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Original Article

Effects of internal conflicts on productivity of arable crop farmers in Oyo State, Nigeria

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ABSTRACT

Internal unrest has an impact on agricultural production, especially in the rural communities that are the food production sites in Nigeria. Recently, communities in Oyo State of Nigeria have been witnessing increasing farmer-herder clashes, affecting food crop production. Hence, this study analyzed the effects of conflicts on the productivity of arable farmers in Oyo State, Nigeria. With primary data obtained from two hundred and twenty-three (223) randomly sampled respondents for two time periods (pre-planting and post-planting of 2022/2023), the data were analyzed with both descriptive statistics (such as frequency and percentage) and the Ordinary Least Square (OLS) model. The results showed that about 45.29% of the respondents' experienced farmer-herder crises within the last production cycle, 13% claimed families' land disputes, and only 4.93% claimed inter-border conflict in their area. Furthermore, herders' encroachment, land disputes, and labour reduce farmers' productivity significantly at 5% and 1% levels, respectively. Conversely, the coefficients of marital status, membership of organisation and access to extension service showed significance at 10% level, while education and farm size showed significance at 5% level, an indication of positive influence on the productivity of arable farmers in the study area. In conclusion, the increasing farmer-herder conflict reduces arable crop production through the displacement of farmers and loss of interest in production, which will invariably lead to the migration of young men in agriculture.

K E Y W O R D S : *Boundary, Encroachment, Farmer-Herder, Grazing, Post-Planting*

INTRODUCTION

Conflict between agricultural land users in Nigeria and other parts of the world has resulted from unhealthy competition between farmers and herders over the use of arable land over time (Ukpong, 2021). Crop farmers encroaching on designated grazing areas and or trespassing cattle or goats damaging crops cultivated on horticultural sites. The issues associated with both environmental and resource management are also significant in creating feud between farmers and pastoralists (Manu *et al.* 2014). Gefu & Kolawole, (2002) stated that the growing global populations of people and animals are some of the factors that led to increased competition for arable land utilization in the twenty-first century. This is due to the fact that an increasing number of people and animals have placed a significant deal of strain on the land resources that are accessible, with a variety of environmental and socioeconomic ramifications (Tarhule & Lamb, 2003). These factors have

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combined to make living in the impacted rural villages in the area extremely filthy and appalling, forcing the people's agro-economic livelihood activities to almost entirely cease, thus worsening the rural poverty situation. As a result, a large number of individuals struggle to meet their basic needs, including those for food, shelter, health care, education, and nutrition, living below the poverty line. The ongoing migration of young people from these villages in search of safety and better opportunities has also exacerbated the region's vulnerability by severing the problem of food security and production capacities (Akpehe *et al.,* 2021), thereby threatening national security.

As to the increasing national insecurity, conflicts have shown that they can cause food insecurity since they result in the deaths of several farmers and herders, as well as the destruction of crops and cattle. As long as both parties keep armaments on hand for self-defense, it has also resulted in the proliferation of weapons. Herders throughout Nigeria are increasingly perceived as Fulani herdsmen who should be avoided or eliminated at all costs, which is contributing to the crisis's eventual emergence as an ethnic conflict (Ukpong, 2021). As human, economy (population and resource utilization) has surpassed natural resources, these new unplanned settlements and their anticipated and unanticipated consequences are laying the groundwork for us to painfully realize that natural resources are limited and will eventually run out as unsustainable utilization affects human, social, economic, and environmental sustainability (Tenuche & Ifatimehin, 2009).

