

FOREST CONFLICT: IMPLICATION ON SUSTAINABLE FOREST MANAGEMENT IN EDO STATE, NIGERIA

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ABSTRACT

Land is the principal source of livelihood which provides for forests and in turn perform the ecological and hydrological functions needed to ensure the survival of biological life. Today, agricultural land and forest resources have become extremely scarce due to both rapid population increases and governance (policy and institutional) failures. Societies everywhere have competed for natural resources to enhance their livelihoods and this have further resulted to conflicts of all kinds. Therefore, this study aimed at assessing forest conflicts and its implication on sustainable forest management in Edo State. Four communities (Okomu, Imasabor, Eka, and Ominike) were randomly selected from four forest reserves (Okomu, Ologbo, Urhonigbe and Ekiadolor respectively). These reserves were randomly selected from the nine functional forest reserves in the state. The population sampled from these villages were 40 in Okomu village, Imasabor (27), Eka (32), and Ominike (30), using 2.5% sampling intensity making a total of 129 respondents. Data were collected using structured questionnaire and data were analyzed using descriptive statistics, chi-square and Logit regression at $\alpha_{0.05}$. Result showed that 48,055.80 hectares out of 200,960 hectares of the forest estate has been ceded through de-reservation over the years bringing the current area of the forest estate to about 152,904 hectares or about 76.1% of the total land area. Majority of respondents were male (75.8%), between 41-60 years (50.5%), had primary education (45.0%), farmers (90.8%), married (91.7%), had farming experience of between 1-20 years (65.0%) and 89.2% were indigenes. Majority (70.8%) of respondents had their farmland located outside the forest reserves. Major factors that cause conflict in the study area are government laws, forest encroachment, and increased competition over scarce land with odds-ratio of 12.06, 5.28, and 3.07 respectively. It was revealed that there was a significant relationship between educational status of respondents ($p = 0.005$; $\chi^2 = 12.91$, $df = 3$), location of farms ($p = 0.000$; $\chi^2 = 23.15$, $df = 1$), nativity ($p = 0.005$, $\chi^2 = 7.92$, $df = 1$), gender ($p = 0.000$; $\chi^2 = 10.08$, $df = 1$), age ($p = 0.001$; $\chi^2 = 25.59$, $df = 3$), marital status ($p = 0.001$; $\chi^2 = 20.01$, $df = 2$) and occupation ($p = 0.000$; $\chi^2 = 30.83$, $df = 1$). Conflicts can be linked with the utilization of forest resources by multiple actors or stakeholders in the state.

Keyword: Conflict, sustainable management, de-reservation, high population density

INTRODUCTION

Conflicts are common in forest management and they exist practically in all countries. Forest related conflict can be observed at different levels and with varying dimensions and intensities. The reason behind forest conflicts is the fact that forest management is multi-objective and involve many stakeholders (local forest users, different government agencies in and outside forest administration, civil societies and the private sectors) often having competing interest (Adekunle *et al.*, 2010). In addition, conflicts over natural resources such as land, water and forest is ubiquitous. Societies everywhere have competed for natural resources to enhance their livelihood.

Furthermore, owing to the increase in population, the scrambling for natural resources to meet human needs creates conflict among competing users and often results in adverse impact both to the land and to its living and non-living resources (Cotula *et al.*, 2004). Consequently, agricultural production and forest conservation are two vital resources in the rural areas which are closely integrated to each other in a long history of human civilization. The promotion of one often leads to the destruction of the other leading to conflicts (Cotula *et*

al., 2004). These conflicts have often emanated from interaction between forestry administration and the rural farmers on land within and around the forest reserves (FAO, 2003). Marfo (2006) thus asserted that it is not surprising that natural resources management has been associated with conflicts due to the multiple actors or stakeholders with diverse interests, perceptions, values and claims involved in the use and management of these resources. Therefore, this study aimed at investigating forest conflicts and its implication on sustainable forest management in Edo state, Nigeria.

