

## **Forest Management Strategies and Sustainability of Forest Resources in Calabar Education Zone of Cross River State, Nigeria**

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### **Abstract**

This study examined forest management strategies and forest resources in Calabar Education Zone of Cross River State, Nigeria. To achieved this study, two research question were posed and two null hypotheses were formulated to guide the study and tested at .05 level of significance. The study adopted correlational research design. The population of the study comprised 312,149 regular household head in Calabar Education Zone of Cross River State. The sample comprised 1,230 household head from the four selected local government area that make up Calabar Education Zone. The instrument for data collection was 12 items questionnaires, title: Forest Management Strategies and Sustainability of Forest Resource Questionnaire (FMSSFRQ) was used to administrated questionnaire, data was organized and analyzed using simple linear regression analysis. The result of the analysis revealed that forest regulation strategy and participatory forest management strategy relatively and jointly contributed to sustainable forest resource management. Based on this result, it was concluded

Forest Management Strategies and Sustainability of Forest Resources in Calabar Education Zone of Cross River State, Nigeria.

**Michael Obun Etan, Ph. D; Mrs. Egere Mirian Akpono, Ph.D; Ambe Benjamin Ayua, Ph.D**

that to maintain sustainable forest ecosystem in the zone, pragmatic measure must be put in place to enhance the level of forest management in forest communities. It was recommended among others that forest management agencies should ensure adequate involvement of community members in formulating and enforcing forest conservation policies in forest communities. Secondly, Environmental agencies should take adequate step to encourage reforestation and afforestation in communities in Calabar Education Zone. These will help to enhance sustainable use of forest resources in Calabar Education Zone of Cross River State.

**Keywords:** Forest, management strategies, sustainability and forest resources.

### **Introduction**

The forest ecosystem play a vital role to the survival of man, the environment and the sustainability of biodiversity which is the key development parameter that every developing country seeks to maximize. The global drive for sustainability forest resources tends to be based on the notion that forest resource provide sources of livelihood to local communities and thus boost socio-economic development of local communities all over the world.

It is also a globally held ideology that sustainability of forest ecosystem does not only promote community-based development but also enhances the sustainability of world's biosphere, which reduces the tendency of global environmental problems such as global warming, climate change, depletion of the ozone layers, acid rain and greenhouse effect. This implies that sustainability of forest resources has relevance on the social, economic, environmental and the cultural well being of people and society, and thus ensure sustainability of forest ecosystem in Cross River State.

Forest management is an inclusive concept that involve all practices mean to preserve forest ecosystem and control the occurrence of destructive and degradable activities in the forest. Adekunle, Momoh and Agbaje (2008) noted that forest management is the practical application of the scientific, technical and economic principles of preserving forest ecosystem. These study stressed that forest management is the organization of a forest property for maintenance, by ordering in time and place the various operations necessary for the conservation, protection and improvement of the forest on the one hand, and the controlled harvesting of the forest resources on the other hand.

Management of forest broadly involves three main task of controlling the composition and structure of the growing stock, harvesting and marketing of forest produce, and administration of forest property and personnel (Paul, 2011). It means that forest

management is the process of ensuring that forest resources are conserved for socio-economic gains of society.

With the rate at which forest ecosystem is destroyed in Cross River State despite the fact that people are aware of the socio-economic, cultural, and environmental importance of forest management practices in the state and the need to devise feasible forest management strategies to enhance sustainability of forest resources in the state (Amuyou, Wang, Bisong & Antonarakis, 2021). Sustainability of forest resource is a phenomenon that cannot be downplayed in a quest to ensure effective community development in any society. This is because the survival of local communities largely depends on the sustainability of biodiversity and services provided by healthy ecosystems within the communities (Birdlife international, 2010). Researchers have also argued that forest resources meet the basic nutritional requirement of present and future generations, improve living standards for the rural people, reduce the vulnerability of the agricultural sector to adverse natural and socio-economic factors and other risk and above all strengthen self-reliance of local communities (Onwubuya, Ogbonna & Ezeobiora, 2014). The awareness of the social economic, environmental, cultural and ecological benefits of sustaining forest resources should naturally reduce the level of sustainability forest practices among communities in Nigeria.

