SOCIOECONOMIC IMPACT OF LAND USE CONFLICT IN NIGERIA: A Study of Agricultural Production in Southwest Nigeria

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ABSTRACT

Little attention has been devoted to the study of the economic implication of land conflict, especially as it relates to agriculture in Nigeria, despite increasing incidence of such conflicts and the crucial role of agriculture in the growth and development of the Nigerian economy. This study used data from the Southwest region of Nigeria to explore the prevalence and pattern of land conflict, analyse its determinants and assess its effect on agricultural production. Data were obtained with the aid of a structured questionnaire, from a survey conducted on a sample of 365 crop farmers who cultivated a total of 462 farm plots. Descriptive statistics, probit and multiple regression analytical techniques were used for data analysis. Reports of conflicts on plots were between 1983 and 2017, with most of the incidences (94.5%) occurring in recent years (2003–2017). Two patterns of land conflicts were identified in the study area: Farmer–Farmer (11%) and Farmer–Pastoralist (89%); the figures reveal that the majority of the conflicts were between farmers and pastoralists. The results further show that plot location, plot distance to farmer's residence, nature of farming and soil quality had significant positive relationships with land conflict, while plot distance to nearby road had a significant negative relationship with land conflict. There was evidence of significant negative impact of land conflicts on crop production and farmers' income; a reduction

of 49% in crop production and as much as 74% reduction in income of farmers. Serious attention from policy makers and agricultural stakeholders on land-related conflicts would ensure sustainability in agricultural production and development.

JEL classification: Q15

1. Introduction

The agricultural sector is an integral part of the Nigerian economy. It contributes almost 40% of the total annual GDP of the country, employs over 55% of the labour force, caters for about 80% of the dietary needs of the country and accounts for about 70% of the country's non-oil exports (Oyekale, 2012; Yusuf, 2014). According to Sertoglu et al. (2017), the agricultural sector plays a crucial role in the economic growth and development of Nigeria. It is the bedrock of economic growth, development and poverty reduction in Nigeria as it is in other developing countries. As a matter of fact, Matahir (2012) and Lavorel et al. (2013) posited in their studies that policy makers in developing countries should consider the agricultural sector crucial in their analysis of inter-sectoral growth policies.

Almost 75% of people in Nigeria are rural dwellers, the majority of which are small-scale farmers (Yusuf, 2014). Studies have shown that most African nations are dominated by small-scale farmers who make use of fragmented land for farming activities (Beinteman and Stadt, 2006; Sertoglu et al., 2017). The majority of Nigerian farmers are small-scale farmers and they account for about 84% of agricultural production. These small-scale farmers who number about 1.8 to 2 million, on the average own only 1 hectare of land (Apata, 2016). These farmers face various land use constraints which translate into low agricultural productivity, resulting in a negative effect on agricultural growth in Nigeria.

Land is a key resource in agricultural production and as such offers the required support for sustainable development (Alawode, 2013). However, it has been reported that the increasing population growth is exerting pressure on available land, making scarcity of farmland a big issue (Headey and Jayne, 2014). The growing human and animal population has made the competition for land use more intense. The population growth rate continues to rise and mount pressure on available land with diverse environmental and socioeconomic implications (Adisa, 2012).

Land use is increasingly becoming a reason for conflict and contestation, particularly in developing countries where the majority depend on agriculture as their source of livelihood (Yamano and Deininger, 2005; Wehrmann, 2008). A number of factors, for example, migration, population pressure, agricultural commercialization and urbanization have added to the expanding number of clashes on land use (Adisa, 2012). Land conflict ensues when a land user is perceived to be trespassing and infringing on the rights, values or amenity of another (Blench, 2010). There is competition for the use of land between different user groups (DPI Factsheet, 2011). Non-agricultural user groups compete with agricultural user groups for land, and within agricultural user groups, there are various levels of intra-group competition.