MATERIALS AND METHODS

Description and location of the study area

Edo State has a land mass of 19,840 km². Lying between latitudes 05° 5' N and 07° 35' N, and between longitudes 05° 4' E and 06° 45' E. It is bounded by Ondo State in the North and East and Delta State in the South. The state is dominated by the moist tropical forest with low land rain forest accounting for 76.5% of the total land area (FORMECU, 1999). The state has precisely 48 forest reserves. Although, most of the forest reserves have undergone dereservation process, there are about nine functional forest reserves in the state (Edo State Forestry Department, 2006). Presently, there are 18 local Government Areas in the state. The forestry department has offices in each of the local government areas for monitoring and forestry projects implementation purposes (FRN, 1997).

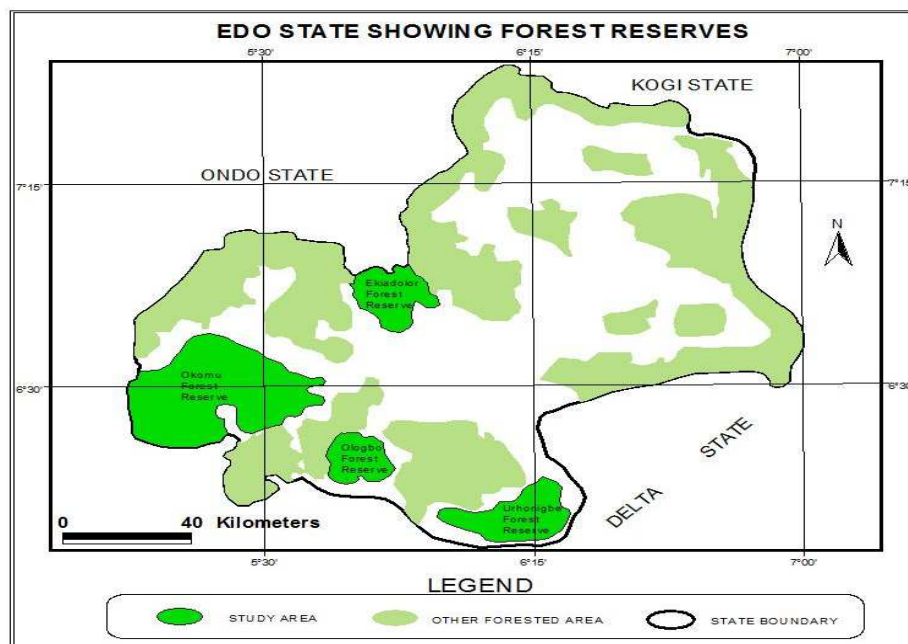


Figure 1: Map of study area

Methods of data collection

Four forest reserves were randomly selected from the nine functional forest reserves in the state. The four selected forest reserves included: Okomu, Ologbo, Urhiongbo and Ekiadolor forest reserves. Simple random sampling was further used to select one community from the communities around the selected reserves. The communities are; Okomu village, Imasabor, Eka, and Ominike. A document that indicated the population of these communities was obtained from the National Population Commission of the State and from this a projection of the 2019 population of each community was computed using the formula:

$$P_n = P_o e^{rt} \dots\dots\dots (1)$$

Where P_n = final population, P_o = initial population, e = exponential, r = growth rate
 t = time at 3.5% and t = time that is (x-1991); where x is the projection year.

However, 2.5% sampling intensity according to Diaw *et al.*, (2002) was used to select respondents for the study. Therefore, 40 questionnaire was administered in Okomu village, 27 in Imasabor, 32 in Eka and 30 in Ominike, making a total of 129 respondents. Also the forest officers in charge of each forest reserve were also interviewed to have comprehensive and detailed information of the reserves. Both primary and secondary data were used for this study. Primary data was collected using structured questionnaire and interview, while secondary data was obtained from the National Population Commission result and other relevant literatures to supplement the primary data. Data collected were subjected to descriptive statistics, chi-square and the binary logistic regression.

