



## **ASSESSMENT OF COMMUNITY PARTICIPATION IN BIODIVERSITY AND NATURE CONSERVATION IN CROSS RIVER STATE, NIGERIA.**

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### **Abstract**

The study assessed community participation in conservation of forest resources in Cross River State, Nigeria. Multi-stage sampling technique was adopted in selecting 120 respondents for the study. The data were obtained using questionnaire and analyzed using percentages, mean scores and multiple regression analysis. Majority (81%) of the respondents were females with mean age 35.2 years and mean income #38530 while, a greater number 44.2% of the respondents possessed HND/BSc. However, respondents participated to a high extent in home gardening (3.07), avoidance of excessive hunting and bush burning (2.72) and reforestation (2.58). Also a grand mean of 2.66 showed that the respondents adopted many forest conservation measures. The regression analysis result showed that farmland size and years of farming experience were significant at 1% level of probability while marital status, educational level, monthly income and primary occupation were significant at 5% level. Therefore, the null hypothesis was rejected. Conclusively, the respondents adopted a reasonable number of forest conservation measures and participated to a high extent in some of them, hence recommended creation of adequate awareness by development agency on the need for community participation in various forest conservation practices.

**Key words:** *participating, forest, conservation, community and resources*

### **Introduction**

The importance of forests cannot be overemphasized in the dire need for conservation of the biodiversity, soil resources and water. The value of conserving these resources owes itself to their significance in the lives and livelihood of the communities that stays adjacent

to the forest. Forest has cultural, economic, and ecological value that play a crucial role in enhancing quality of life and supporting natural systems in the environment (Tiede *et al.*, 2017). The practice of forest conservation in the world over are changing from the traditional management approach with emphasis on managing natural resources in a way that ensures greater flow to all stakeholders especially local communities. Local community participation is the key strategy to current forestry conservation and management. A number of stakeholders including local communities are involved in conserving and managing natural resources for the expected success of enhanced conservation efforts (Purnomo *et al.*, 2005).

According to Bisong, *et al* (nd), the shift in emphasis is informed by the fact that the local communities are inextricably tied to their cultural resources based, whether used as a source of food, medicine, fuel or for maintaining ecological balance. Thus, Sustainable management of natural resources requires a more comprehensive approach which include strengthening the organization and technical capabilities of rural communities, as well as engendering support for sustainable resources use from larger community group (Food and Agricultural organization, 2005).

Community participation may be viewed as a process that serves as instrument of empowerment, building beneficiary capacity, increase effectiveness desire to share cost, and improves efficiency in relation to project (Paul, 2005). Community participation, according to Enuameh-Agboloso *et al.*, (2015), is the involvement of local people in decision making processes including the management of forest resources within their area of abode. Osumba (2011) adds that community participation could enhance sustainable use of forest resources, and support the establishment of community forestry. According to FAO (2015), participation of rural communities in forest resources management is necessary to ensure the sustainable maintenance of the resources.

Steady and continuous deforestation without a corresponding afforestation or replacement of our forest resources locally, nationally and internationally has continued to be a subject of discourse among scholars and environmentalist. For instance, the rate of illegal logging, grazing and forest encroachment has accelerated, significantly in recent times. This has its height in the tropics where over 2.5 million people depend on forest resources for a variety of services (Adekola, *et al.* 2015). However, the rate of deforestation at the global level is not significantly different from the current trend in the study area. Onwubuya *et al.* (2014) reported that deforestation in Nigeria is put at an

average of 400,000 hectares per annum, while afforestation stands at 32, 000 hectares annually which cumulatively show that the country has lost so much of her forest in less than 100 years. This is largely due to the increase in the local population, increasing poverty levels, ignorance, and poor forest policy enforcements.

