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# Crop Farmers and Pastoralists' Socio-Economic Characteristics Influencing Agricultural Land Use Conflicts in Abia State, Nigeria

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**Abstract:** *This study analyzed the influence of socioeconomic characteristics on crop farmers and pastoralists' land use conflicts in Abia State, located in the Southeastern part of Nigeria. Data were collected with structured questionnaire, complimented with observation from 300 crop farmers and 40 pastoralists and analyzed using ordinary least squares regression model. On the part of the crop farmers, the result indicates that three of the ten independent variables (sex, family size and farm size) influenced positively and significantly the perceived causes of crop farmers and pastoralists land use conflict. On the part of the nomads, household size ( $t = 2.131$ ), educational level ( $t = 2.222$ .) and social organization membership ( $t = 2.144$ ) all influenced positively the perceived causes of land use conflict at 0.05% probability level. Herding experiences ( $t = 3.141$ ) also influenced positively and significantly the perceived causes of land use conflict at 0.01% level of significance. It was recommended that the government should fasten the creation of more grazing reserves following the challenges of climate change for easy access by the pastoralists. The government should fasten the proposed demarcation of livestock route from the North to the South.*

**Keywords:** Conflicts, crop farmers, pastoralists, land use, land tenure

**I**n Nigeria, agriculture plays a leading role in the non-oil sector. It supports 63 percent of the population directly by providing about 28 percent of the gross domestic product (GDP) from the total exports, and 70 percents non-oil export production (Oladele, 2004; Oladele & Oladele, 2011). Nigeria as an agrarian country, the production of foods and other raw materials is a necessary ingredient for the take-off of all other sectors of the nation's economy. About 70% of the Nigerian total labour force is employed within the agricultural sector. (Oladele & Oladele, 2011). Most of these farmers operate land owned through inheritance and acquisition through family ties. A key feature of the Nigerian agriculture is the dominance of small holder farms that cultivated less than 5 hectares (Eze *et al*, 2011). They have limited resources and are dependent on traditional implements.

According to Lambrou and Laub (2006), 75 percent of today's food comes from 12 arable crops and five animal species, with just three arable crops (rice, maize and wheat) accounting for about 60 percent of the calories and proteins obtained from plants. Worldwide, arable crops include a wide range of annual crops of primary importance such as maize, rice, sorghum, millet, cassava, cowpea, wheat, soybeans, melon, groundnut yam, vegetables and so on. In Nigeria, production of arable crops is essentially the prominent feature of agricultural activities. Indeed, almost all farmers in Nigeria cultivate one or more arable crops for food and income. According to Fayinka (2004), Nigerian agricultural production is dominated by rural-based small scale arable crop producers, who account for about 80% of total food requirement. In a study on production of some major arable crops in Nigeria, Okuneye et al., 2001 (cited in Adisa, 2012) revealed that the average farm size in arable crop production was 4.58 ha. Central Bank of Nigeria, CBN, (2005) reported that 36.25 and 82.41 million hectares of arable crops were cultivated in 2004 and 2005 respectively. The CBN report further stated that production of arable crops increased from 88.3 million tons in 2001 to 110.8 million tons in 2005. By far the most widely grown arable crop in Nigeria is maize, accounting for 6.6 and 7.5 million hectares in 2004 and 2005 respectively. Maize is grown in almost every part of the country (CBN, 2005). Most arable crop farmers rely on rainfall to produce, with farming activities normally beginning as soon as the onset of rains. Apart from being veritable sources of income for farmers, arable crops are processed into other useful items at industrial and household levels.