RESULTS AND DISCUSSION

Table 1 revealed that one area that mostly generates conflict in the state is the aspect of forest dereservation. Forest dereservation could be defined as government's deliberate decision in the removal of a part of protected and scientifically managed forest ecosystem for individual purpose(s). The result showed that all four reserves have undergone dereservation. About 48,055.80 hectares out of 200,960 hectares of the forest estate has been ceded through dereservation over the years mainly for agricultural and infrastructural purposes. This has brought the current area of the forest estate to about 152,904 hectares or about 76.1% of the total land area of the reserves. The original purposes of conservation which include attaining self-sufficiency in production of raw materials, gainful employment, production of improved varieties etc. as entrenched in the policy ceases to exist for the area so removed. The reason could be attributed to the fact that as the country experiences population growth, there is also the need for expansion (either for urbanization or agricultural activities). This therefore conformed to the findings of FAO (2010) which reported that Nigeria is considered as the world's highest deforested country and has lost about 55.7% of its primary forest and currently, over 90 percent of Nigeria's rural population depend solely on forest resources for livelihood and economic survival (FMEH&UD, 2008).

Table 1: Total areas dereserved in the study area

S/No	Forest reserve	Total area (ha)	Area dereserved (ha)	Balanced area (ha)
	Okomu B.C.9	123,902	28,580	95,322
2.	Ologbo	19,425	8,305	11,120
3.	Urhonigbe B.C 32/ and 33/1	32,116	6,070.80	26,045.20
4.	Ekiadolor B.C. 11/1	25,517	5,100	20,417
Total	4	200,960	48,055.80 (23.9%)	152,904 (76.1%)

Source: Edo State Forestry Department, 2006

Demographic information of respondents in the study area

Out of a total of 129 questionnaire administered, 120 was retrieved making 93.0%. Table 2 showed the demographic information of respondents in the study area. Gender distribution of respondents revealed a higher percentage of males (75.8%) compared to females (24.2%). The study therefore shows that majority of male respondents were actively involved in farming activities while a lower number of females were actively involved in farming activities. This might be due to the fact that women were mostly involved in domestic work while the men engage in more tasking jobs in providing for the family needs. This corroborated the findings of Adebisi-Adelani *et al.*, (2010) who reported that male resilient to stress management make it possible for them to engage in more tedious work than their female counterpart. The study also revealed that majority of respondents (52.5%) fall within age range of 41-60 years, followed by those within the range of 21- 40 years with 30.8% while those above 80 years recorded the least with 2.5%. This is an indication that most of the respondents are within the active group. This was in line with Jibowo (2000) who stated that the highly productive age involved in agricultural and forestry activities fall within the age group of 31-50 years. Furthermore, most of the respondents (91.7%) were married while singles recorded the least with 3.3% indicating that respondents have responsibilities of caring and providing for their families. This however supported the findings of Jibowo (2000) who stated that a high percentage of the rural population are married. Also, majority of respondents (45.0%) obtained primary education.

However, the least percentage was observed with respondents with education at the tertiary level with an average of 1.7%. It therefore supported the findings of Awe *et al.*, (2011) that although education is an engine for development, it is not necessarily needed for the rural communities as their utmost concern is the easy, cheap and readily available farm practice to sustain themselves.

The table also showed the occupation of respondents which revealed that majority (90.8%) of them engaged in farming as their major occupation while a few of them (9.2%) engaged in farming activities and other activities such as trading, tailoring etc. Furthermore, majority (65.0%) of the respondents have been in the business of farming for a period of 1-20 years while a few others (2.5%) have been involved for over 60 years. This is a clear indication that forest based conflicts in the study area are caused mainly by the farmers as they daily source for various means of survival. This conformed to the findings of Ekong (2003) which reported that farming is the major economic activity in the rural areas. However, most of the respondents were indigenes with 89.2% while 10.8% of the population were non- indigenes. This implied that the indigenes of the communities are the main stakeholder in the forest and agricultural business therefore, as they daily source for means of survival they involve in activities that cause conflicts.