Farmers and herders compete with one another for land for cultivation and grazing techniques, respectively, which is making agricultural operations in the grasslands more difficult. The main growth season, which runs from March to September, and the dry season, which is limited to lowlands, woodlands, and riverbanks and occasionally obstructs cow paths that connect to different watering locations. These typically lead to disputes between farmers and grazers since the cattle trespass and destroy crops (Manu *et al.,* 2014). Thus, the primary focus of herder/farmer conflict in Nigeria has been the Fulani people's pastoralism centered around cattle. The Fulani were restricted to the edge of the desert for a considerable amount of time. In the 20th century, Fulani pastoralists started to travel through and dwell in entire regions that were off-limits to them. This led to their encounters with previously undiscovered populations, customs, and agricultural practices. And it resulted in a variety of untested interactions between all parties and a large amount of room for miscommunication and conflict (Odoh & Chigozie, 2012).

Communities are becoming more violent, development efforts have been significantly hampered by the destruction of infrastructure, disruption of production, and diversion of resources from useful purposes (Oji *et al*., 2015). If some experts' assertion that poverty motivates people to commit violent crimes is true, then more violence—which inevitably results in more poverty would probably happen in the area. According to Awortu (2015), the government's performance in terms of employment creation, infrastructure development, and worker welfare has been significantly impacted by the ongoing confrontations between crop farmers and herdsmen. This assertion holds validity, given that the budgetary allocation to security has been impacted by the increased security votes and concentration of governments at all levels.

In recent times, conflicts over grazing area have led to more regular clashes between farming and pastoral populations in several parts of central and northern Nigeria. Analysts who have attributed the pattern to the growing desertification of the area have suggested that herders are moving southward in search of pasture, frequently resulting in conflicts with farmers. So, what might have been the root reasons of the dispute is the question. The occurrence of disputes and its resolution are inherent aspects of the human affairs order, regardless of the underlying reasons (Olabode & Ajibade, 2010). The country's socio-economic activities are mostly affected by the herdsmen and farmer issue, which pose a huge threat to Nigeria and its citizens. Because of the way that its increased operation has diverted and removed government attention from some important areas of the economy while a massive amount of material and human resources are channeled towards curbing the menace, it also poses a serious threat to Nigeria's development and national security. Farmers have occasionally picked up guns during these disputes in an attempt to defend themselves against the Fulani herdsmen's attacks (Babagana *et al.,* 2019). To this end, this study quantitatively assesses the types of conflict in the study area; examine the effect of conflict on farmers' productivity; estimate the cost implication of conflict in the study area and identify the perceived effect of conflict on farming.

METHODOLOGY

Study Area

The study was carried out in Oyo State. Oyo State is located in the South-Western part of Nigeria. Its capital is Ibadan, the third most populous city in the country and formerly the second most populous city in Africa. Oyo State is bordered to the north by Kwara State, to the east by Osun State, and to the South by Ogun State, to the west by Republic of Benin. It is located longitude $4^{0}30^{0}$ and 6^{0}

east of the Greenwich meridian, $5^0 45^0$ and $8^0 15^0$ North of the Equator. Having land area of 28,454km^2 (10,986 sq. mi), the population of Oyo State in 2006 was 5,580,894 by National Population Commission. The state is made up 33 local government areas, there languages are: Yoruba and English and their occupations are: Farming, Trading, Logging, Fishing, Crafting, Public services. There are two distinct seasons namely wet and dry seasons with relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25^0C (77.0^0F) and 35^0C (95^0F), almost throughout the year (Oyo State Government, 2022).

Data collection and Analytical techniques

A multi-stage random sampling technique was used for this research. Purposively, both Ibadan/Ibarapa and Saki/Oke-Ogun Agricultural Development Programme (ADP) zones were chosen from the four ADP zone in Oyo State due to higher incidence of farmer-herders crisis in the areas. Two hundred and forty-three (243) farmers were randomly selected from the area and questionnaire was administered. The data were collected through the use of a well-structured questionnaire. Pilot survey was conducted to test the validity of the questionnaire after experts in this field has scrutinize the questions. In analyzing the data obtained for the study, a number of analytical methods were employed and these include; descriptive statistics, Agricultural Productivity Index, and Ordinary Least Square (OLS) regression model. Agricultural Productivity Index (API) is the ratio of the value of total farm output to the value of the total variable cost used in farm production. Following Key and Mcbride (2003) and Rahji (2007), the farm productivity of farmers was determined using the following formula in Eq. (1):

$$\text{Productivity}=Y \div TVC \quad (1)$$

Where Y is quantity of total farm output using conversion factor (₦); TVC is Total Variable Cost also in naira;