Cattle herding is dominated almost entirely by the Fulani tribe in Nigeria, Iro (1994) gave a vivid documentation of the herding system of the Fulani in Nigeria, and most of what is presented hereunder was derived from his according to him, herding is a daunting task, and contrary to widespread belief, it is not the delight of the Fulani- they herd not as a matter of choice but as a necessity. Iro (1994) found that about 75% of the sampled nomadic pastoralists maintained that cattle herding is not only toilsome, but also becoming increasingly strenuous. The optimum Fulani cattle herd size lies between 80 and 100, with a preponderance of female over male at ratio 4:1, the Fulani maintains a balanced functional species composition that is made up of beefers, milkers, breeders, carriers, and stock beautifiers. Iro (1994) also stated that the slow-maturing Sokoto Red cow and the Iyre—horned white Fulani cattle are the mainstay of the pastoral Fulani holdings. White and Wickens (1976), cited by Iro, 1994) disclosed that the white Fulani, though less hardy, has higher milk and yield compared with the Sokoto Red.

Cattle belonging to individual family members are usually herded together, with male family members assuming automatic rights to all cattle, making it difficult to determine cattle ownership by female family members. Fulani men possessing less than twenty cows are seen as poor, while women having six cows are considered as rich (Iro, 1994). Women, however, own most of the small ruminants and all the poultry (Swinton, 1987 in Iro, 1994). Through most Fulani men herd cattle well pass the middle age, herding is dominated by the youths, while decisions about grazing are mainly made by the elderly family members. The Fulani herdsman makes excellent use of sigh language, the cane and verbal command to drive the animals, with faster animals occupying the front rows. During migration, a typical herd consisting of several family units move in a column of up to five meters wide and two kilometers long and by the time it passes any

given point, everything that stands at that point is destroyed' (Fricke, 1979; and Vengroff, 1980 as cited in Iro, 1994).

Describing the annual herding cycle of the Fulani, Iro (1994) stated that the herding season begins with southward movement of the herd and along rivers and stream valleys from October to December- marking the end of rainy season and beginning of dry season. January to February is the harmattan season that is characterized by longer grazing hours, herd splitting, and more frequent visits to stable water sources. These thus increase southward movement of the herds. The months of March and April are usually the toughest for the herdsman and his cattle, as it is the hottest period in the grazing calendar. Indeed, he now herds his cattle only in the evenings and nights (Riesman, 1977, as cited in Iro, 1994). May and June signify the end of dry season and vegetation begins to appear; this also marks the beginning of northward movement of cattle herds. From this period up till milk production and shorter grazing hours, cattle herding coincides significantly with arable crop production. Farmer- herdsman conflict therefore becomes prevalent during this period.

In the Abia state of Nigeria, there exists a gap in understanding the socioeconomic factors influencing conflict between pastoralists and farmers, even though there is heavy presence of the Fulani nomads in the state. It is however unfortunate that despite the heavy presence of these nomads in Southeastern Nigeria, little or nothing is known about their interaction with the host farmers. Because there is no existing empirical data on this, information available is based on guesses, suppositions or in literature based on occurrences from other parts of the world. These have given rise to a wide gap in knowledge, which has inhibited policy formulation for solving the re-occurring conflict situations in the area. The specific objective of the study was to analyze the socioeconomic factors influencing crop farmers and pastoralists agricultural land-use conflicts.

### **Methodology**

This study was conducted in Abia State. Abia State lies within approximately latitudes  $4^{\circ} 40'$  and  $6^{\circ} 14'$  north, and longitudes  $7^{\circ} 10'$  and  $8^{\circ}$  east. The state shares common boundaries to the north with Ebonyi state; to the south and southwest with Rivers State; and to the east and southeast with Cross River and Akwa Ibom states respectively. To the west is Imo state, and to the northwest is Anambra State. The state covers an area of about 5,243.7 sq.km which is approximately 5.8 percent of the total land area of Nigeria (NPC, 2006) Abia state has a variety of landforms, even though it is dominated by flat and low-lying land, generally less than 120m above sea-level (Dale, 2010). The low-lying plain is the inland extension of the coastal plain from the Bight of Benin. The central part of the state is characterized by undulating land with many hills. The highland areas are part of Enugu – Nsukka-Okigwe cuesta. This area has an average height of between 120m and 180m above sea level. From Okigwe (Imo state), this escarpment extends in a west-East direction and, on getting to Afikpo (Ebonyi State), veers south-eastwards to Arochukwu where it terminates.