Table 2: Demographic information of respondents in the study area

Demographic characteristics	Frequency	Percentage
Gender		
Male	91	75.8
Female	29	24.2
Total	120	100
Age		
21-40	37	30.8
41-60	63	52.5
61-80	17	14.2
80-100	3	2.5
Total	120	100
Marital status		
Single	4	3.3
Married	110	91.7
Widowed	6	5.0
Total	120	100
Education status		
No formal	32	26.7
Primary	54	45.0
Secondary	32	26.7
Tertiary	2	1.7
Total	120	100
Occupation		
Farming (Major occupation)	90.8	109
Farming (Minor occupation)	9.2	11
Total	120	100
Years in farming		
1-20	78	65
21-40	32	26.7
41-60	7	5.8
61-80	3	2.5
Total	120	100
Nativity		
Indigenes	107	89.2
Non-indigenes	13	10.8
Total	120	100

Farmers views on forest land use

Out of the 120 respondents sampled, 99.2% own at least a portion of land for farming while only 0.83% which is just a very minute portion of the whole does not own land (Table 3). It was also observed that most of the land acquired was through inheritance (41.7%) and leasing (32.5%), while 11.7% was through purchase. Moreover, some other respondents (12.5%) though acquired their land through inheritance still leased portions of land to supplement the one(s) they have while a few respondents (1.7%) acquired theirs through both inheritance and purchase (Table 4). In addition, the study showed that 70.8% of respondents have their farmland located outside the forest reserve while 29.2% have their farmland located within the forest reserve (Figure 2). This therefore implies that land is a major determinant in rural survival and also root cause of conflict in most communities. This is in support of Niamir-Fuller (2000) who stated that forest conflicts and competition stem from conflicts of interest between different land users and that conflict and competition over forest resources exists on different levels.

Table 3: Response of respondents on Ownership of Land

Ownership	Frequency	Percentage
Yes	119	99.2
No	1	0.8
Total	120	100

Table 4: Response of respondents on Ownership Mode

Ownership mode	Frequency	Percentage
Inheritance	50	41.7
Leasing	39	32.5
Purchase	14	11.7
Inheritance/ leasing	15	12.5
Inheritance/ Purchase	2	1.7
Total	120	100

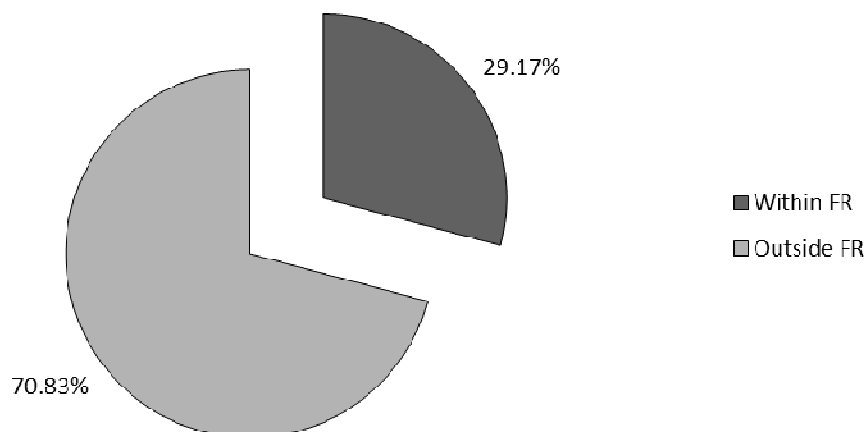


Figure 2: Response on location of land

Forest officers' views on forest land use

Forest officers in charge of the reserves were also interviewed because most information needed for this study are institutionally based. From the response given by the various officers there was reduction in the sizes of forest reserves in Urhonigbe, Ologbo, Ekiadolor, and Okomu. The reasons given vary from forest land encroachment, dereservation, overexploitation and deforestation. Also, it was stated that there are enclave communities within the forest reserves

but the government stand on the use of forest reserve is total restriction in Urhonigbe forest reserve, partial restriction in Ologbo and Okomu forest reserves while in Ekiadolor there was no form of restriction at all and due to this reason, the Ekiadolor forest reserve has been experiencing a great threat from the local communities through encroachment, deforestation and overexploitation. In Ologbo forest reserve, the major threat to the reduction of reserve is dereservation process by the government, reduction in this case is in terms of the quality of the reserve as most areas dereserved are either used for urbanisation or for the raising of oil palm plantation. This however, negates the mandate of the state forest policy. This further corroborated the findings of Niamir-Fuller (2000) who stated that forest conflicts and competition stem from conflicts of interest between different land users and that conflict and competition over forest resources exists on different levels.

