

“This is Our Land – Resource Conflict and Arable Crop Production: Evidence from southwest Nigeria”

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ABSTRACT

Farmers-herdsmen conflicts have grown and intensified over the past few years in sub-Saharan Africa. In Nigeria, it has become widespread and affected the agricultural sector, posing a challenge to crop production and food security. Land, a major resource used in the production of arable crops has often been the center of the conflict. However, little research has been done to examine the effect of farmers-herdsmen conflict on arable crop production. This paper is derived from an in-depth study of the factors that cause farmers-herdsmen conflict and its effect on crop production. It employed the use of well-structured questionnaires to collect data from 150 respondents chosen through a two stage-sampling technique. The data were analyzed using descriptive statistics and Tobit regression model. The study showed that the major cause of conflict were inadequate grazing area, reprisal attacks, uncontrolled bush burning, differences in ethnicity and sustainability concerns which resulted in malnutrition, displacement of families, food shortage, loss of properties and lives. Tobit regression model revealed that age and conflict levels significantly influenced crop production. To manage and resolve the conflicts, it is recommended that the community leaders, herdsmen and government meet to deliberate on land appropriation, grazing areas and farmers’ orientation strategies. Added to this, Rural Grazing Area settlement programme (Ruga) introduced by the Muhammad Buhari presidency should be implemented. There is, therefore a need for rigorous consultation from all levels of government and punishment of culprits who fail to adhere to set down rules and principles.

Key words: Conflict, Herdsmen, arable crop production, Tobit regression, Ruga

Introduction

Conflict exists in all parts of the world. Sometimes, it starts with a dispute or a clash between two or more people, or groups and disintegrate into fights, battles, wars which have adverse effects on the general populace. For instance, on June 18, 1914, the world knew no peace. That year marked the beginning of the First World War. A year that was characterized with unprecedented slaughter, carnage and destruction. It started as a result of a land dispute, triggered with the assassination of Austria's archduke Franz Ferdinand. An act that left over 8 million military personnel and 6.6 million civilians dead (Blakemore, 2019).

In Africa, conflict is becoming more complex as the numbers of conflict actors have increased. Rebel groups are more numerous and often fracture into additional groupings. (Ajibefun, 2019). In conflict-affected countries in sub-Saharan Africa for instance, the number of undernourished people increased by 23.4 million between 2015 and 2018 – a significantly sharper increase compared with countries not exposed to conflicts (FAO, 2019). A form of conflict is on the rise and is gaining grounds nationwide. It is the Farmers-herdsmen conflict. Farmers-herdsmen conflict often emerge because people have different uses for resources such as forests, water, pastures and land, or want to manage them in different ways (FAO, 2000). Of all resources, however, land has remained an overwhelming source of farmers-herdsmen conflict among various user groups as well as individuals at varying thresholds (Adisa and Adekunle, 2010).

The effect of the Farmers-herdsmen conflict cannot be overemphasized. Economically, it is an indisputable fact that the activities of the herders against the arable crop farmers have resulted in a huge economic setback and crop production. For instance, in Nigeria, the creation of artificial scarcity of goods and services as a result of herders attacks on the Arable crop farmers have consequently led to inflation and devaluation of the naira (Ebele and Ibenwa, 2017). This in turn has led to an increase in poverty status. Statistically, more than 82 million Nigerians live on less than \$1 a day (NBS, 2020). 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 conflict between farmers and herdsmen had resulted in the displacement of some settlements, loss of cattle and destruction of arable crop farms which were essentially the source of income for the victims (Ogunwande and Akinrinola, 2017).

The study area has attracted researchers in recent times over the incessant killings and loss of properties experienced in recent years. For example, in Alabata area of Ogun state, herdsmen stabbed a 49-year-old farmer to death (Olatunji, 2019). The violent activities by the herdsmen has resulted in huge death of thousands of people, destruction of property, and massive displacement in the country (Ademola and Achakpa, 2018). There is much discourse on the impact of farmers-herdsmen conflicts on human lives and property in Nigeria. However, little attention has been given to its food production impact, especially on those that were forced to move out of their villages, homes and farms. Questions involving the quality of the harvested produce, the quantity of the harvested yield and income generated from the sales of the farm produce remains unanswered. Even till date, responses to the conflict at both the federal and state levels have been poor. The lack of data makes it difficult for the government to target affected crop farmers in need of compensation or shelter.