Most recently, it has been recognized that the “top – down” forest conservation regimes have failed to manage forest resources in a sustainable manner because of their rigidity that deprived local communities of the motivation to use and manage these resources in a sustainable way (FAO, 2015). The study described the socio-economic characteristics of respondents in the study area; determined the extent of community participation in the conservation of forest resources and investigated the forest resource conservation measures adopted by the respondent.

### **Methodology**

The study was conducted in Cross River State, Nigeria. Cross River State is a coastal state situated in the South-South geopolitical zone of Nigeria. The state occupies an area of about 22,342.176 square kilometers. The State has eighteen Local Government Areas and three agricultural zones. The zones are: Ogoja (Northern agricultural zone), Ikom (Central agricultural zone) and Calabar (Southern agricultural zone). The 2016 population of Cross Rivers State is projected as 3,866,269 (NBS, 2017). The state is located between latitude 4° 28' and 6° 55' North of the Equator and longitude 7° 50' East of the Greenwich Meridian. It shares common boundaries with the Republic of Cameroun in the East, Benue state in the in the North, Ebonyi and Abia state in the West and Akwa Ibom state, Atlantic ocean in the South.

The vegetation spans from mangrove swamps and rainforest in the South to derived savannah in the North. The vegetation and climate are therefore very diverse and so are the crops grown. There are lots of natural resources and great tourism potentials that have attracted international attention (Ajah *et al*, 2017). Agriculture is the predominant occupation of the people, for almost all the farm families either as primary or secondary occupation. The ecological zone favours the growing of crops like rice, yam, plantain, cassava, maize, melon, cocoa, oil palm, rubber etc, Major animals reared include chicken, goats, sheep and pigs.

Multistage random sampling technique was used for the study. In each of the three agricultural zones (Ogoja, Ikom and Calabar), two Local Government Areas (LGAs) were purposively selected based on the intensity of existence of forest resources there. In each

of the selected LGA, five communities were randomly selected, and from each community, one village was randomly selected to give a total of five villages. Four community members were randomly selected from each of the villages to give a sample size of 120 community members for the study. Data were collected using structured questionnaire /interview schedule and analyzed using descriptive statistics, such as means, percentages and frequencies and hypotheses was tested using inferential statistics (multiple regression analysis).

**Objective i:** describe the socio-economic characteristics of the respondents in the study area was realized using percentages, mean and frequencies.

The socio-economic variables in this study were the following;

**Age of respondent** (in years).

**Sex** (a dummy variable: male = 1; female = 0)

**Educational level** (number of years of formal education).

**Household size** (the number of persons living in the same roof and eating from the same pot).

**Income** (Naira).

**Cooperative membership** (dummy variable: membership=1, non-membership=0)

**Farming experience** (in years).

**Farm size** (in hectares)

**Occupation** (Farmers = 4, Artisan = 3, Traders = 2 and Civil servants = 1).

**Objective ii:** determine the extent of community participation in the conservation of forest resources was realized using mean count. Data were collected on a 4-points rating scale of Very high (4), High (3), Low (2), Very low (1). Mean scores were computed for each respondent by adding 4+3+2+1 and dividing by 4 which gave a mean of 2.5. This mean score was used as a benchmark for decision making. An upper and lower limit were determined. Thus, any mean score response equal to or above the upper limit was adjudged to indicate as “High extent”, while a lower mean score below the benchmark was viewed as “low extent”.

**Objective iii:** investigate the forest resource conservation measures adopted by the respondents was realized using mean obtained on a data collected with 4-points rating scale of Strongly agree (4), Agree (3), Disagree (2), Strongly disagree (1). In using a 4-point rating scale, a mid-point is obtained by adding 4+3+2+1 and dividing by 4 which gave a mean of 2.5. For the purpose of decision making, upper and lower limits were determined. Thus any mean score response equal to or above the upper limit was adjusted

to indicate as accepted, and below 2.5 was established for the conservation measures to be rejected.

Multiple regression analysis was used in testing hypothesis, which stated that there is no significant relationship between the socio-economic characteristics of the respondents and their level of participation in forest conservation. This was tried on the four functional forms of linear, exponential, double-log and semi-log in order to make choice for the lead model.