Nigeria, according to 2019 estimates, has a population of 201 million and a land area of 910, 800 square kilometres, more than 80% of which is suitable for cultivating crops and raising livestock (Conroy, 2014; United Nations, 2017; United Nations Population Fund (UNFPA), 2019). Despite this, issues pertaining to land use contribute significantly to the conflict events pervading the country. To fully comprehend the issue of land conflicts in Nigeria, especially those that result in violence, there is a need to map out the various patterns of land conflicts found and examine the contexts in which these conflicts arise.

Land conflict is increasingly becoming critical to food production and economic stability. It has shown a high potential for aggravating food crisis, insecurity and impeding agricultural sustainability (Eklund and Persson, 2015). Nigeria is facing a persistent food shortage problem despite her vast land area. She cannot produce required food in adequate quantity and quality. According to Adegbola et al. (2012), domestic food production in Nigeria is not enough to meet the national food demand and any system where food demand is significantly higher than what is supplied is, as a matter of fact, one with looming food crisis.

Despite the increased occurrence of conflict globally, which has resulted in a growing research interest in conflict and land systems, little is understood in the area of land conflict (Baumann and Kuemmerle, 2016). Different studies have investigated the issues of insurgence, armed conflict, communal clash, and tribal war, how they relate to land systems, and how they evolve into land conflict (Bob, 2009; Stevens et al., 2011; Dode, 2012; Gorsevski et al., 2012; Conroy, 2014; Eklund and Persson, 2015). However, there is a dearth of studies

on land conflict, particularly as a result of competition for land, a situation brought about by conflicts of interest in the use of land and how such conflicts affect agricultural production and sustainability.

It is against this background that this study sought to analyse land conflict and the effect on crop production. Highlighting land use conflict and examining its effect on crop production will help identify its peculiar contribution to production loss and decline in production growth rate. The specific objectives of this study were to assess the prevalence and patterns of land conflict, estimate the determinants of land conflict and measure the effect of conflict on crop production in the study area. Addressing these issues will provide insights into factors that predispose farmers to land conflicts, especially as it concerns agriculture and thus guard against them. Furthermore, government and policy makers will see the need for concerted effort in preventing land-related conflicts and also the need for their intervention in resolving on-going conflicts, especially on agricultural land. This will go a long way in enhancing agricultural sustainability, food production and hence strengthen food security in Nigeria.

2. Materials and Methods

2.1 Study area and sampling procedure

This study was carried out in the Southwestern region of Nigeria. The region lies within longitudes 2°48' – 6°0'E and latitudes 5°5' – 9°12' N. It is divided into 6 states: Oyo, Lagos, Ekiti, Ogun, Ondo and Osun. According to a report from the National Bureau of Statistics (2016), the Southwestern part of Nigeria accounts for a total population of about 38,257,260 and has a land area of 114,271 km^2, about 12% of the country's land mass. The climate in the region is typically tropical and is characterized by wet and dry seasons. The climate highly favours crop production, and agriculture is a major occupation in the area.

A multi-stage sampling technique was employed in the study. The first stage involved the random sampling of three states in Southwestern Nigeria: Oyo, Osun and Ekiti states. The second stage was probability proportional to size sampling of local government areas (LGAs) from the selected states. Six LGAs from Oyo and five each from Osun and Ekiti states were proportionately selected. The third stage was the random selection of three villages in each of the LGAs selected. This gives a total of forty-eight villages. The last stage was also a random sampling of 8 households from each of the selected villages, giving a

total of 384 households. However, due to inadequate information given by some respondents, only 365 copies of the questionnaire were found useful for analysis. The questionnaire contained questions that elicited information on the socioeconomic characteristics of the farmers, land use conflict and crop production by farming households. A key informant interview was carried out in each of the selected villages. The key informants were farmers' leaders in the communities. In situations where the farmers' leader could not be reached, an elder in the community who was also a farmer was interviewed as the key informant. One key informant was interviewed per village, making a total of 48 key informants.

2.2 Analytical techniques and models

2.2.1 *Descriptive Analytical Approach*

Descriptive analytical methods such as frequency count, percentage, mean and standard deviation were used to analyse some socioeconomic variables of the respondents, characteristics of the farm plots, and the prevalence and pattern of land use conflict in the study area.