Based on these highlighted factors, this paper is derived. This study is very necessary especially at this point of Nigeria's development, where there should be massive increase in the need to map and study how the infrastructures and welfares of those affected can be achieved. Focusing on examining the effect of

farmers-herdsmen conflict and addressing food production issues among arable crop farmers. The broad objective of the study is to assess the impact of farmers-herdsmen conflicts on food production in Odeda local government, Ogun state. Specifically, this paper aims at examining the factors that cause farmers-herdsmen conflict and the effect of farmers-herdsmen conflicts on crop production. The study is based on 3 theories. They are mainstream theory, frustration- aggression model and environmental security status. The idea behind main-stream theory is simply based on scarce resources. It follows a rational choice theory that assumes that respondents will maximize their utility based on available resources at their disposal. Frustration-aggression model is based on retaliation. It believes that frustration leads to aggression which in turns results in retaliation. It addresses farmers' behavior in response to attacks from herdsmen while environmental security theory is based on population and scarce resources. It examines threats posed by environmental events and trends to individuals, communities or nations. The study hypothesized that there is no significant relationship between food production and the number of times of farmers-herdsmen conflict was experienced by arable crop farmers in the planting season.

Methodology

The study area is Odeda local Government Area in Ogun State, Nigeria. The headquarters is in the town of Odeda, located at Abeokuta. It has an area of 1,560km² and a population of 109,449 at the 2006 census. Odeda has 10 districts. They are Aigbagba, Alabata, Ilugun, Itesi, Obantoko, Obete, Odeda, Olodo, Opeji and Osiele. The people are predominantly Egbas and they speak Egba dialect. However, their main language is Yoruba while a few non-yoruba are Fulani, Hausa, Igedes of Benue state and Ito. Odeda has several opportunities for economic development. One of the features of Odeda local government is the vast land for agriculture for both perennial and arable farming. Due to the nature of vegetation, there is also propensity for animal rearing, poultry farming and agro-based industries. Another of its features is the great opportunity for siting of quarry industries due to its enormous deposit of granites in the area.

Multistage sampling procedure was used for this study. The first stage involved the purposive selection of two (2) districts out of the ten (10) districts in the local government. The second stage involved the random selection of five (5) villages from the two (2) districts chosen. Of the ten (10) district in Odeda Local Government, Odeda and Obantoko districts have reported the highest occurrence of farmer-herdsmen conflict. The random selection of the villages is based on the high perceived occurrence of farmers-herdsmen conflict in the area. In the selected 5 villages (3villages from Odeda, 2villages from Obantoko), 30 farmers were chosen randomly. This brought an overall number of sample respondents to be one hundred and fifty (150).

Primary data was used in achieving the objective of the study. A well-structured questionnaire was administered to the randomly selected farmers within the five villages. The survey gathered information on the socio-economic characteristics of the household head such as age, sex, marital status, educational status, farming experience, income from primary occupation, income form secondary occupation, household size, and cropping system.

Both descriptive and inferential analytical tools were used in analyzing data collected for the study. Descriptive statistics employed ranged from mean, mode, median and standard deviation. Inferential tools such as the Likert scale and Tobit regression model was used to analyze the cause and effect of farmers-herdsmen conflict on arable crop production.

The Likert scale is a type of rating scale employed to measure attitudes or opinions of farmers on the factors that cause conflict. The rating scale ranged from strongly disagree, disagree, undecided, agree and strongly agree. From each theory, six variables were subjected to Likert scaling and the variable with the highest mean value represented a perceived factor that cause conflict.

Conflict level was determined using the data collected from the Likert scale. A set of 18 questions was administered to capture the likely factors of conflict in the area. Each question was scored on a Likert scale value of 1-5 with the highest obtainable score being 90. A percentage score was determined. Hence, the lower the score, the lesser the level of conflict in the area.

Food production level is obtained from the mean of the output level of the crop. Any output level less than the mean output level implies low food production while those greater than the mean implies high food production status.

Tobit regression model was used to analyze the effect of farmers-herdsmen conflict on crop production. The major crops produced by the farmers were maize, cassava and yam. However, for ease of summation and uniformity, cassava was chosen for the study. The model specification for Tobit regression according to Maddala is as given as,

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n + U_i$$

Where $Y = Y^*$ if $Y > 0$ ($Y = 0$ if the production output level is less or equal to zero). In this case, any farmer not affected by the conflict has a zero observation as his production output level.