The seems to be an increasing trend of destructive forest practices in Nigeria society. These unsustainable practices observable among community dwellers in Nigeria seems to range from unauthorized logging, indiscriminate hunting, indiscriminate bush burning, using explosive as fishing strategies and so on. Onwubuya et al (2014) note that the type of natural environment that was obtained in Nigeria some years ago are no longer available because of anthropogenic factors such as farming, bush burning, over grazing by animals, animal hunting, timber logging, over exploitation of forest and other deforestation practices. Iheke and Eziuche (2016) argue that despite the immense value of forest resources, forest are being cleared as demand for timber and agricultural activities increases in Nigeria, and that the extreme exploitation of forest resources in all parts of the country has reduced their range and abundance compared with what was obtainable in the past.

Afforestation/reforestation is another common strategy that has adopted globally to sustain forest cover and other forest resources.woodfine (2009) explained that afforestation entails effectiveness of tree planting to manage degraded land where the said land cannot be categorized as forest land, while the term reforestation is used if new trees are planted on a previous forested land. Reyer, guerick and ibisch( 2009) noted that afforestation and reforestation represent a form of increasing or at least preserving forest ecosystems benefits,

and that afforestation, reforestation and deforestation control are considered the main types of climate change mitigation project in the forestry sector. Palaghianianu (2017) explained that sustainability is ensure forest continuity or even increase forest cover, acting responsible in this direction would imply to ensure the future resources needs, securing jobs, providing recreational and wood for nearby communities, maintaining ecosystem functions or climate mitigation role. Peprah (2017) added that afforestation and reforestation are considered as carbon sink projects in clean development manchanism (CDM) to reduce carbon emission from degraded lands and achieve global benefits of climate change mitigation.

The extent of exploitation of forest resource seems to be on the increase in Cross River State specifically in Calabar Education Zone. Iheke and Eziuche (2016) noted that forest products play important roles in supporting rural livelihoods and food security in many local communities and that forest provides critical source of food; medicine, shelter, building materials fuels and cash income for local people. This implies that there are chances of untold hardship and adverse environmental conditions in communities in Calabar Education Zone in the future, if urgent measures are not put in place to ensure sustainable forest practices in the zone. The sustainability of natural biodiversity is a scientific approach and carefully planned actions for utilization and conservation of land, water bodies, soil system, plant and animals to enable the people to fulfill the requirement so that along with the present generation the future generation would also benefit (Babu & Nautiyal, 2015) sustainability of forest resources is stewardship and use of forests and forest lands in a way, and at a rate that maintains their biodiversity, productivity; regeneration capacity, vitality and their potential to full, now and in the future, relevant ecological, economic and social functions, at local, national, and global level sand that does not cause damage to other ecosystem. Martin Garcia & Diez, 2014) Hamid, Usman, Elaigwu and Zabair (2010) submitted that uncontrolled mechanization, overexploitation of natural resources, deforestation and extensive use of chemical fertilizer and pesticides for extraction of biodiversity are unsustainable forest practices that have brought about many changes in different components of the environment and the natural ecosystem all over the world.

This implies that ensuring sustainability of forest resources may involve minimizing bush burning, timber logging, indiscriminate hunting of animal species, indiscriminate firewood extraction, destructive fishing practices, and uncontrolled farming practices.

Community based education strategy and enlightenment programmes seem to been another important measures that can help to create awareness on sustainable forest resources conservation practices in forest communities. Ganiyu and Mbalisi (2015) stressed that

community education is a tool for equipping the grassroot people with knowledge and skills on every issues that affect their existence falls within the purview of non-formal education. Bui(2011) stated that community education or enlightenment programme are activities based on four key qualities such as community-based, collaborative, information based, and action oriented, and that of community- based environmental education are expected to broaden the community's capacity to improve environmental quality, combine environmental management goals with other community development activities, lead to environmental actual development and increase involvement of more community interests.