2.2.2 *Probit Regression Approach*

In order to estimate the determinants of land conflict in the study area, probit regression technique was used. The conflict status of the households on their plots was categorized into two: ongoing and no conflict. Therefore, a standard probit model was used. A probit regression model is used to model dichotomous or binary outcome variables: where the dependent variable takes only two values. The model is used in estimating the probability of an observation with particular characteristics falling into one of the two outcomes. In a probit model, the inverse standard normal distribution of the probability is modelled as a linear combination of predictors.

The probit equation is expressed as:

$$C_{ij} = \alpha + \beta \boldsymbol{Q}_j + \delta \boldsymbol{X}_i + \varepsilon_{ij}$$

i denotes plot

j denotes farmer

$\boldsymbol{Q}_j$ = farmers' characteristics

$\boldsymbol{X}_i$ = plot characteristics

C_{ij} is a dummy variable, which is equal to 1 if conflict is ongoing on plot *i* owned by farmer *j* and is 0 if the farmer has never experienced conflict on the plot or the conflict has been resolved as at the time of data collection.

Key elements in $\boldsymbol{Q}_j$ include:

$\boldsymbol{Q}_{j1}$ = Age of farmer measured in years

$\boldsymbol{Q}_{j2}$ = Immigrant Status of farmer (native = 1, otherwise = 0)

$\boldsymbol{Q}_{j3}$ = Nature of farming (part-time =1, otherwise =0)

$\boldsymbol{Q}_{j4}$ = Number of location of plots

Key elements in $\boldsymbol{X}_i$ include:

$\boldsymbol{X}_{i1}$ = Distance of each plot to farmer's location of residence in km

$\boldsymbol{X}_{i2}$ = Distance of each plot to nearby road in km

$\boldsymbol{X}_{i3}$ = Soil Quality (fertile = 1, otherwise = 0)

2.2.3 *Multiple Regression Approach*

Multiple regression analysis was used to measure the effect of land use conflict on crop production, a multiple regression analysis that took into account a broader set of independent variables by specifying a function of the form:

$$\ln(\boldsymbol{Y}_j) = \alpha + \delta C_i + \beta \boldsymbol{N}_j + \gamma \boldsymbol{X}_i + \varepsilon_{ij}$$

$\mathbf{Y}_j$ is crop output per plot

C_i indicates the conflict status of the plot

$\boldsymbol{N}_j$ denotes farmer's characteristics

$\mathbf{X}_{\mathrm{i}}$ denotes plot characteristics

Key elements in $\boldsymbol{N}_j$ include:

$\boldsymbol{N}_{j1}$ = Age of farmer measured in years

$\boldsymbol{N}_{j2}$ = Nature of farming (part-time =1, otherwise =0)

$\boldsymbol{N}_{j3}$ = Number of plots owned by farmer

$\boldsymbol{N}_{j4}$ = Years of education of farmer

Key elements in $\boldsymbol{X}_i$ include:

$\boldsymbol{X}_{i1}$ = Distance of each plot to farmer's location of residence in km

$\boldsymbol{X}_{i2}$ = Soil Quality (fertile = 1, otherwise = 0)

C_i is a dummy variable, which is equal to 1 if conflict is ongoing on plot *j* owned by household *i* and 0 if the farmer has never experienced conflict on the plot or the conflict has been resolved as at the time of data collection.

3. Results and Discussions

3.1 Socio-economic characteristics of farmers

Results of the socio-economic characteristics of the farmers are presented in table 1. The average age of the farmers was 45 years with almost two-thirds (63.6%) of the farmers falling between 30 and 60 years of age, showing that the majority were in their active years. Most (84.1%) of the farmers were male and were married (89.5%), reflecting the culture of the people in the area, which regards men as the household head and breadwinner of the family. The majority (81.7%) of the respondents had formal education at different levels and they were mainly (76.5%) natives of their villages of residence.