The functions were explicitly specified thus:

Linear function:  $Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + e_i$ .....3.1

Semi log function:  $Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + b_6 \ln x_6 + b_7 \ln x_7 + b_8 \ln x_8 + e_i$ .....3.2

Double log function:  $\text{Log} Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + b_6 \ln x_6 + b_7 \ln x_7 + b_8 \ln x_8 + e_i$ .....3.3

Exponential function:  $\text{Log} Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + e_i$ .....3.4

Where:

Y = dependent variable (level of participation in forest conservation)

$e_i$  = stochastic error Term

$b_0$  = Intercept

$b_1 - b_8$  = parameters to be estimated

$x_1 - x_8$  = independent variables (Socio-economic variables)

$X_1$  = Age (years)

$X_2$  = Sex (1 = male, 0 = female).

$X_3$  = Educational level (no. of years spent in school)

$X_4$  = Household Size (number of people eating from one pot)

$X_5$  = Income level (Naira)

$X_6$  = Marital Status (1 = married, 0 = single)

$X_7$  = Farm Size (hectares)

$X_8$  = Farming Experience (years)

$e_i$  = error term

**Results and Discussion**

### ***Socio-economic characteristics of the respondents***

The result on socio-economic characteristics of respondents are presented in table 1. The distribution of respondents by sex showed that majority (81%) of the respondents were females while 39% of them were males. This may be attributed to the fact that men are known to migrate out of rural areas in search of greener pastures and also resources for family survival while women usually make up a bulk of the rural population because of the need to cater for domestic issues. Mbalisi *et al.* (2012) noted that a rural population made up mainly of females will have a greater dependence on forest resources

The result further revealed that 36.6% of the respondents were between the ages of 31 - 40 years, 27.5% were between 41-50 years while 26.6% were greater than 50 years and 6.7% were between 21-30 years of age. Also only 2.5% of the respondents were less than 20 years with mean age of 35.2 years. This result showed that majority of the rural population were people in the active age group. This result does not conform to the results obtained by Onuche, (2010), in his study on forest conservation by rice farmers in South Western, Nigeria that 44% of the rural people fell within the age range of 41-50 years

On marital status, the result showed that 45.0% of the respondents were married, 22% of them were single while 20% were divorced and 16.7% were widowed. The high percentage of married respondents has implications for household size which in turn influences the forest resource conservation but on the other hand, can enhance labour for conservation activities. According to Onuche, (2010), farm families in Eastern Nigeria are polygamous with a tendency to having more children to assist in farming activities.

Education is an important socio-economic factor that influenced decision making in communities on awareness and adoption of conservation practices. The result revealed that 16% of the respondents had no formal education while; 15.0% had primary education, 20.0% had secondary education, 44.2% had HND/BSc and 5.0% had MSc./Ph.D. This result showed that majority of the respondents (84 %) in the study area had one form of formal education or the other implying that there is potential for some people in the study area to be aware and adopt forest conservation practices. According to Mbah *et al.*, (2017), western education facilitates the adoption of environmental conservation practices. This finding is in line with Onuche, (2010), who observed that formal education has a positive and significant impact on level of participation in forest conservation.

A household unit consists of household head, wife or wives, children and other dependent relatives living with the family. Household size is of paramount importance in

determining the level of production, conservation and management of forest resources. Table 1 showed that 45.7% of the respondents in the study area had household size of 4 – 6 persons. However, 22.5% of them had between 1-3 family members, 20.8% had household size of 7 – 9 while, 9.2% had household size of greater than 9% with mean household size of 5 persons. According to Mbah *et al.*, (2019), large household size is more likely to provide the required labour for forest resource conservation practices.