Also the controlled of unsustainable fishing practices ensures the preservative and sustainability of aquatic lives which is also part of the forest resources. Camara and Santero Sanchez (2019) submitted that there is a need to apply regulations to repopulate fish stock, reduce overfishing, eliminate destructive fishing practices, and promote access to resources for sustainable fishing. It is quite obvious that forest management strategies such as afforestation/reforestation and community based education strategy and can reduce unsustainable forest resources practices in the society. Given the fact that sustainability of forest resource may be achieved when appropriate forest management strategies are applied in forest communities, it becomes necessary to examine whether forest management strategies and sustainability of forest resource in Calabar Education Zone have any association with the forest management strategies applied in communities.

### **Methodology**

The designed employed on this study was the correlational design. Correlational research design is a research approach that attempts to find the nature of the non-causal relationship existing between a set of variables; of which cannot be determined by the researcher or manipulated but present within a group or sample. The study design was also adopted to investigate the relationship between forest management strategies and sustainability of forest resources in Calabar Educational zone.

The study population consist of 312,149 regular household heads in Calabar Education Zone. The sample consist of 1,230 household head from the four selected local government area, and multi stage sampling techniques was adopted for the study.

Two research question was raise to guide the study:

- i. What is the extent to which afforestation/reforestation strategy contributes to sustainability of forest resources?
- ii. How does community based education strategy contribute to sustainability of forest resources?

The research hypothesis was formulated to guide the study.

- i. Afforestation/reforestation strategy does not contribute significantly to sustainability of forest resource.
- ii. There is no significant contribution of community based education strategy to sustainability of forest resources.

Structure questionnaire was used as instrument for data collection for the area. The questionnaire was title: forest management strategies and sustainability of forest resource questionnaire (FMSSFRQ). The respondents were advise to be honest in their responses in the item as information obtained will be treated with amount of confidentiality in analysis of date.

Hypothesis was tested by the statistical tool employed. Data was analyzed using simple linear regression.

### **Result**

Afforestation/Reforestation strategy does not contribute significantly to sustainability of forest resources in Calabar Education zone of Cross River State.

Summary of simple regression analysis for the relationship between afforestation/reforestation strategy and sustainability of forest resource in Calabar Education Zone.

**Table 1**

Model	sum of squares	Df	Mean square	F-ratio	Sig.	R	R2
Residual	10119.729	1	10119.729	281.878	.000	.436	.190
	43009.521	1198	35.901				
Total	53129.250	1199					

a. Criterion: Sustainability of forest resources in Calabar Education Zone of Cross River State

b. Predictors: (Constant), afforestation/reforestation strategy

The result of the Table 1 revealed that Afforestation/reforestation strategy contributed significantly to sustainability of forest resources. This implies that the extent to which afforestation/reforestation practices are used as a strategy to manage forest in Calabar Education Zone of Cross River State determine the extent to which forest resource are sustained in zone. This result suggest that the level of sustainability of forest resource in

Calabar Education zone of Cross River State has a direct association with extent to which afforestation/reforestation practices are out in the communities.

The result of this analysis further reveal that of variance in the regression output produced an F-ratio of 281.878( $p < .05$ ), which is statistically significant at .05 probability level with critical F-ratio of 3.85 and 1:1198 degrees of freedom. This means that the data for afforestation/reforestation strategy fit the model better than if afforestation/reforestation strategy was not added to the model, which means that afforestation/reforestation strategy contribute significantly to the observed variance in sustainability of forest resource in calabar education zone of cross river state. The result also shows that regression coefficient (R) OF.436 and a coefficient of determination (R<sup>2</sup>) of .190. This implies that afforestation/reforestation strategy relate significantly to sustainability of forest resources in Calabar educational zone of cross river state and that 19.0% of the variation in sustainability of forest resources in calabar educational zone is accounted for, by the variation in afforestation/reforestation strategy in forest communities.

