
Frequency of conflicts Versus Farmers' Productivity	0.183	0.025	Significant

The result of the correlation analysis for the relationship between the effects of conflicts and agroforestry farmers' productivity is presented in Table 8. The relationship was tested using

Spearman rank correlation. Result shown that effects like reduction in farm output ( $r=0.164$ ;  $p=0.027$ ), reduction in income ( $r=0.181$ ;  $p=0.015$ ), loss of produce in storage ( $r=0.154$ ;  $p=0.040$ ),

scarcity of food items ( $r=0.170$ ;  $p=0.023$ ), and destruction of farm produce ( $r=0.174$ ;  $p=0.020$ ) are

significantly related to agroforestry farmers' productivity.

**Table 8: Correlation analysis of relationship between the Effects of conflicts and Agroforestry Farmers' Productivity**

Variables	Spearman's r	P- value	Decision
Reduction in farm output.	0.164	0.027	Significant
Loss of properties.	0.098	0.189	Not Significant
Reduction in income.	0.181	0.015	Significant
Inability to service loan.	0.011	0.877	Not Significant
Loss of produce in storage.	0.154	0.040	Significant
Loss of farm lands.	0.088	0.239	Not Significant
Scarcity of food items.	0.170	0.023	Significant
Destruction of soil nutrients due to inferno	0.113	0.132	Not Significant
Destruction of farm produce.	0.174	0.020	Significant
Reduction in manpower.	0.020	0.114	Not Significant

## DISCUSSION

The result revealed that the respondents are in their youthful and active age. A larger population of the respondents in the three states is male. Considering the marital status of the respondents, all the three states have more married respondents than singles and widowers. Majority of the respondents have medium level of education which is secondary educational level. This implies that farming does not require much formal education but skill.

The highest household size in Plateau and Nasarawa among the respondents is 6-8 people category while the highest household size among Benue respondents is the 9-11 categories. The least household size across the three states is more than 18 people categories. This shows that the idea of having very large household size among Nigerian rural farmers to serve as farm labour is gradually phasing off. Majority of the respondents from the three states are predominantly Christians. This shows that North Central Nigeria is dominated by Christians with a few Moslems and traditional worshippers. This may account for basic religious differences between the farmers and the pastoralists because majority of pastoralists are Moslems (Mohammed, Ismaila, Bibi, 2015).

Majority of the respondents practice farming as their primary. This result supports the findings of Ijirshar, Ker. and Terlunmun (2015) that Benue, Plateau and Nasarawa State are predominantly

agrarian communities and thus, agriculture is perhaps, the oldest occupation of the people of the state. The major farm size classification in two states is 6-10 acres. However, 1-5 acre is the highest category of farm size in Plateau. For farmers using more than 20 acres for farming, Benue takes the lead. The result of the findings showed that Benue has the highest percentage of farmers planting on largest space of land. This agrees with the appellation given to Benue State as the Food Basket of the nation.

As per belonging to farmers' association, half of the Benue respondents belong to the association, almost half for plateau and three quarter for Nasarawa. The implication is that belonging to farmers' association is more desirable in Nasarawa than any of the other two states. Benue respondents plant majorly melon, maize, cassava and cowpea. Majority of the respondents of Plateau farmer's plant maize, cowpea, melon, cassava, Irish potatoes and few are involved in planting spices and vegetables. Nasarawa farmers majorly plant vegetables, melon, cowpea, maize, cassava, rice and sorghum while a few are involved in planting spices. This implies that the respondents are involved in arable farming and all other sorts of food crops necessary for survival. When it comes to agroforestry practice the following trees are planted and maintained by the farmers Benue respondents planted cashew, mango and citrus trees. Majority of the respondents in



Plateau plant citrus trees, mango tree, with a few teak, gmelina and jatropa tree. Nasarawa farmers majorly plant gmelina, jatropa, with a few cashew trees.

As regards the causes of the conflicts, the ones identified in the study area are crop damage, low level of compliance to stock route, farm fragmentation, ethnic rivalry, depleting soil fertility, indiscriminate bush burning, little or no respect for traditional rulers, stealing of crops, farm encroachment, low awareness of stock route, deliberate hostility by pastoralists, declining influence of traditional rulers and low/ poor government intervention. However, the major causes of the conflicts according to the findings of this study are crop damage, deliberate hostility by pastoralists, low or poor government intervention, ethnic rivalry and little or no respect for traditional rulers. The findings of this study corroborates that of De Haan (2002), which identified crop damage as the most common identified cause of conflict by the farmers.

The result showed that Benue state has the highest percentage of the size of destroyed or affected farmland and Nasarawa has the least. The result established Benue state is the state most affected by the conflict in terms of farm land. This is in support of the findings of Ijirshar, Ker and Terlumun, (2015) that Benue State is the most affected state in the North Central in terms of destruction of farmland due to pastoralist - farmer conflict. However, respondents from Nasarawa state have the least amount of monetary loses, while Plateau state has the highest amount of loses in monetary terms.

According to the findings of this study, the following are the economic effects of farmers-pastoralist conflicts in the study area: reduction in farm output, loss of properties, reduction in income, inability to service loan, loss of produce in storage, loss of farm lands, scarcity of food items, destruction of soil nutrients due to inferno, destruction of farm produce and reduction in manpower were found to be economic effects of the conflicts on the farmers. However, the majorS the economic effect of the conflict were found to be in the following descending order: reduction in farm

output, reduction in income, scarcity of food items, destruction of farm produce and loss of properties. The implication is that reduction in farm output, reduction in income, scarcity of food items, destruction of farm produce and loss of properties are the major economic effects felt by the respondents. This is in agreement with Ajibefun, 2018 that the major economic effect of herdsmen and farmers clashes includes reduction in outputs and income of farmers/nomads, loss of produce in storage, scarcity of agricultural product, loss of house an properties and infrastructural damages.

The result showed that crop damage, farm fragmentation, ethnic rivalry, indiscriminate bush burning, stealing of crops and low/poor government intervention are the ones that constituted significantly to frequent occurrence of conflicts and this agrees with the findings of Musa and Shabu, 2014. According to the findings of this study, farmers' productivity is significantly related to the frequency of conflicts. The implication of this result is that the frequency of conflict occurrence constituted significantly to the farmers' productivity. The result showed that reduction in farm output, reduction in income, loss of produce in storage, scarcity of food items, and destruction of farm produce are the ones that constituted significantly to the agroforestry farmers' productivity.

## CONCLUSION

In considering the effect of the pastoralist-farmers conflict on the productivity of agroforestry farmers in North central, Nigeria, the causes and the frequency of the conflict were established. It was also clear that there are negative economic effects on agroforestry farmers' productivity in the three states. This is in line with the findings of Adisa (2012), who reported that most farmers see conflict as a loss. Hence the need for conflict resolution to alleviate agroforestry farmers loses.

## Recommendations

he need to alleviate this effect necessitates the adoption of the following recommendations for the resolution of the land conflict of interest between the pastoralists and agroforestry farmers in North central, Nigeria and possibly for other regions of the nation at large.

- i. Amicable arrangement should be devised between both parties through seasonal meetings for conflict resolution
- ii. Traditional rulers and community leaders need to be involved to serve as mediators between both and the creation of reserve areas for pastoral activities in the study area.
- iii. Increase interaction between the traditional leaders of the farming community and pastoralist to reduce this menace.

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