The effect of conflicts on productivity of arable crop farmers was estimated using an Ordinary Least Square (OLS) estimation techniques which was specified below:

$$Y = \alpha_0 + X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 + X_9 + X_{10} + X_{11} + X_{12} + X_{13} + e \quad (2)$$

Where Y is the Agricultural Productivity index,

X_1 = Boundary Conflict (Yes=1; No=0); X_2 = Farmer-Herders Conflict (Yes=1; No=0); X_3 = Land Dispute (Yes=1; No=0); X_4 = Marital Status (1 = Married, otherwise = 0); X_5 = Household size (Number of people); X_6 = Education (Years spent in school); X_7 = Farming experience (Years); X_8 = Farm size (Hectare); X_9 = Labour (Man day); X_{10} = Planting Materials; X_{11} = Extension visits (Number); X_{12} = Access to credit (if acquired = 1, otherwise = 0); X_{13} = Membership of cooperative society (Years)

RESULTS AND DISCUSSION

The summary statistics presented on Table 1 revealed the mean, standard deviation and description of some of the variables captured in the study. Variables presented here are continuous variables showing the average age of the farmers as about 48 years old; this indicated that most of the farmers are still in their productive age as posited by Manu *et al.*, (2014). The average household size was 5 and farm size of about 5 hectares too. Result further showed that arable crop farmers in the study area had considerable number of years of farming. Also, education is important in adoption of farming innovative techniques, and the result here have shown that most of the farmers are literate which could help in the adoption of new farming technologies and enhanced production of arable crops in the study area. With the average distance to farm (8.8 kilometers) as recorded on the table, it revealed nearness of the farms from the homes of the farmers. Also, shown on the table was the average cost expended on some of the variable cost of production; this include the cost on labour, fertilizer, transportation, herbicides, seed(s) and planting materials (Cassava stem, potato vines and so on) with average value of about ₦103,320.18; ₦83,966; ₦46,842; ₦67,497; ₦41,677 and ₦77,482 respectively.

Conflicts and its Types

The result presented on Table 2 revealed the types of conflicts experience by farming households in the study area. The table showed that there are three different types of conflict experienced by the farmers. From the result, about 45.29% of the respondents claimed that they experience farmer-herders' crisis within the last production cycle. About 13% also claimed that they are victims of land dispute and conflict in their location while only 4.93% claimed boundary type of conflict in their area. Meanwhile, 37.22% of the respondents claimed that they never experience any of such conflict types within last production year.

Table 1: Summary statistics of the respondents

Variables	Description	Mean	Standard Dev.
Age	Age of the respondents in years	48.37	12.13
Household size	The total number of household members	5.33	2.13
Farm size	The total number of cultivated plot(s) in hectares	4.93	4.16
Experience	The number of years of cultivating arable crops	19.18	11.23
Education	Number of years of formal education	8.53	6.47
Distance to farm	Total distance between home and farm	8.82	7.24
Labour cost	Cost expended on labour used for farm operations	103320.18	53512.68
Seed cost	Cost expended on purchase of seeds for planting	41677.58	16659.43
Planting materials	Cost expended on purchase of planting materials	77482.51	10748.21
Transportation	Cost expended on transportation for farm activities	46842.15	8364.501
Herbicides	Cost expended on purchase of herbicides	67497.76	27445.5
Fertilizer	Cost expended on purchase of fertilizer	83966.66	15359.76

Source: Author's computation 2023

Table 2: Distribution of Respondents by Types of Conflicts

Types of Conflict	Frequency	Percentage
None	83	37.22
Farmer – Herders	101	45.29
Boundary Conflict	11	4.93
Land Conflict	28	12.56
Total	223	100.00