The results further show that 75.3% of the farmers had their farms in a single location, 21.1% had farms in two different locations while just 3.6% had in three different locations. Cultivation of farm plots in different locations could predispose farmers to land conflict due to ineffective monitoring (Alawode, 2013). Almost two-thirds (64.5%) of the farmers had been farming for 10 – 30 years which means they could have been exposed to conflict at one time or the other. Concerning earnings from farming activities, almost half (49.5%) of the respondents earned less than ₦150,000 per annum, the same proportion earned between ₦150,000 and ₦450,000 per annum, while only 1% earned above ₦450,000 per annum. Also, 60.5% were involved in other livelihood activities to earn more income, especially when they have experience conflict on their farms.

Table 1. Frequency Distribution of Socio-economic Characteristics of Farmers

Variables	Frequency (n=365)	Percentage
Age group		
< 30	25	6.8
30 - 60	232	63.6
60	108	29.6
Mean (45±10.54)		

Variables	Frequency (n=365)	Percentage
Gender		
Male	307	84.1
Female	58	15.9
Marital Status		
Single	16	4.5
Married	327	89.5
Divorced	7	2
Widowed	15	4
Educational Status		
No formal education	67	18.4
Primary	117	32.1
Secondary	12457	34.0
Post-secondary		15.6
Immigrant Status		
Native	279	76.5
Non-native	86	23.5
Nature of farming		
Full-time farming	144	39.5
Part-time farming	221	60.5
Number of plot location		
1	275	75.3
2	77	21.1
3	13	3.6
Mean (1.3±0.52)		
Years of Experience		
< 10	93	25.5
10 - 30	235	64.5
> 30	37	10
Mean (23±9.47)		
Income from Crop Production (₦)		
< 150000	181	49.5
150000 - 250000	111	30.5
250001 - 350000	62	17
350001 - 450000	7	2
> 450000	4	1
Mean (168,510±150000)		

Source: Field survey, 2018.

3.2 Plot characteristics

A plot is an area of land planted to a particular type of crop (Alawode, 2013). Farmers' plots may be contiguous or non-contiguous. A total of 462 plots were owned by the respondents. Table 2 shows that the average size of plots allotted for crop cultivation was 2.4 hectares, and most (51.5 %) of the plots fell between 2 – 4 hectares. The average distance of farm plots to nearby roads was 1.2km, while up to 63.6% of the plots were more than 1km from nearby roads. The average distance of farm plots to farmers' places of residence was 12.9km. About 43.1% of the farm plots were between 7km and 13km from the farmers' place of residence, while only 14.6% were less than 7km away. Very few (1.7%) of the plots were indicated as not fertile.

Table 2. Plot Characteristics

Variables	Frequency (n = 462)	Percentage
Size of plots (hectares)		
< 2	148	32
2 – 4	238	51.5
4.01 – 6	64	13.9
> 6	12	2.6
(2.4±1.33)		
Distance to road (km)		
< 0.5	68	14.6
0.5 – 1	100	21.7
> 1	294	63.6
(1.2±0.76)		
Distance to home (km)		
<7	68	14.6
7 – 13	199	43.1
14 – 20	124	26.9
>20	71	15.4
(12.9±5.53)		
Soil quality		
Very fertile	153	33.1
Fertile	301	65.2
Not fertile	8	1.7

Source: Field survey, 2018.

It is expected that the farther the farm plot is from the farmer's place of residence and nearby road, especially for part-time farmers, the greater the likelihood of experiencing conflict. This is because farm supervision would not be optimal. On the other hand, full-time farmers have the tendency to have a temporal place of abode on the farms that are far from their houses to be able to monitor and work on their farms effectively. On the other hand, farm plots that are close to nearby roads might be easily invaded by cattle herds moving along the road while those that are very far from the roads might not be within easy reach of cattle herds.

3.3 Prevalence and pattern of land conflict

3.3.1 *Prevalence of Land Conflict*

The information collected on prevalence of land conflict is presented in table 3. The incidences of conflict on plots were from 1983 to 2017. The results show that most (90.1%) of the plots were affected by conflict. Results further show that the majority (89%) of the conflicts were with pastoralists; only 5.3% were with relatives, while the remaining 5.7% were with other farmers who were non-relatives.