There are two seasons in the year, namely: the rainy season and the dry season. The rainy season begins in March and ends in October with a break in August usually referred to as the "little dry season." The dry season, which lasts for four months, begins in November. Heavy thunderstorms are characteristic of the onset of the rainy season. The total rainfall decreases from 2200mm in the north to 1900 in the south. The hottest

months are January to March when the mean temperature is above 27 degrees Celsius (Dale, 2010). The vegetation in Abia State is ordinarily considered part of tropical rain forest which is the dominant natural vegetation in most parts of the southern Nigeria. The northern part of the state has rich savannah vegetation of which the bamboo (*Dendrocalamus strictus*) is a typical grass species. The multi-stage (3-stage) sampling technique was adopted in the process of sample selection. The first stage was a purposive selection of two local government areas with conflict occurrence namely Umunneochi and Ugwunagbo. The second stage was the purposive selection of Isuochi and Lokpanta communities from Umunneochi Area, while Uturu was selected from Ugwunagbo Area. The third stage involved the proportionate selection of 105 crop farmers from a total of 1050 affected farmers from Isuochi community, and 69 crop farmers from a total of 695 crop farmers from Lokpanta and a selection of 126 affected crop farmers from a total of 1260 affected farmers from Uturu. This gave a total sample size of 300 crop farmers selected from the household lists of 3,005 crop farmers affected by the conflicts obtained and compiled by various agencies of the State (Office of the Governor on Peace and Conflict Resolution; Local Government and Chieftaincy affairs). The household heads were used as the sampling unit. The household heads included widows who fend for themselves and family. This was followed by a selection of 40 nomads from their various camps near the affected communities, this gave a grand total of 340 respondents. Both primary and secondary data sources were used. The primary data were collected through questionnaire (survey), observation, and interview schedule. The data were collected from farmers, nomads, community leaders, youth leaders and the police. The secondary data were obtained from publications, such as research reports, academic journal and conference proceedings found relevant to this study. Ordinary Least Squares (OLS) Regression Model was used to achieve the objective of the work and to test the hypotheses.

### Hypotheses (Null)

1. There is no significant relationship between crop farmers' socioeconomic characteristics and their perceived causes of land use conflict with pastoralists.
2. There is no significant relationship between pastoralists' socioeconomic characteristics and their perceived causes of land use conflict with crop farmers.

### Hypotheses 1

There is no significant relationship between crop farmers socioeconomic characteristics and their perceived causes of land use conflict. This was established using ordinary least squares multiple regression model (OLS) which produced the t-value.

The model is implicitly specified as follows:

$$Y_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, U)$$

Where:

Y = Dependent variable (respondents sum of rating of perceived causes of conflicts).

$X_1$  = Sex (dummy male= 1, female =0)

$X_2$  = Age (years)

$X_3$  – Marital status (single 1, married 2, widow 3, and Widower 4)

$X_4$  = Family size (number of persons in a household)

$X_5$  = Level of education (no formal 0, quaranic education 1, primary 2, secondary 3, tertiary 4)

$X_6$  = Farming/Herding experience (number of years in farming/herding business)

$X_7$  = Farm size/Herd size (hectare of farmland cultivated/number of animals)

$X_8$  = Income (Naira)

$X_9$  = Membership of organization (Dummy Yes=1, No=0)

$X_{10}$  = Number of organizations belonged (number)

U= error term

***A priori expectation:*** the coefficients of  $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10} > 0$ ). Four functional forms of the model namely linear, double log, semi-log and exponential models were estimated. A lead equation (double log) was chosen based on the statistical significance of the variables, magnitude of coefficient of regression, and the value of coefficient of multiple determination ( $R^2$ ).