$Y = Y^*$ if $Y > 0$ ($Y = Y^*$ if production level is greater than zero) $Y^* =$ production level (ratio of actual output to expected output)

β = parameters to be estimated, Where:

X_1 = age

X_2 = limited resources

X_3 = Migration

X_4 = killing of cattle

X_5 = Decreased consumption rate

X_6 = loss of lives

X_7 = loss of productivity

X_8 = displacement of farmers

X_9 = malnutrition

X_{10} = Conflict level

e = Error term

Table 1: A priori Theoretical Expectation

S/N	VARIABLES	EXPECTATION	LITERATURE/AUTHOR
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1	Age	+ve	Ogunwande and Akinrinola (2017) Babagana <i>et al.</i> , (2019)
2	Sex	+ve	Ahmed and Abah (2015)
3	Marital status	+ve	Kirwan and Maye, (2013)
4	Education level	+ve	Babagana <i>et al.</i> , (2019) Babatunde <i>et al.</i> , (2007)
5	Primary income	+ve	Shehu <i>et al.</i> , (2012)
6	Household size	+ve	Babatunde <i>et al.</i> , (2007)

Result and discussion

Socio-economic Characteristics of Respondents

In order to clearly understand the impact of farmers-herdsmen conflict in the study area, a descriptive table is drawn to compare and reflect rudimentary socio-economic characteristics of farmers between those who experienced conflict and those who did not experience conflict. Such variables include age, sex, marital status, education level, primary occupation income, household size and cropping system.

Table 2: Socio-economic characteristics of respondents

Variable	Experienced Conflict		Not Experienced Conflict		All	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age						
0 – 29 years	14	9.33	2	1.33	16	10.67
30 – 59 years	72	48.00	41	27.33	113	75.33
≥ 60 years	17	11.33	4	2.67	21	14.00
Mean = 46 years						
Sex						
Male	56	37.33	25	16.67	81	54
Female	47	31.33	22	14.67	69	46
Marital Status						
Married	77	51.33	37	24.67	114	76
Divorced	6	5.33	2	1.33	10	6.67
Single	18	12.00	8	5.33	26	17.33
Education Level						
Primary	41	27.33	26	17.33	67	44.67
Secondary	46	30.67	15	10.00	61	40.67
Tertiary	16	10.67	6	4.00	22	14.67
Income from Primary occupation						
₦0 – ₦150000	82	54.67	37	24.67	119	79.33
₦150001 – ₦300000	17	11.33	8	5.33	25	16.67
₦300001 – ₦450000	0	0.00	1	0.67	1	0.67
₦150001 – ₦600000	4	2.67	1	0.67	5	3.33
Mean = ₦104565.33						
Household size						

1-3	27	15.34	10	9.36	37	24.7
4-6	40	33	28	12.6	68	45.6
7-9	25	13	8	9	33	22
≥ 9	11	7.33	1	0.67	12	8
Mean = 5						
Cropping system						
Mono cropping	51	34.00	14	9.33	65	43.33
Mixed cropping	52	34.67	33	22.00	85	56.67
Total	103	68.67	47	31.33	150	100

Source: Field survey, 2019

The socio-economic characteristics presented in table 1 above revealed that 72 (48%) of the respondents aged 30 – 59 years had the highest encounter of conflict with herdsmen. This is likely so since those of this age group are in their active stage and are mostly found on their farms making them vulnerable to attacks. This concur with findings carried out by Babagana and Madaki (2019) on Impacts of Fulani Herdsmen-farmers' Conflicts on Food Production in Gujba and Tarmuwa Local Government Areas of Yobe State, Nigeria.

As regards sex, the survey revealed that that of the 150 sampled respondents, 81 are male while 69 are female. Of the 81 male respondents, 56(37.33%) have experienced farmers-herdsmen conflict while 25(16.67%) have not. Of the 69 female respondents, 47(31.33%) have experienced farmers-herdsmen conflict while 22(14.67%) have not. This concur with findings carried out Ahmed and Abah (2015).

With respect to marital status, further profiling revealed that of the 150 sampled respondents, 114 respondents are married, 10 respondents are divorced and 26 respondents are single. Of the 114 married respondents, 77(51.33%) have experienced farmers-herdsmen conflict while 27(24.67%) have not. Of the 10 sampled divorced respondents, 6(5.33%) have experienced farmers-herdsmen conflicts while 2(1.33%) have not. Of the 26 sampled single respondent, 18(12%) had experienced conflict while 8(5.33%) had not experienced conflict. Evidently proving that majority of the married couples were susceptible to attack. A likely factor may be because of the age. At 20 years and above, a lady is expected to be married and must be on the farm to assist her husband. This agreed with the findings of Kirwan and Maye, (2013).