Table 3. Prevalence of Land Conflict

Variable	Frequency	Percentage
Conflict status of plot		
Yes	416	90.1
No	46	9.9
Starting years of conflict		
1983 – 1987	2	0.4
1988 – 1992	8	1.9
1993 – 1997	5	1.3
1998 – 2002	8	1.9
2003 – 2007	37	8.8
2008 – 2012	165	39.7
2013 – 2017	191	46
Conflict with Whom?		
Family member	22	5.3
Other farmers	24	5.7
Pastoralists	370	89

Source: Field survey, 2018.

Land conflict in the study area could therefore be grouped into two major patterns:

Farmer – Farmer: Conflict between a farmer and another farmer, who could be a relative or a non-relative.

Farmer – Pastoralist: Conflict between a farmer and herdsmen.

The distribution of land conflict shows that only 11% of the conflicts were between farmers; the majority (89%) were between farmers and pastoralists.

3.3.2 *Trend of Land Conflict*

The occurrence of conflicts followed an increasing trend across the years as shown in figure 1, except for 1993 – 1997, when there was a slight drop. This could be a result of proper handling of farm border issues which was actually the reason for the majority of the conflicts in that period.

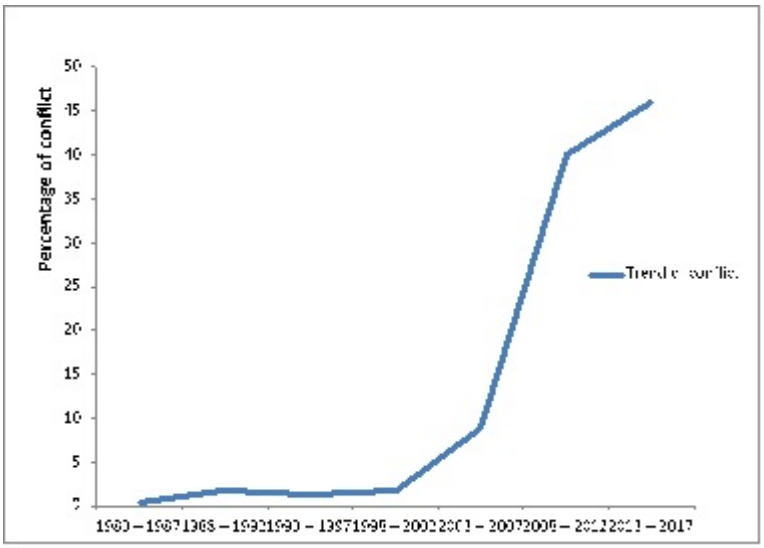

Figure 1. Trend of Prevalence of Land Conflicts (1983 – 2017).

Source: Data analysis, 2018.

Conflict experience shot up from 1.9% in 1998 – 2002 to 8.8% in 2003 – 2007 and since then has been increasing at an alarming rate. There were more conflicts on plots in the period 2003 – 2017 (94.5%) than 1983-2002 (5.5%).

Conflicts over plots were highest in 2013 – 2017 (46.0%), followed by 2008-2012 (39.7%) and were actually lowest in 1983 – 1987 (0.4%), revealing that there have been more land use conflicts in recent years. This is in line with the findings by Alawode (2011) that there were more conflicts on farm plots in recent years as against preceding years.

3.3.3 *Prevalence and Trend of the Different Patterns of Land Conflict*

Table 4 and figure 2 show that the highest level of farmer-farmer conflict was in 2003 – 2007 while the highest for farmer-pastoralist was in 2013 – 2017. The lowest level of farmer-farmer conflict experienced was in 1983 – 1987 while the lowest for farmer-pastoralist was in 1998 – 2002 when it was just emerging in the area. Considering the trend of farmer-farmer conflict over the years, figure 2 reveals that from the starting years of conflict, farmer-farmer conflict was increasing up to 1992, then declined. It picked up again and reached its peak between 2003 and 2007, declining thereafter. This could be attributed to proper handling of conflict issues and intervention from the farmers' leaders and the village heads. The results further reveal that farmer-pastoralist conflict started in 1998, and since then, has been increasing at an alarming rate. This also, could be attributed to increased influx of herdsmen in search of greener pastures for their animals.

