

## **Assessing the Impacts of Tenure Practices on Forest Management in Cross River State, Nigeria**

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### **Abstract**

The challenge of sustainable forest management is the relationship between land and forest resources utilization. Land is the central focus of all human manipulations. The study assessed the impact of tenure practices on forest use and management in the rainforest communities of Cross River State, Nigeria. Data collection was basically through household questionnaire survey and participatory rural appraisal methodologies. Descriptive statistics such as simple percentages, mean, standard deviation and table were used for the analysis, while the one-way analysis of variance (ANOVA) was employed to assess the variation in the effectiveness of the land and tree tenure practices in forest utilization and management. The study identified three main tenure practices such as land tenure, tree tenure and common property resource ownership that influenced forest management. The one-way Analysis of Variance (ANVOA) confirmed a statistically not significant difference in the effectiveness of tenure practices on forest resource use and management since the calculated F-ratio of 0.873 was less than tabulated F-ratio of 4.00 at 0.05 level of confidence. This implies that all the tenure practices in the area were very effective in promoting forest management in the area. Furthermore, the analysis also established a statistically significant difference in the effectiveness of land tenure practices such as institutional ownership, communal ownership, family or individual ownership, leasehold and private tenure in forest resources management based on the analysis of variance (ANOVA) that produced F-ratio of 45.196 which was higher than the tabulated F-ratio of 2.45 at 0.05 level of confidence. It was discovered that family or individual land ownership was more effective in promoting sustainable forest management than other land tenures since it has a higher mean score of 44.78 representing 66.06 percent of the total responses. Although women establishment of rights over land was mostly through their male children, father and husband in the rainforest

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communities, however the study identified several factors such as culture/tradition, nature of land tenure, nature of tree species and tree species value as affecting the rights of tree tenure, which in turn influenced forest use and management in the area. Based on the findings, the study recommended that; tenure practices such as land tenure, forest tenure and common property resource ownership should be regulated and encouraged for their effective influence in forest utilization and management. Also, land tenure practices such as individual or family land ownership which attracted the highest mean score of 44.78 representing 66.06 percent of total response should be encouraged among the rainforest dwellers, since it promotes sustainable forest management in Cross River State, Nigeria.

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**Keywords:** Tenure, forest, management, sustainable tree tenure, land ownership

## Introduction

Forests all over the world are facing greater threat ever than before. That is why management approaches have undergone experimental phases without tangible results. Current deforestation trend is alarming and according to recent estimates, the world lost nearly 10 percent of its untouched forest in just over ten years. Everyday, the world loses about 50,000 hectares of forest to agricultural clearing, road development and other human activities (Erickson-Davis, 2014).

However, the trend of deforestation in Nigeria is not different from the world picture. Butler (2005) reported the revised estimates of Food and Agricultural Organisation of the United Nations and stated that, Nigeria has the world's highest deforestation rate of primary forests. Between 2000 and 2005, the country lost 55.7 percent of its primary forests. The leading causes of forest clearance in Nigeria includes; logging, subsistence agriculture and collection of fuelwood. In Cross River State, the Government had banned logging for over five years due to carbon credit economy on green economy yet the daily loss of primary forest is unprecedented.

The increasing loss of forest ecosystem is affecting the socio-economic livelihood of the indigenous rural population of Cross River State (Ajake and Enang, 2012). Tropical forests are important for their abilities to protect genetic diversity (IUCN, 1980) and provide for the livelihood of rural communities (Ajake, 2012). However, these forests are quickly disappearing and community participation in managing these areas is a critical component in ensuring their survival (FAO, 2010 and Ajake & Anyadike, 2012). This is especially true for biologically diverse ecosystems outside established protected areas. Forest management cannot succeed unless it is linked to opportunities and activities targeted at those whose pursuit of livelihood threatens the viability of the ecosystems.

In addition, as a result of the magnitude and the speed of forest resource degradation, a demonstration of different management strategies especially in the humid tropics and Cross River State in particular has been observed (FAO, 2007, Raufflet & Barragan, 2006 and Ajake & Anyadike, 2012). In Cross River State, forest management is anchored on different land uses such as creation of protected areas or landscapes (forest reserves, national park and wildlife sanctuaries etc.). These management perspectives relied on the legal framework which is captured by the landuse and forestry laws of Nigeria. By this, all forests are subject to the jurisdiction of the State Forestry Agency, which has the responsibility to determine which parts of the land are assigned to the category of forest areas meant for conservation and management for reduced emissions from deforestation and degradation (REDD) and other land uses.

According to FAO (2010), about 80 percent of the world forests are publicly owned, and that forest ownership and management by communities, individuals and private companies are increasing in recent times. However, Ajake (2012) noted that community forest management institutions and their initiatives which focus on communal lands ensure sustainability of forest resources management than government institutions that are targeted at publicly owned forest areas/lands. Although, a large portion of world's forests remain under public ownership and state control especially in developing countries, a diversification of forest tenure arrangement is taking place in various regions of the world as part of revised forest policies and laws. The nature of these tenure settings varies considerably, reflecting the past and recent history of countries and different approaches selected by governments to improve forest management (FAO, 2013). Bull and White (2002) claimed that 11 percent of the world's forests are managed by communities, which is far greater than that managed by forest industry, and about the same as that held by all private landholders combined. They predicted that this figure will rise from 298 million hectares of community owned and managed land in 2001 to 740 million hectares by 2015, representing 45 percent of the world forest estates.