## Hypotheses 2

There is no significant relationship between pastoralists' socioeconomic characteristics and their perceived causes of land use conflict. This was established using ordinary least squares multiple regression model (OLS) which produced the t-value.

The model is implicitly specified as follows:

$$Y_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, U)$$

Where:

Y = Dependent variable (respondents sum of rating of perceived causes of conflicts).

$X_1$  = Sex (dummy male 1, female 0)

$X_2$  = Age (years)

$X_3$  – Marital status (single 1, married 2, widow 3, and Widower 4)

$X_4$  = Family size (number of persons in a household)

$X_5$  = Level of education (no formal 0, quaranic education 1, primary 2, secondary 3, tertiary 4)

$X_6$  = Farming/Herding experience (number of years in farming/herding business)

$X_7$  = Farm size/Herd size (hectare of farmland cultivated/number of animals)

$X_8$  = Income (Naira)

$X_9$  = Membership of organization (Dummy Yes=1, No=0)

$X_{10}$  = Number of organizations belonged (number)

U= error term

***A priori expectation:*** the coefficients of  $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10} > 0$ ). Four functional forms of the model namely linear, double log, semi-log and exponential models were estimated. A lead equation (exponential model) was chosen based on the

statistical significance of the variables, magnitude of coefficient of regression, and the value of coefficient of multiple determination ( $R^2$ ).

**Table 1: Crop farmers socioeconomic determinants of the perceived causes of land use conflict between pastoralists and crop farmers**

Variables	Linear Function	Double Log	Semi-log	Exponential Function
Constants	11.222	16.201	71.001	19.224
Standard error	12.211	6.019	0.888	0.453
$R^2$	0.630	0.699	0.467	0.676
N	300	300	300	300
F-value	61.321	45.122	73.111	46.360
Sex ( $x_1$ )	0.555 (1.811)	0.221 (9.114)**	0.221 (0.333)	0.001 (-1.522)
Age ( $x_2$ )	0.777 (-1.991)	0.552 (-0.990)	0.989 (0.111)	0.661 (0.868)
Marital Status( $x_3$ )	0.411 (1.200)	0.033 (0.333)	0.000 (0.666)	0.002 (-1.236)
Household Size ( $x_4$ )	0.225 (0.122)	0.311 (2.888)**	0.068 (-1.333)	0.009 (-3.331)
Educational Level ( $x_5$ )	0.037 (1.955)	0.037 (0.444)	0.090 (0.222)	0.888 (1.179)
Farming Experience ( $x_6$ )	0.112 (0.089)	0.001 (0.111)	0.001 (1.555)	0.011 (3.141)
Farm Size ( $x_7$ )	0.077 (0.664)	0.700 (3.222)**	0.411 (-1.061)	0.218 (0.189)
Monthly income ( $x_8$ )	0.321 (0.045)	0.014 (1.112)	0.002 (0.331)	0.000 (-1.981)
Membership of Social Org. ( $x_9$ )	0.311 (0.011)	0.666 (1.199)	0.223 (0.33)	0.222 (2.144)
Number of Social Org belonged ( $x_{10}$ )	0.279 (1.003)	0.000 (0.017)	0.021 (1.606)	0.006 (1.001)

Field survey, 2016

\*\* Significant at 1% probability level

### Hypotheses 1

There is no significant relationship between crop farmers' socioeconomic characteristics and their perceived causes of land use conflict.

Ordinary least square multiple regression analysis produced the t-ratios that were used to test the hypothesis. Based on the appropriateness of the signs, number of significant variables and magnitude of the  $R^2$ , the double log was chosen as the lead equation.