The results of the study showed that 33.3% of the respondents were engaged in farming, 30.0% in trading while 21.7% and 15% were engaged in craft work and civil services respectively. The high percentage of respondents who are primarily engaged in farming has implication for forest resource conservation and management as they are most likely to depend on forest resource for sustenance and hence, increased pressure on forest resources and possible reduction in forest conservation participation.

The results also indicated that 23.3%, 18.3% and 16.7% of the respondents had less than 3 years, 4 – 6 years and 7 – 9 years of farming experience respectively. Also 41.7% have farming experience greater than nine years with mean years of farming experience of 8.5 years. This showed that farmers in the study area were fairly experienced in farming and therefore poised for forest conservation and sustainability as properly harnessed experience and skill will result in sustainable forest management (Mbalisi *et al.* 2012).

Pertaining to the income of household head, the result showed that people who earned between N 20,001 - N 40,000 per month were greater in number with 36.7%. Household heads who earned between 40,000 - 80,000, greater than 80,000 and less than 20,000 were 24.2%, 29.2% and 10.0% respectively with mean income of #38530

The result revealed that many (52.33%) of the respondents did not belong to any organization in the area while 47.5% had membership in organizations. This implies that programs aimed at educating the people on forest conservation may not be effective since reaching a wide audience per unit time will be difficult. This situation could result to ineffectiveness of forest conservation programs like seminars and workshops because rural organizations, clubs and societies are usually the first point of call when rural programs are to be instituted since they can help in effective information dissemination to their members.

The result indicated that 40.0% of the respondents had farmland size of 0.51 – 1.0 hectares, 30.8% had a farm size of less than 0.5 hectares. However, 11.7%, 3.3% and 14.2 % of the respondents had farm size of 1.1 – 1.5 hectares, 1.51 – 2.0 hectares and greater than 2 hectares respectively. The implication of this finding could be that the respondents are small scale farmers producing at subsistence level. This result is in consonance with the findings of Mbah *et al.* (2017) who reported that majority of farmers in South Eastern Nigeria operate on a small - scale basis with less than 1 hectare under their operation.

***Extent of community participation in the conservation of forest resources***

The result in table 2 revealed the extent of participation in the conservation of forest resources in Cross River State. Findings indicated that the forest conservation measures adopted to a high extent were home gardening with a mean score of 3.07, avoidance of excessive hunting with a mean score of 2.72 and reforestation with a mean score of 2.58. The mean value result on extent of participation in the conservation of forest resources further showed that avoidance of bush burning had a mean score for 2.38, alley cropping had a mean score of 2.08 and afforestation had a mean score of 1.85. The grand mean score for extent of community participation was 2.2

**Table1.2: Distribution of respondents based on extent of participation in the conservation of forest resources**

Forest Conservation Practices	VH	H	L	VL	Mean (x)	Decision
Home Gardening	42 (35.0)	51(42.5)	20(16.7)	7(5.8)	3.07	High Extent
Avoidance of excessive hunting	45(37.5)	21(17.5)	29(24.2)	25(20.8)	2.72	High Extent
Reforestation	17(14.2)	60(50.0)	16(13.3)	27 (22.5)	2.58	High Extent
Selective Logging	37(30.8)	25(20.8)	21(17.5)	37(30.8)	2.52	High Extent
Avoiding bush burning	22(18.3)	37(30.8)	25 (20.8)	36(30.0)	2.38	Low Extent
Regulated and planned cutting of trees	29(24.2)	24(20.0)	25(20.8)	42(35.0)	2.33	Low Extent
Alley cropping	23(19.2)	22(18.3)	17(14.2)	58(48.3)	2.08	Low Extent
Afforestation	13(10.8)	14(11.7)	35(29.2)	58(48.3)	1.85	Low Extent
<b>GRAND MEAN</b>					<b>2.2</b>	

Note: MS = 2.5 = High Extent; Ms less than 2.5 = Low Extent(Values in bracket are percentages %)  
 %VH – Very High, H – High, L – Low, VL – Very Low,  
 Source: Field survey, 2019