This result is in line with woodfine (2009) who affirmed that afforestation entails effectiveness of tree planting to manage degraded land where the said land cannot be categorized as forest wood, while the term reforestation is used if the new trees are planted on a previously forested land.

**Table 2:** Summary of simple regression analysis for the relationship between community education strategy and sustainability of forest resource in calabar Education zone of Cross River State.

Model	sum of squares	Df	Mean square	F-ratio	Sig.	R	R <sup>2</sup>
Residual	19528.452	1	19528.452	696.266	.000	.606	.368
	33600.798	1198	28.047				
Total	53129.250	1199					

- a. Criterion: Sustainability of forest resources in Calabar Education Zone of Cross River State
- b. Predictors: (Constant), community education strategy

The result is table 2 shows that the analysis of variance in the regression output produced in f-ratio of 696.266 ( $P < .05$ ), which is statistically significant at .05 probability level with critical f-ratio of 3.85 and 1:1198 degrees of freedom. This means that the data community education strategy was fit the model better than if community education strategy was added

Forest Management Strategies and Sustainability of Forest Resources in Calabar Education Zone of Cross River State, Nigeria.

**Michael Obun Etan, Ph. D; Mrs. Egere Mirian Akpono, Ph.D; Ambe Benjamin Ayua, Ph.D**

to the model, which means that community education strategy contributed significantly to the observed variance in sustainability of forest resource in Calabar Education zone. The result also show a regression coefficient (R) of .606 and a coefficient of determination ( $R^2$ ) of .389. This implies that community education strategy relates significantly to sustainability of forest resource in Calabar Education zone of Cross River State and that 36.8% of the variation ins sustainability of forest resource in Calabar Education Zone of Cross River State is accounted for, by the variation in community education strategy in forest communities across Calabar Education zone of the state.

Similarly, the result of the regression weights of the predictor variable (community education strategy) in Table 2 show positive unstandardized and standardized beta coefficients (B and Beta) of 1.596 and .606 respectfully. This means community education strategy has a positive relationship within sustainability of forest resource in Calabar Education zone.

The study is in line with the opinion of Ganiyu and Mbalisi (2015) who maintained that community education is a tool for equipping the grassroot people with knowledge and skills on every issues that affect their existence falls within the purview of non-formal education. In line with this result, Bui (2011) stated that community education or enlightenment progremme are activities based on four key qualities such as community based, collaborative, information based, and action oriented, and that community based-based environmental quality, combine environmental management goals with other community development activities, lead to actual environmental improvement and increase involvement of more community interest (both group and points of viwer) in community environmental management activities. . The results revealed that there was significant direct relationship existing between community education strategy and sustainability of forest resources in Calabar Education Zone of Cross River State.

### **Conclusion**

Based on the result of the study, it is concluded that afforestation/reforestation strategy and community education strategy significantly contribute to sustainability of forest resources in Calabar Education zone of Cross River State, pragmatic measures must be put in place to enhance the level of forest management in communities within the zone.

### **Recommendation**

Based on the result study obtained from the analysis of data; the following recommendation were made;

1. Environmental agencies should take adequate step to encourage reforestation and afforestation, in communities in Calabar Education Zone of Cross River State. This will boot the level of sustainability of forest resources in the zone.
2. Environmental agencies including international forest NGOs, should designed measures to sensitize, educate and mobilize the community people towards environmental awareness. This will help to control the level of forest exploitation in the zone.

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Forest Management Strategies and Sustainability of Forest Resources in Calabar Education Zone of Cross River State, Nigeria.

**Michael Obun Etan, Ph. D; Mrs. Egere Mirian Akpono, Ph.D; Ambe Benjamin Ayua, Ph.D**

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