The household size of the respondents had a mean size of 5 members per household with a minimum of 1 member and a maximum of 10 members respectively. The table showed that majority of the respondents who had not experienced conflicts had four or more members of the household to cater for in relation to those who had experienced conflict. The implication simply is, the household head will have to stay longer on the farm, put in extra effort to provide for his family. This findings is supported by the research carried out by Babagana *et al.*, (2019) and Babatunde *et al.*, (2007).

The result inferred from level of education indicated that a larger percentage of the respondents who experienced conflicts were those whose education stopped at the primary level. The respondents were mostly found on the farm rather than in classrooms.

The Monthly income of the respondents showed that 54% who experienced conflicts earn less than ₦104565.33 in comparison to the 24% of the respondents who did not experience conflicts is considered insignificant and extremely meagre. This implied that the farmers' income is greatly affected by the conflict between farmers and herdsmen. This findings is supported by the research carried out Shehu *et al.*, (2012)

The cropping system of the respondents showed there was an even distribution between mono croppers and mixed croppers in the study area. Common crops planted by the farmers were cassava and maize.

Factors that causes farmers-herdsmen conflict in the study area

This section discussed the table presenting the factors that cause farmers-herdsmen conflict in the study area. The factors are scarce resources, retaliation and over population.

Table 3: Causes of Farmers-herdsmen conflict based on Mainstream theory

Main Stream Theory	SD F (%)	D F (%)	U F (%)	A F (%)	SA F (%)	Mean Value	Total F (%)
Inadequate grazing area	49(32.67)	25(32.67)	10(16.67)	42(28)	24(16)	2.78	150(100)
Pollution of water bodies	62(41.33)	26(17.33)	13(8.67)	22(14.67)	27(18)	2.50	150(100)
Encroachment of farm lands	18(12)	40(26.67)	10(6.67)	59(39.33)	23(15.33)	2.57	150(100)
Limited forage	65(43.33)	27(18)	19(12.67)	24(16)	15(10)	2.31	150(100)
Unequal resource accessibility by both farmers and herdsmen	29(19.33)	65(43.33)	19(12.67)	26(17.33)	11(7.33)	2.26	150(100)
Construction of public and private building on grazing areas	63(42)	31(20.57)	18(12)	26(17.33)	12(8)	2.29	150(100)

Source: Field Survey, 2019.

Based on main stream theory, the highest mean value of 2.78. The respondents agree that limited resources accessibility by both farmers and herdsmen is a factor that causes conflict between the two parties. This is owing the fact that resources are scare in supply. In a bid to find pastures for their cattle, herdsmen encroach on farmers' land, feed on the limited vegetation on the field and destroy the crops. Thereby leading to disagreements and ultimately conflict between the farmer and herder.

Table 4: Causes of farmers-herdsmen conflict based on Frustration-aggression model

Frustration-Aggression Model	SD F (%)	D F (%)	U F (%)	A F (%)	SA F (%)	Mean Value	Total F (%)
Reprisal attacks	8(5.33)	37(24.67)	19(12.67)	56(37.33)	30(20)	2.41	150(100)
Harassment of herdsmen by the host community	67(44.67)	38(25.33)	18(12)	20(13.33)	7(4.67)	2.08	150(100)
Killing of stray cattle of the herdsmen by the arable farmers	28(18.67)	11(7.33)	28(18.67)	59(39.33)	24(16)	2.39	150(100)
Uncontrolled bush burning which spread across farmland	54(36)	36(23.33)	24(16)	21(14)	16(10.67)	2.40	150(100)
Traditional leaders supporting the herdsmen and providing them with land while neglecting their farmers	61(40.67)	32(21.33)	20(13.33)	24(16)	11(7.33)	2.35	150(100)
Differences in religious beliefs by farmers and herdsmen in host community	58(38.67)	35(23.33)	14(9.33)	26(17.33)	16(10.67)	2.40	150(100)

Source: Field survey, 2019

The result from the frustration-aggression model showed that majority of the respondents agree that aggression on the part of the farmers is a factor that causes conflicts. Aggression has the highest mean value of 2.41. Farmers are likely to retaliate due to sight of cattle droppings on their farm land and pollution of water bodies by cattle which leads to killing of stray cattle and inferably spike some reactions from the herdsmen, thereby leading to conflicts.