**Table 1: Distribution of respondents by socio-economic characteristics (n=120)**

Variables	Frequency	Percent	Mean
<b>Sex</b>			
Female	81	67.5	
Male	39	32.5	
<b>Total</b>	120	100.0	
<b>Age</b>			
less than 20	3	2.5	35.2
21-30	8	6.7	
31-40	44	36.6	
41-50	33	27.5	
greater than 50	32	26.6	
<b>Marrital status</b>			
Single	22	18.3	
Married	54	45.0	
Widowed	20	16.7	
Divorced	24	20.0	
<b>Edu. Qualification</b>			
No Formal Education	16	13.3	
FSLC	18	15.0	
SSCE/GCE	24	20.0	
OND/NCE	3	2.5	
HND/BSC	53	44.2	
M.Sc./Ph.D	6	5.0	
<b>Household size</b>			
1-3	27	22.5	5
4-6	57	47.5	
7-9	25	20.8	
greater than 9	11	9.2	
<b>Primary occupation</b>			
Farming	40	33.3	
Trading	36	30.0	
Craft Work	26	21.7	
Civil Servant	18	15.0	
<b>Farming experience(yrs)</b>			
less than 3	28	23.3	8.5
4-6	22	18.3	
7-9	20	16.7	
greater than 9	50	41.7	
<b>Monthly income</b>			
less than 20,000	12	10.0	38530
20,001 - 40,000	44	36.7	
40,000 - 80,000	29	24.2	
greater than 80,000	35	29.2	
<b>Membership to organization</b>			
Farmland size(hectare)	57	47.5	
less than 0.5	37	30.8	
0.51-1.0	48	40.0	
1.1-1.5	14	11.7	
1.51-2.0	4	3.3	
greater than 2	17	14.2	

Source: Field survey data, 2019

**Forest resources conservation measures adopted by rural farmers in Cross River State**

The summary of the forest resources conservation measures adopted in Cross River State were presented in Table 3. The table revealed that shifting cultivation technique with a mean of 3.16, prohibition of setting of fire in forests with a mean of 3.15 and legislation against indiscriminate felling of trees with a mean of 2.84 were among the forest conservation measures predominantly adopted in the study area. The result further showed that punishment of forest offenders through payment of fines had a mean of 2.40, use of law enforcement agents against forest resources conservation with a mean of 2.23 and enlightenment had mean scores of 2.18. The implication of the findings is that community forest resources conservation activities which is instituted by local laws and enlightenment is not very effective.

This result attested to the view of Hermida (2008) that areas without high encroachment of urbanization still practice shifting cultivation because of the moderate to low population which do not have high pressure on available land. N.D.U. (2000) noted that prohibition of forest fires is adopted in semi-rural areas to ensure that farmlands and fallow lands are not destroyed by forest fires.

**Table 1 3: Distribution of Respondents Based on Forest Resources Conservation Measures Adopted**

Forest Conservation Measures Adopted	Resources	SA	A	D	SD	Mean (x)	Decision
Shifting cultivation technique		65(54.2)	26 (21.7)	12(10.0)	17(14.2)	3.16	Adopted
Prohibition of setting of fire in forests		48(40.0)	49(40.8)	16(13.3)	7(5.8)	3.15	Adopted
Legislation against indiscriminate felling of trees		29(24.2)	53(44.2)	28(23.3)	10(8.3)	2.84	Adopted
Punishment of forest offenders through payment of fines		28(23.3)	30(25.0)	24(20.0)	38(31.7)	2.40	Not Adopted
Use of law enforcement agents against forest resources conservation		35(29.2)	12(10.0)	20(16.8)	52(43.3)	2.23	Not Adopted
Enlightenment		17(14.2)	32(26.7)	26(21.7)	45(37.5)	2.18	Not Adopted
<b>GRAND MEAN</b>						2.66	