Causes of conflict in the study area

In this study, the binary logistic regression analysis was used to investigate the factors that cause conflicts in Urhonigbe, Ologbo, Ekiadolor, and Okomu forest reserves. The factors investigated were Nativity (N), Forest Encroachment (FE), Government Laws (GL), Increased Competition over Scarce Land (ICSL), High Population Density (HPD) and Low Farm Yield (LFY). Investigation was done in three batches:

(i) Factors such as Nativity (N), Forest Encroachment (FE), Government Laws (GL) and High Population Density (HPD) were fitted together and analysed to see how they influence conflict. The resulting models were evaluated using the chi-square goodness-of-fit statistics (Bruhn *et al.*, 1991). The final loss on accuracy was computed using maximum likelihood estimation method and odds ratio (Deeks, 1996; Davies *et al.*, 1998). The model obtained is presented as follows:

Conflict = $-3.401 + 1.583N + 1.397FE + 2.49GL + 0.725HPD$ Model 1

Final loss = 45.04; Chi-square (df, 4) = 52.99; $p = 0.0000$

Odd ratio unit change: Constant (0.33); N (4.87); FE (4.04); GL (12.06); HPD (2.07)

Where:

FC = Forest Conflict; N = Nativity; FE = Forest Encroachment; GL = Government Law; HPD = High Population Density

(ii) Also factor such as Forest Encroachment (FE), Government Law (GL) and Low farm yield (LFY) were also fitted together following the same procedure as in (i) above, the model obtained is presented as follows:

Conflict = $-2.060 + 1.664FE + 2.115GL + 1.062LFY$ Model 2

Final loss = 46.00; Chi-square (df, 3) = 51.067; $p = 0.0000$

Odd ratio unit change: Constant (0.13); FE (5.28); GL (8.29); LFY (2.89)

Where:

FC = Forest Conflict; FE = Forest Encroachment; GL = Government Law; LFY = Low Farm Yield

(iii) Factors such as Forest Encroachment (FE), Government Law (GL) and Increased Competition over Scarce Land (ICSL) were also fitted together as in (i) above, the model obtained is presented as follows:

Conflict = $-2.228 + 1.701FE + 2.092GL + 1.124ICSL$ Model 3

Final loss = 45.86; Chi-square (df, 3) = 50.67; $p = 0.0000$

Odd ratio unit change: Constant (0.11); FE (5.48); GL (8.10); ICSL (3.08)

Where:

FC = Forest Conflict; FE = Forest Encroachment; GL = Government Law; ICSL = Increased Competition over Scarce Land

Model (1) presented above shows significant fit to the data judging from the chi-square value that was significant at $p < 0.05$. This implies that the regression parameters in the model were statistically significant. Forest conflict was significantly influenced statistically by, Government Laws, Nativity, Forest Encroachment and High Population Density with odds ratio of 12.06, 4.87, 4.04, and 2.07 respectively (Table 5). In model (2), Forest Conflict was significantly influenced statistically by Government Laws, Forest Encroachment and Low Farm Yield with odds ratio of 8.29, 5.28 and 2.89 respectively (Table 6). Similarly, in model (3),

Forest conflict was significantly influenced by Government Laws, Forest Encroachment and Increased Competition over Land with odds ratio of 8.10, 5.48 and 3.08 respectively (Table 7). The higher the odds ratio, the more significant the factor will influence forest conflicts. Therefore, from the three models, Government laws was the most significant factor influencing forest conflict in the study area. This could be attributed to the fact that with increasing population, the need for expansion either for urbanization or agricultural activities is bound to occur. This therefore supported the findings of Uzamere (2006) who stated that the impact of conflicts is traceable to human activities who are mostly involved in over-exploitation of wood, non-wood products, urbanization, dereservation and farming activities.