Table 4. Prevalence of the Different Patterns of Land Conflict

Starting years of conflict	Farmer – Farmer		Farmer – Pastoralist		Total (prevalence of conflict)
	Frequency	%	Frequency	%	
1983 – 1987	2	0.4	0	0	2
1988 – 1992	8	1.8	0	0	8
1993 – 1997	5	1.3	0	0	5
1998 – 2002	2	0.4	5	1.2	8
2003 – 2007	20	4.9	17	4.1	37
2008 – 2012	4	0.9	162	39	165
2013 – 2017	5	1.3	186	44.7	191
Total (pattern of conflict)	46	11	370	89	416

Source: Field survey, 2018.

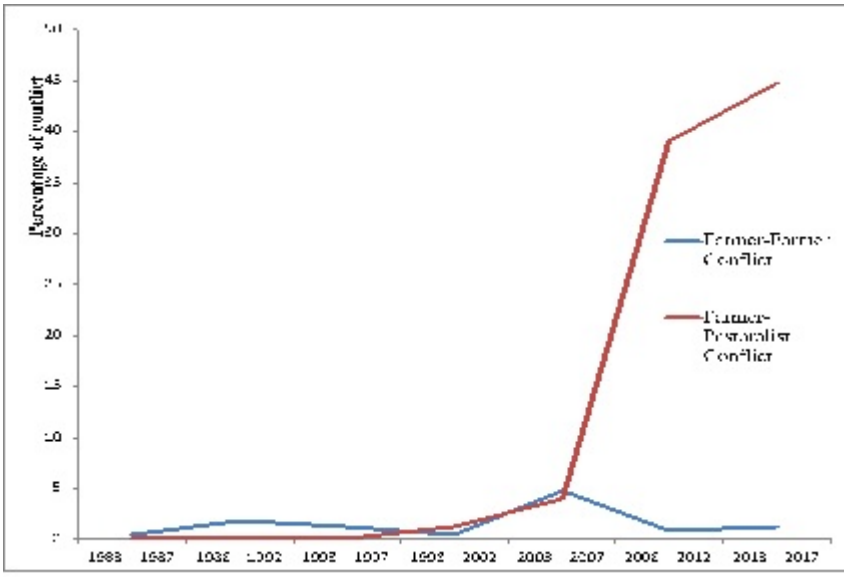

Figure 2. Trend of the Different Patterns of Conflict Over the Years (1983 – 2017).
Source: Data analysis, 2018.

The majority of the conflicts in recent years were between farmers and pastoralists, showing that the alarming increase in land conflicts in recent years has been due, mainly, to the conflicts between farmers and herdsmen. The low prevalence of farmer-farmer conflict could be as a result of the availability of more than enough cultivable land for smallholder farmers in the study area and an organized system of allocating land as indicated by the key informants interviewed. These key informants are stakeholders, i.e. they are also farmers in the area. According to them, they have more than enough land for farming, so they do not see any reason for unjustified struggle for farmland with one another. Furthermore, their traditional way of addressing land use conflicts, which they strongly adhere to, is sufficient to foster caution amongst them.

3.4 Estimation of the determinants of land conflict

In estimating the factors influencing the prevalence of land conflict among the respondents in the study area, a probit regression model was fitted to the study data. The conflict status of the household (1 = conflict ongoing, 0= otherwise) was the dependent variable while a number of independent variables were

employed. The results of the fitted form of the regression function are presented in table 5.