The result of the ordinary least square multiple regression analysis in Table 1 reveals that 70% of variation in crop farmers perceived causes of the conflict could be

explained by the combined effects of the socio-economic variables in the equation. The result indicates that three of the ten independent variables (sex, family size and farm size) influenced positively and significantly the perceived causes of crop farmers and pastoralists land use conflict. Recall that the priori expectation sets  $x_1$ - $x_{10}$  will all be positive and significant ( $>0$ ). However, from the result, only sex( $x_1$ ), family size ( $x_4$ ) and farm size ( $x_7$ ) are in complete agreement with the a priori expectation.

The coefficient of determination for sex influenced positively the perceived causes of conflict with a t-value of 9.114 which was significant at 0.01 probability level. This implies that since majority involved in crop farming in the study are male, they had more disposition and capacity to identify the causes of conflict than the female. This means that the more the number of male farmers, the more the tendency to identify the causes of conflicts. The feminist composition of farmers may predispose their lethargy to issues involving conflict as against male farmers who would seek more opportunities to venge and express their dis-satisfaction with the pastoralists.

This confirms the findings of Sulaiman *et al.*, (2011) in a study on influence of gender in conflict incidence. He observed that males are more affiliated with conflicts as they are more exposed to the use of Fadama resources that are sources of conflicts. Even though the resources available in the Fadama areas are sources of conflicts, the economy of the farming families is directly hinged to these resources dominated in use by the male.

Again, household size and farm size influenced positively the perceived causes of conflict as indicated by t-values of 2.888 and 3.222 respectively at 0.01% probability level respectively. The above implies that the larger the family size, the more the perceived causes of land use conflict. This could mean that each member of the farm family is a potential analytical unit. Thus, each member furnishes facts on land use conflicts as he or she perceives it, more than a small household. Again, large households could also entail the availability of so many farm soldiers in the farm family. This could be more so when young people dominate the household. Each person in his/her capacity sees it as a challenge not only to defend the farm from the ravaging herdsmen, but it is also another way of maintaining the integrity of the home. The positive correlation between large farm size and perceived causes of land conflict implies that the larger the farm size, the higher the perceived causes of land use conflict. Farm size could reflect the asset base of a farm. Large farm size could indicate large asset base. This could also mean a high level of farm investment. Most large farms operate on commercial scales and the farm is often on full time production. A high level of investment would entail an increased level of consciousness to ensure that activities are in course for efficiency. Thus, the detection of causes of land conflict with the high level of apprehension is normal and expected. High rate of destruction by herds could incite rampage and wanton destruction.

This is in line with Collier and Hoeffler (2005) who posits that cost of production by arable crop farmers have very strong relationship with conflict. Costs of inputs and services are highly sensitive to conflict situation because during crises, cost of goods and services increase and thus cost of production increases. Land is the key source from which crop farmers/pastoralists and most other conflicts on the world emanated (Kurer, 2001). The expansion of Fadama cultivation and crop farmers cultivation of more lands often leads to blocked cattle routes which is a major cause of conflict which explains the strong relationship between land size and conflicts.



However, the other variables; age ( $x_2$ ), marital status ( $x_3$ ), educational level ( $x_5$ ), farming experience ( $x_6$ ), monthly income ( $x_8$ ), membership of social organization ( $x_9$ ),

**Table 2: Pastoralists' socioeconomic determinants of the perceived causes of land conflict between pastoralists and crop farmers.**