Table 5: Logistic binary nature for forest conflict in the study area

Dependent variable (FC) = Forest Conflict in Edo State (Presence =1; Absence = 0)		
Independent variables	Coefficient	Odds- ratio
Whether conflict is influenced by Nativity (N)	1.58	4.86*
Whether conflict is influenced by Forest Encroachment (FE),	1.40	4.04*
Whether conflict is influenced by Government Laws (GL),	2.49	12.06*
Whether conflict is influenced by High Population Density (HPD)	0.73	2.06*
Final loss= 45.04; chi-square (df,4)=52.99,p=0.0000		

Note: significant $p < 0.05$

Table 6: Logistic binary nature for forest conflict in the study area

Dependent variable (FC) = Forest Conflict in Edo State (Presence =1; Absence = 0)		
Independent variables	Coefficient	Odds- ratio
Whether conflict is influenced by Forest Encroachment (FE),	1.67	5.28*
Whether conflict is influenced by Government Laws (GL),	2.12	8.29*
Whether conflict is influenced by Low Farm Yield (LFY)	1.06	2.89*
Final loss= 46.00; chi-square (df, 3)=51.07,p=0.0000		

Note: significant $p < 0.05$

Table 7: Logistic binary nature for forest conflict in the study area

Dependent variable (FC) = Forest Conflict in Edo State (Presence =1; Absence = 0)		
Independent variables	Coefficient	Odds- ratio
Whether conflict is influenced by Forest Encroachment (FE)	1.70	5.48*
Whether conflict is influenced by Government Laws (GL)	2.09	8.09*
Whether conflict is influenced by Increased Competition over Scarce Land (ICSL)	1.12	3.08*
Final loss= 45.86; chi-square (df, 3)=50.67,p=0.0000		

Note: significant $p < 0.05$

Relationship between demographic characteristics of respondents and forest conflicts

Table 8 showed the relationship between demographic characteristics of respondents and forest conflicts. It was revealed that there was a significant relationship between educational status of respondents ($p = 0.005$; $\chi^2 = 12.91$, $df = 3$), location of farms ($p = 0.000$; $\chi^2 = 23.15$, $df = 1$), nativity ($p = 0.005$, $\chi^2 = 7.92$, $df = 1$), gender ($p = 0.000$; $\chi^2 = 10.08$, $df = 1$), age ($p = 0.001$; $\chi^2 = 25.59$, $df = 3$), marital status ($p = 0.001$; $\chi^2 = 20.01$, $df = 2$) and occupation ($p = 0.000$; $\chi^2 = 30.83$, $df = 1$). All these were highly significant at 5% confidence limit. This corroborated the findings of FMEH&UD (2008) that over 90 percent of Nigeria's rural population depend solely on forest resources for livelihood and economic survival.

Table 8: Relationship between demographic characteristics of respondents and forest conflicts in the study area

Demographic characteristics	Chi-square value	Df	p-value
Educational status	12.91	3	0.005*
Location of farmland	23.15	1	0.000*
Nativity	7.92	1	0.005*
Gender	10.08	1	0.000*
Age	25.59	3	0.001*
Marital status	20.01	2	0.001*
Occupational status	30.83	1	0.000*

*= significant at $p < 0.05$

Effects of conflict in the study area

Table 9 showed the response of respondents on the effects of conflict in the study area; the major effects of conflict are poverty (49.2%) and competition over scarce land with 23.3%. On the other hand, the forest officers and agricultural officers interviewed were of the opinion that conflict has resulted in low food productivity and competition over scarce land. The implication of this is that resource scarcity, absolute or relative lack of access to land and forest resources could result in poverty and the idea of scrambling for scarce land area could in turn damage the environment, displace a population and result in environmental insecurity. The impact indirectly extends to national and regional economics through reduced agricultural yield, increased rural-urban migration, and depletion of natural resource assets (Pearce *et al.*, 2003).

Table 9: Effects of conflict in the study area

Effects	Frequency	Percentage
Poverty	59	49.2
Migration	13	10.8
Low food productivity	20	16.7
Competition over scarce land	28	23.3
Total	120	100

CONCLUSION

The study revealed that a majority of population depend on forest and its resources and given the role it plays in triggering and causing conflicts, sustainable forest management must be taken up as a development imperative. The Land Use Act of 1978 should be reviewed in the light of the confusion the Act has generated since its inception. Furthermore, most of the forest reserves are depleted and there is urgent need to embark on afforestation programmes in order to increase the vegetation cover. Therefore, for this to be made possible and successful the issue of quality and quantity of manpower available to organise the country's forestry department should be considered, as the dearth of forestry manpower has led to low output, inadequate supervision and monitoring of the forest reserve.

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