Table 5. Probit Analysis of the Determinants of Land Conflict

Variables	Marginal Effect	Coefficient	Z	P > / Z /
Number of Plot Location	0.0069030	1.075907	2.98	0.003***
Plot Distance to Nearby Road	-0.0035884	-0.5592937	-1.97	0.049**
Plot Distance to Farmer's Residence	0.0019858	0.3095085	4.68	0.000***
Nature of Farming	0.0067603	1.05367	2.74	0.006***
Soil Quality	0.0094493	1.472783	3.42	0.001***
Age of Farmer	0.0000233	0.0036376	0.17	0.868
Immigrant Status of Farmer	-0.0002116	-0.0329794	-0.08	0.93
Number of obs = 200		LR chi2(7) = 113.78		
Prob > chi2 = 0.0000		Pseudo R2 = 0.6791		

*** significant at 1% level ** significant at 5% level

Source: Data analysis, 2018.

The regression results in table 5 show the determinants of agricultural land conflict in the study area. The specified model is found to produce a good fit for the study data. Results show that number of plot location, plot distance to farmer's residence, nature of farming, and soil quality had significant positive relationships with conflict status at 1%, that is, the probability of farmers experiencing land conflict increases as these variables increase. However plot distance to nearby road had a significant negative relationship with conflict status at 5%. This implies that as plot distance to nearby road increases, the probability of being affected by conflict reduces.

Marginal effect estimates show that as the number of farm location increases by one, the probability of the farmer being affected by conflict on one or more of his farm plots increases by 0.007. This is expected because dispersed farm plots are more difficult to monitor, thus predisposing such to encroachment and cattle invasion. A kilometre increase in the distance of the plots from farmer's residence increases the probability of being affected by conflict by 0.002. This is also expected and could be attributed to poor monitoring as a result of distance.

Part-time farmers have increased likelihood of 0.007 to be affected by conflict. Such farmers have less time to visit and watch over their farm plots as compared to their counterparts who are into full-time farming. Also, fertile plots have a higher probability of being affected by 0.01. This is expected as flourishing crops are very attractive to grazing animals and could lead to invasion of farmlands by herdsmen with their animals, resulting in conflict between farmers and herdsmen.

However, a kilometre increase in the distance between the plots and a nearby road decreases the probability of the plots to be affected by conflict by 0.004, implying that the farther a plot is to the roadside, the less likely it is that the plot would be affected by conflict. This could be as a result of the fact that such a plot would be less conspicuous or attract less attention.

3.5 Effect of land use conflict on crop production

Table 6 shows the effect of land conflict on crop production. It shows that there is significant difference in the output from a plot affected by conflict as against a plot not affected by conflict. There is a huge reduction in crop output as a result of conflict with a magnitude of 0.49. This implies that land conflict reduces crop output by 49%. From a policy point of view, this points to the fact that land use conflict has significant adverse impact on food production.

Coefficients of other variables also reveal their effects on crop production. A year increase in age increases crop output significantly (at 1%) by 1.3%. This could be attributed to acquisition of more farming experience with increase in age. Contrary to what was expected, level of education significantly (at 1%) decreased crop output by 26%. This could be because the more educated the farmer, the more they reduce their involvement and commitment to farming activities and get involved in other activities which they consider more attractive.

The number of plot locations and distance of plot to farmer's residence, at 1% level of significance, decreased crop output by 20% and 3.1% respectively. This, in relation to the descriptive evidence, could be as a result of the failure to monitor the plots closely. The magnitude of the loss from plot distance to farmer's residence, however, could be attributed to the fact that most farmers whose farms are very far from their residence, have temporary places of abode on their farms, in which they lodge anytime they need to work on their farms. The nature of farming affects crop output significantly at 10%. It decreases

output by 13%, implying that output from part-time farmers is significantly below the output from full-time farmers by 13%.