Source: Author's computation, 2023

Effect of Conflict on Productivity

Table 3 below showed the regression result of the effect of conflicts on agricultural productivity of smallholder farmers in the study area. Agricultural productivity was constructed and an index; was formed; this was achieved by dividing the total output by the total variable cost expended on production. The results showed that the coefficient of herders Encroachment (p = 0.029), Land dispute (p = 0.001) and labour (p = 0.000) were negative and statistically significant at 5% and 1% respectively. These variable reduces productivity with any increase. Conversely, the coefficient of marital status (p = 0.088), education (p = 0.041), farm size (p = 0.026), access to extension services (p = 0.102) and membership of farm organization (p = 0.064) were all positive and significantly influence agricultural productivity of the respondents.

From Table 3, the coefficient of marital status of the respondents in the study area was positive and statistically significant at 10% level of significance; this implies that a unit increase in the numbers of married household heads will lead to an increase in agricultural productivity by 0.1017. Also, education was positive and statistically significant at 5% level of significance, it indicates that a unit increase in years of education of the respondents, there will be an increase in productivity of the respondents by 0.0210. The result was in conformity with the findings of Simonyan *et al.,* (2020), who found out that education is crucial to reduce conflict through awareness. Membership was positive and statistically significant at 10% level of significance, it indicates that a unit increase in membership of the respondents will increase the productivity by 0.5558. The coefficient of extension visits was positive and statistically significant at 10% level of significance, this implies that a unit increase in extension services will increase productivity of the respondents by 0.3440. And lastly, farm size of respondents was positive and statistically significant at 5% level of significance, it indicates that a unit increase in farm size of the respondents will increase agricultural productivity of the respondents by 0.0264.

Against the background of the effect of conflict on productivity level of smallholder farmers in the study area, three identified types of conflict as it affects the farmers in the study area were included in the model. The result showed two out of the three variables were negative and significant at 5% and 1% level of confidence. Herders' farm encroachment conflict showed an inverse relationship with agricultural productivity. The result implied that increase in herders' farm encroachment will reduce agricultural productivity of the respondents in the study area. Herder encroaches farmland in search for green pasture for their livestock, while farmers will record economic loss in the process. George *et al.,* (2021) found that increase Fulani ethnic militia violence affect agricultural output. Also, the coefficient of land dispute showed negative sign and was significant at 1% level. The result indicated that increase in land dispute will reduce agricultural productivity of the respondents in the study area. Land dispute most often result into economic loss to farmers. There are cases of both intra-family and inter-family land disagreement in the study area and this has serious implication on agricultural production in the area (Ibrahim *et al*., 2015). Delay in planting, destruction of crops, abandonment of land and even death are some of the consequences of land dispute in the study area.

Table 3: Parameter estimate of the effect of conflicts on productivity

Productivity	Coefficient	Std. Err.	T	P>|t|
Conflict types				
Victim of community Conflict	-0.1058	0.1119	-0.95	0.345
Herders Encroachment	-0.0157	0.0071	-2.20	0.029**
Land dispute	-0.0284	0.0087	-3.27	0.001***
Demographic and farm specific factors				
Marital status	0.1017	0.0594	1.71	0.088*
Household size	-0.0235	0.0197	-1.19	0.235
Education	0.0210	0.0102	2.06	0.041**
Farm Experience	0.0005	0.0047	0.12	0.902
Farm Size	0.0264	0.0117	2.24	0.026**
Labor	-0.3015	0.0502	-6.00	0.000***
Planting materials	0.1454	0.2570	0.57	0.572
Access to Extension service	0.3440	0.2079	1.65	0.102*
Access to formal credit	-0.0575	0.1561	-0.37	0.713
Membership of organization	0.1558	0.0819	1.90	0.064*
_cons	4.7291	0.5509	8.58	0.000
Diagnostics				
Number of obs = 223				
F(12, 210) = 7.74				
Prob > F = 0.0000				
R-squared = 0.5521				