Variables	Linear Function	Double Log	Semi-log	Exponential Function
Constants	11.232	12.111	61.331	29.724
Standard error	12.411	7.111	0.923	0.643
R <sup>2</sup>	0.666	0.451	0.677	0.771
N	40	40	40	40
F-value	55.333	35.122	63.411	56.260
Sex ( $x_1$ )	0.633 (0.444)	0.009 (0.214)	0.231 (1.133)	0.000 (0.712)
Age ( $x_2$ )	0.887 (-0.121)	0.023 (-1.990)	0.998 (2.009)	0.242 (1.238)
Marital Status( $x_3$ )	0.662 (2,001)	0.044 (0.311)	0.001 (1.332)	0.002 (0.211)
Household Size ( $x_4$ )	0.33 (0.115)	0.211 (0.091)	0.007 (-2.133)	0.065 (2.131)*
Educational Level( $x_5$ )	0.898 (1.911)	0.006 (0.131)	0.008 (0.112)	0.898 (2.222)*
Herding Experience( $x_6$ )	0.213 (2.229)	0.008 (0.222)	0.005 (0.115)	0.011 (3.141)**
Herd Size ( $x_7$ )	0.789 (1.724)	0.771 (3.112)	0.016 (0.361)	0.218 (0.189)
Monthly Income( $x_8$ )	0.553 (2.045)	0.006 (3.002)	0.006 (1.301)	0.000 (-1.981)
Membership of Social Org. ( $x_9$ )	0.212 (0.211)	0.987 (0.199)	0.008 (1.313)	0.222 (2.144)*
Number of Social Org belonged ( $x_{10}$ )	0.288 (0.903)	0.014 (0.117)	0.008 (0.806)	0.006 (1.001)

\* Significant at 5% probability level

\*\* Significant at 1% probability level

and number of social organizations belonged ( $x_{10}$ ) were not significantly related to the perceived causes of land use conflict. They do not exert significant impact and as such are inconsequential. They should not be considered when formulating policies and designing programs. .

### **Hypothesis Two**

There is no significant relationship between pastoralists' socio-economic characteristics and their perceived causes of the conflict.

Ordinary least square multiple regression analysis produced the t-rates that were used to test the hypothesis. Based on the appropriateness of the signs, number of significant variables and magnitude of the  $R^2$ , the exponential functional form was chosen as the lead equation for the pastoralists.

On the part of the nomads, the result in Table 2 reveals that 77.1 percent variation in causes of land use conflicts could be attributed to the combined effects of the socioeconomic attributes investigated in the study. The t-values of household size ( $t = 2.131$ ), educational level ( $t = 2.222$ .) and social organization membership ( $t = 2.144$ ) all influenced positively the perceived causes of land use conflict at 0.05% probability level. Herding experiences ( $t = 3.141$ ) also influenced positively and significantly the perceived causes of land use conflict at 0.01% level of significance.

The positive influence of education, membership of social organization, years of rearing animals and household size imply that increasing the magnitude of the variables increased the perception of the causes of land use conflict among the pastoralists. Education enlightens people and exposes them to information as regards their existence, treating them as inferior could lead to conflicts. The form of education most of the nomads received (Quranic) is religion and culture bound. It brings faith to bear each time the other person is not in the Islamic faith. This would engender their apprehension when dealing with non-Muslims and increase their consciousness. Through their membership of many Islamic organizations and groups they also received information on the things around them and this enlightens and empowers them as well. Herding experience of nomads over the years may lead them to claim ownership of the land their animals graze on. Because they are allowed access to parcels of land over a long period of time may make them resist attempts at evicting them. They may also be seeing land as a natural resource which no one should prevent or deny another access to the use. Increased household size allows several members of the family the opportunity to access information and share ideas. This could predispose increased analytical spirit and thus increase their perception of the causes of land use conflict.

The positive signs exhibited by the variables of interest are in complete consonance with a priori expectation earlier stated. Therefore, the null hypothesis which states that there is no significant relationship between crop farmers and pastoralists socioeconomic characteristics and their perceived causes of crop farmers/pastoralists conflict was rejected.

## Conclusion

The findings show that socioeconomic variables influencing crop farmer and pastoralists' land use conflict were sex, household size, farm size, education level, herding experience, and organization membership. Furthermore, the results reveal that low participation of women in politics was fostered by marginalization, discrimination, ethnicity, religion, and the nature of post-colonial politics. Based on these results, this study recommends that government should eliminate structural and legal obstacles that hinder women's participation in politics and decision-making and hold those obstructing them accountable. In sum, civil society organizations and government should offer training programs to young people, women, and men on political systems, including women rights to participation in politics and in the policymaking process.

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