Table 6. Multiple Regression to Estimate the Effect of Land Use Conflict on Crop Production

Variables	Coefficient	t	P > / t /
Conflict Status	-0.487351	-3.58	0.000***
Age of Farmer	0.0135268	3.66	0.000***
Education Level of Farmer	-0.2639842	-3.38	0.001***
Number of Plot Location	-0.2024742	-3.47	0.001***
Plot Distance to Farmer's Residence	-0.0313336	-4.44	0.000***
Nature of Farming	-0.1314273	-1.73	0.084***
Soil Quality	0.027178	0.62	0.534
F (8, 244) = 11.77	Prob > F = 0.0000		
R-squared = 0.7785	Adj R-squared = 0.7548		

*** significant at 1% *significant at 10%

Source: Data analysis, 2018.

3.6 Effect of land use conflict on livelihood income of farmers

Table 7 shows the results on the effect of land use conflict on the livelihood income of farmers, coupled with effects of some other socio-economic variables. The results show that land use conflict negatively influences the livelihood income of farmers significantly at 1%; bringing about up to 74% reduction in their income from farming. Farmers who were not affected by conflict realized income higher by 74% compared to their counterparts who were affected by land use conflict.

Coefficients of other variables also revealed their effects on farmers' income. Age was found to reduce livelihood income by 1.3% at 10% level of significance. A year increase in the age of the farmers reduced their income by 1.3%; considering an average age of 49 years, this could be as a result of reduced agility which accompanies ageing.

Results further show that the size of farmers' households influences their livelihood income significantly at 1% level. The result implies that an additional member to the household brings about an increase in farm income by 6.1%. This could be as a result of the household members contributing to the labour force

employed by the farmers, which has a tendency to increase the income that could be realized from the farm.

Furthermore, the size of farm plots cultivated by farmers significantly affects their income at 1% level of significance. The result shows that an increase in plot size by 1 hectare increases income from the farm by 4.7%. This implies that increase in the area of land under cultivation will boost the income of farmers..

Table 7. Effect of Land Use Conflict on Livelihood Income of Farmers

Variables	Coefficient	t-value	P > / t /
Conflict Status	-0.741458***	-6.27	0
Age	-0.012675*	-2.65	0.06
Household Size	0.061102***	4.18	0
Plot Size	0.046921***	7.86	0
Level of Education	0.0625845	1.08	0.283
Sex	0.0818324	0.84	0.566
Marital Status	0.0772869	1.26	0.332
F (8, 191) = 43.06	Prob > F = 0.0000		
R-squared = 0.6433	Adj R-squared = 0.6284		
Root MSE = 64505			

*** Significant at 1%, * significant at 10%

Source: Survey data, 2018.

4. Conclusion

This study analysed the prevalence and pattern of land use conflict, as well as its effect on agricultural production and livelihood of farmers. The findings revealed that the conflict challenges faced by farmers on agricultural land use come primarily from pastoralists. Agricultural land use conflict has persisted for far too long and is increasingly becoming a threat to lives and agricultural productivity and sustainability. The issues of land use conflict need to be addressed to ensure sustainability in agricultural production and development. The findings from this study highlight the need to drive policy formulation and implementation in a direction that will lessen the burden of farmers on land use, particularly crop farmers. There is the need for policy formulation that will regulate nomadic pastoralism and promote resolution of conflicts relating to agricultural land use. More attention, through policy designs and agricultural

programmes, should be given to the protection of crop farms against undue invasion.

Furthermore, the following recommendations are made:

i. Traditional and local leaders should be consulted and carried along in proffering solutions to the problem of land conflict, especially, as regards agriculture. It is of utmost importance to acknowledge the need for local informal institutions and work with them in tackling land-related conflict.

ii. There is need for the intervention of non-governmental organizations in managing conflict, particularly as regards awareness and designing of preventive measures. In addition, non-governmental organizations should provide assistance to farming households in conflict mitigation and also help in pushing for favourable national policies.

iii. Government should make provision for grazing reserves as a panacea to the intractable farmer-pastoralists conflicts on land use. The settlement of nomadic herdsmen will offer a lasting solution to this pattern of conflict. This will facilitate the peaceful coexistence of the pastoralists and crop farmers and will give room for cattle grazing without destroying farmers' crops.

iv. There is the need to educate both farmers and pastoralists on peaceful co-existence and mutual understanding and also get them well informed on land use regulations.

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