Source: Author's computation, 2023

Cost Implication of Conflict in the Study Area

Studied (Ijeoma, 2014; Awodola & Oboshi 2015; Obani, 2019; Ogezi *et al.,* 2021) have found that cost incurred due to conflict has a huge impact on livelihood activities of households' members and economic development in Nigeria. The result as presented on Table 4 showed various conflicts experience in the study area, the frequency of occurrence of these conflicts and the loss recorded by the victims. From the table, farmers revealed that farmers – pastoralist type of conflict occur at least four (4) time in the last production year. This indicated that most of the victims' experience invasion of these pastoralist in their farmland like four times. This action led to loss of revenue to a value of about two hundred and four thousand, and three hundred and forty naira (₦204,340) only. In the case of community clashes, though it doesn't occur frequently like other identified conflicts in the area, but its significant impact on arable crop production cannot be overlooked. From the result, the respondents claimed that it only occurs once in the last production cycle and this brought loss of revenue to the account of about three hundred and fifteen thousand, nine hundred and six naira (₦315,906) only. Land conflict rises from individual who claimed to own a particular property (land grabbing). The rising case of this phenomenon has often pose threat on food production and security in Nigeria. The result, showed a significant loss of revenue to this conflict to the amount of about one hundred and twenty-six thousand and seven naira (₦126,007) only. This result showed that the economic implication of conflicts in the study area largely affect arable crop farmers immensely. Since there may be account of loss due to injury, farm assets, shelter, farm produce and lives (Ogezi *et al*., 2021).

Table 4: Average Loss implication of conflict

Conflict Type	Frequency of conflict in the last production cycle (₦)	Loss recorded as a result of conflict in the last production cycle (₦)
Farmer – Herders	4	204,339.67
Community boundary Conflict	1	315,906.1
Land Conflict	2	126,007.41

Source: Author's computation, 2023

The result presented on Table 5 revealed the perceived effect of conflict on arable crop farmer's productivity in the study area. from the result, it was evidence that reduction in profitability of the farm enterprise was ranked first. This signal the intensity of the disruptions that conflict could cause farmers' farm investment. Also, conflict poses significant threat on victims as migration of these farmers increases with increase in conflict. Conflict

result in destruction of farmers' investment (crops and farm assets) and may sometimes threat the lives and security of the farmers. This played significant role in migration of the victims thereby enhance rural-urban migration. The finding corroborated Alawode, (2013) and Audu (2013), these authors revealed the consequential aftermath of conflict and posited that conflict resultantly influence destruction of income chains and opportunities of the farmers, caused dislocation and frequent loss of lives and properties.

Table 5: Perceived effect of conflicts on Arable Crop Farming in the study area

Perceived effect	Frequency	Percentage	Rank
Increases cost of conflict management	176	13.33	6th
Reduces profit on farm	223	16.89	1st
Premature crop harvesting	198	15.00	5th
Loss of farmland due to incessant attack	206	15.61	3rd
Loss of lives and farm properties	203	15.38	4th
Migration of victims	216	16.36	2nd
Loss of interest in farming	98	7.42	7th
Total	1320	100.00	

Source: Author's computation, 2023, Note: multiple responses

CONCLUSION AND RECOMMENDATIONS

The study concluded that conflicts plays a significant role in productivity of arable crop farmers in the study area, as both herder encroachment (farmer-herders type of conflicts) and land dispute significantly affect productivity of arable farmers in the study area. Therefore, there should be intensification of conflict resolution in these areas due to the eventualities that follows the conflicts.

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Authors' Contribution

KA wrote the first draft, OAD and GEF managed data collection, interpretation of data, writing of manuscript, JOA managed the literature searches. GEF and OAD managed the development of methodology, data analysis, and the development of the model. All authors read and approved the final manuscript.

Ethical Statement

Not applicable

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