Note: MS = 2.5 = Adopted; Ms less than 2.5 = Not Adopted (Values in bracket are percentages)  
 %SA – Strongly Agree, A – Agree, D – Disagree,SD – Strongly Disagree,  
 Source: Field survey, 2019

### **Test of Hypothesis**

**H<sub>0</sub>:** Socio-economic characteristics of respondents has no significant influence on rural community participation in the conservation of forest resources in Cross River State

The socio-economic factors which formed the independent variables include age, gender, marital status, educational qualification, number of years spent in school, household size, primary occupation, years of experience, monthly income, membership to organization, farmland size and access to credit. The exponential regression model was chosen as lead equation based on its conformity with econometric and significant criteria such as the magnitude of  $R^2$ , F ratio, number of significant variables and agreement with *a priori* expectation. The  $R^2$  value of 0.687 indicated 68.7% variability in level of participation in forest conservation as explained by the independent variables. The F-value (17.05) was highly significant at 1.0% level of probability indicating a goodness of fit of the regression.

Specifically, the results of the regression analysis showed that farmland size and years of farming experience were significant at 1% level of probability while marital status, monthly income, number of years spent in school and primary occupation were significant at 5% level of significance. The implication is that some of the socio-economic variables positively affected the level of participation in forest conservation. Therefore, the null hypothesis which stated that socio-economic characteristics of respondents has no significant influence on their level of participation in forest conservation was rejected, while the alternative hypothesis was accepted

### **Conclusion and Recommendations**

The study has shown that many community forest conservation practices do exist in the study area. They also adopt a reasonable number of forest conservation measures. Findings indicated that extent of community participation in the conservation of forest resources in Cross River State was to a high extent. The study recommends that government and other development agencies should support and provide forestry extension agents to the rural farmers to educate them on the importance of forest conservation as well as best logging and forest products harvesting techniques to reduce damage and losses. Also, community members should be allowed to participate in different stages of the project such as planning, monitoring and evaluation to promote effective forest conservation.

**Table 4 : Regression Estimates of Determinants of community participation in the conservation of forest resources in Cross River State.**

Source: Computed by the author from field survey data, 2019 Figures in parenthesis are t-values; + = lead equation

\*\*\*Significant at 1%; \*\* Significant at 5% and ; \* Significant at 10%. Figures in parentheses

Variable	Linear	Exponential+	Cob Douglass	Semi Log
(Constant)	2.687 (1.238)	1.902(13.052)	2.604(13.916)	11.766n(3.487)
Sex	-.625 (-1.138)	-.060 (-1.626)	-0.011(-.362)	-.190(-.357)
Age	-.494 (-1.429)	-.035 (-1.489)	-.015(-.909)	-.265 (-.869)
Marital Status	0.525 (2.613**)	0.030 (2.205**)	0.031(2.997)	.598 (3.213**)
Number of Years Spent in School	0.353 (1.718)	0.041 (2.960**)	0.030(2.278)	.528 (2.224**)
Household size	0.275 (0.907)	0.026 (1.300)	-.103(-1.717)	1.866(1.73***)
Primary Occupation	0.567(2.284**)	0.035 (2.119**)	0.024(0.660**)	.443 (.687)
Years of experience	1.058(4.684***)	0.068 (4.500***)	-0.001(-.022)	.024 (.033)
Monthly Income	0.874 (3.182***)	0.046 (2.479**)	-0.002 (-.059*)	-.112 (-.184)
Membership to organization	0.113 (0.166**)	0.005 (0.107)	-0.171 (-1.713)	-2.551 (-1.418)
Farmland size	0.805 (3.832***)	0.056 (3.966***)	0.080(2.638)	1.538 (2.815)
Access to credit	0.621 (0.805)	0.037 (0.706)	0.372(2.547)	6.807 (2.588**)
<b>R<sup>2</sup></b>	0.665	0.687	0.486	0.500
<b>R<sup>2</sup> Adjusted</b>	0.629	0.651	0.412	0.428

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