Table 5: Causes of farmers-herdsmen conflict based on environmental security theory

Environmental Security theory	SD F (%)	D F (%)	U F (%)	A F (%)	SA F (%)	Mean Value	Total F (%)
Differences in climatic condition which affects planting season and income of the farmers	56(37.33)	33(22)	16(10.67)	33(22)	11(7.53)	2.45	150(100)
Large migration of people to the host community while competing for limited resources	57(38)	32(21.33)	18(12)	34(22.67)	9(6)	2.37	150(100)
Available land use type of host community	53(35.55)	27(18)	27(18)	23(15.33)	23(13.33)	2.53	150(100)
Decreasing economic productivity through an increased population from migration of herdsmen to host community	37(24.67)	16(10.67)	16(10.67)	42(28)	39(26)	2.64	150(100)
Sustainability concerns	32(21.33)	30(20)	23(15.33)	49(32.67)	16(10.67)	2.91	150(100)

Source: Field survey, 2019

Based on environmental security, the mode of the respondents agree that ecological processes and natural resources are sources or catalysts for conflict. The desire to sustain feeding consumption rate had the highest mean value of 2.91. This could be as a result of decrease in economic productivity due to increasing population which is likely to cause worry among the farmers

Effect of Farmers-herdsmen Conflict on Crop Production

Effect of farmers-herdsmen conflict is presented in table 6 below. Of the variables analyzed, significant factors that have effect on crop production are age and conflict level. The age of the arable crop farmers was positive and statistically significant at 1%. This means the higher the age, the higher the crop production level. It implies that certain testosterone level increases in the body as the farmer advances in age from childhood, generating an increase in food intake of household members and which ultimately drives crop production. This result concurs with the finding of Ogunwande and Akinrinola (2017). Conflict level was negative and statistically significant at 1%. This implies that crop production increases with decrease in the level of conflict. When conflict strikes, it is associated with reduction of farmers on the field, lack of willingness to work, low productivity, loss of lives and properties. Babagana *et al.*, (2019) opined that the higher the loss of lives experienced in the area, the lower the crop production level attributed to reduced

number of labor available to farm. Respondents complained that herdsmen often uproots their plant stands purposefully each time they invade their farmlands. The effect of various uprooting of plant stands negatively affects the quantity of yield obtained during harvesting. Others opined that after harvest season some of the food items purchased by households include maize, rice, yam, plantain, gari and cassava, fish, beef, and oil. Items they earlier do have to buy. But with conflict and low productivity, they purchase these items at a high rate, even trekking far distances to market places because many farmers have had to leave the area or farmland.

Table 6: Effect of Farmers-herdsmen conflict on Food Production

Food production	Coefficient	Std. Err	Z	P>{Z}	dy/dx
Age	0.022683	0.008679	2.61	0.01**	0.005525
Limited resources	-0.02591	0.085095	-0.3	0.761	-0.19415
Migration of people	0.116867	0.090232	1.3	0.197	-0.06153
Killing of cattle by farmers	-0.00461	0.09682	-0.05	0.962	-0.19603
Decreased consumption rate	-0.08584	0.079322	-1.08	0.281	-0.24266
Loss of lives	0.184714	0.0160933	1.15	0.253	-0.13346
Low productivity	0.078732	0.156085	0.5	0.615	-0.22986
Displacement of farmers	0.089563	0.074506	1.2	0.231	-0.05774
Malnutrition	-0.14539	0.11034	-1.32	0.19	-0.36354
Conflict level	-0.04257	0.012512	-3.4	0.001**	-0.0673
_cons	-49.52789	21.44096	-2.31	0.022	12.8877

No of obs = 150
 LR chi² = 93.59
 Prob > chi² = 0.0000
 Pseudo R² = 0.3533
 Log likelihood = -85.6440

Source: Field survey, 2019 Asterisks * indicates significance at 10% level, ** indicates significance at 1% while *** indicates at 5%.

Conclusion and recommendation

In conclusion, this study was able to reveal several factors as to the root cause of farmers-herdsmen in Odeda local government in Ogun state as well as the impact of such conflicts. Factors like scarce resources, retaliation and over population are catalysts to conflicts leading to farm encroachment, aggression, killing of stray cattle, decreased economic productivity and decreased consumption rates. Hence, if these causes were allowed to continue unchecked, farmers-herdsmen conflict cannot be resolved while their devastating impacts of crop production would also continue to escalate and will be felt nationwide. As a recommendation, community leaders, herdsmen and government should meet to deliberate on land appropriation, grazing areas and farmers' orientation strategies. The Rural Grazing Area settlement programme (Ruga) introduced by Muhammad Buhari presidency involving a specific area of land carved out for the settlement of herders and their cattle should be implemented with adequate security on farm. Punishment of culprits who fail to adhere to the rules and regulations of the land must be upheld.

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