Furthermore, White and Martin (2002) considered forest tenure in twenty-four out of thirty most forested countries and observed a major unprecedented transition in forest tenure. They called for better understanding of forest tenure, particularly who owns and who has right to the world forests. Although, forest tenure is considered in terms of reforms (FAO, 2011), there is no much link with the implication on forest use and management systems especially in Cross River State. Accordingly, FAO (2011) considered tenure as a commonly misunderstood term, and that it is a generic term referring to a variety of arrangements that allocate rights to and often set conditions on those who hold land, while Glover (2014) describes tenure as the rights which different community members may have with regard to the access to and ownership of land and tree resources.

Rights denote claims enforceable with the support of law, custom or convention. Access is the ability to benefit from land resources. In addition, land tenure denotes the method by which individual or group of people in a society acquire, hold, transfer or transmits property rights in land. The bundle of rights also covers the tree resources which man depend on for daily livelihood.

Previously, FAO (1989) noted that tenure comes in a bewildering diversity of forms. For instance, some third world farmers were using land or trees under "freehold", "leasehold" and other tenures from western laws, but many others cultivate under indigenous land tenure systems. These systems, though similar, have evolved to meet specific needs of particular technologies. Tenure, whether land and trees, affect planting and conservation, and it is not a new knowledge, rather it has long been a part of the folk consciousness of farmers all over the world. In Africa, Bisong, Animashaun and Andrew-Essien (2009) considered tenure as many relationships of the rural people with the resources of the ecosystem. It involves the right to use spatially defined tracts of cultivated and/or uncultivated land for varying length of time within certain regulations and cultural practices.

Tenure systems vary in terms of which individual or groups may enjoy some or a number of the bundle of rights (FAO, 2011). For instance, there are cases where certain groups of people have rights of access to certain forest resources from an area of forest, but not to other products, whereas in other regions, certain groups may have access within specific season and for individual trees that are considered common property. However, in Vietnam, a forest land allocation process provides for the State land to be allocated to individual households with a bundle of rights that include the right to transfer the land title; whereas in Latin America, the Pacific and Philippines, individuals or groups may have legal rights to use or sell all resources without the right to sell the land (FAO, 2011).

Campese (2009), in his right-based approaches described it as an integrating rights, norms and principles into policies, planning, implementation and outcome assessment to help ensure that conservation practice respect rights in all cases and support their further realization where possible. Recently, attention has been paid to common property tenure system whose debate has ever been since Hardin in 1968 on the "tragedy of the commons", but it is a situation where resources within common access would eventually degrade through overuse because individuals would have no incentive to reduce their own off-takes, while others continued without limit (FAO, 2011).

Bisong, Animashaun, Andrew-Essien and Utang (2008) discovered that unregulated access to land was found to characterize the use of common lands as well as being the critical factor behind the rapidly shrinking common lands in Nigeria and Cross River State in particular. Formal tenure arrangement has observed transitions over the years in many parts of the world (FAO, 2011). These transitions especially in the de-collectivization of forests and agricultural lands in Soviet Union (former), China and Vietnam; legitimization and formalization of indigenous and local community claims to land and forests in Latin America; increasing adoption of community forestry in many parts of the world and privatization of national forest assets in New Zealand, Australia and South Africa reflect changes to important tenure characteristics.

Land tenure systems are influenced by the use to which land is put for economic and social development (Bassey, 2003), yet land use determines whether resources could be conserved or not, and the level of conservation attainable for natural resources. Glover (2014) noted that although trees and land tenure are distinct, each affect the other. Planting of trees can be used to establish de facto private ownership of land, while FAO (1989) observed that tenure is not some bizarre phenomenon found in and out of the way, it should be no longer treated as an exception in natural resources conservation. The assessment of tenure practices and its implications on forest resources management should be captured in forest management approaches all over the world and Cross River State in particular. This is necessary in the sense that, Bisong, Animashaun and Andrew-Essien (2009) in determining the relationship between tenure patterns and forest resource decline discovered that household size alone is significant in explaining the variation in size and total number of farm plots among individuals and the size and number of idle forest plots determined the rate at which virgin forests were converted to new farmlands.

Also, Ajake (2012) recommended that, since trees are critical factor to human population existence, it may be necessary to adopt landuse systems that can encourage tree retention and cultivation habits, in order to increase benefits vis-à-vis reducing population pressure from the primary forest in the rainforest villages of Cross River State, Nigeria.

Furthermore, FAO (2013) asserts that secure tenure is also increasingly being recognized as contributing immensely to poverty alleviation of millions of people who depend directly or indirectly on forest resources for their livelihood, and more generally to sustainable tenure from different perspectives. FAO (2011) observed that women and men often have desperate knowledge of forest resources and different roles in tree and forest management.

Women practice traditional agroforestry production systems and have the responsibility for collecting fuelwood for the household, forest resources used for food and medicine (Bisong & Ajake, 2001), while men tend to be more involved in high-value activities such as cutting and hauling of timber (FAO, 2011). Research suggests that trees and forests are more important to rural women's livelihood than those of men (Bisong & Ajake, 2001; FAO, 2010).

Many tenure processes are not adequately implemented because of weak supporting environment, lack of involvement of the beneficiaries in decision making, and lack of periodic assessment of the effectiveness of tenure practices. From the foregoing, several studies (Bisong, Animashaun & Andrew-Essien, 2009; Grove, 2014; FAO, 2009, 2010, 2011 and 2013) have investigated on land and forest tenure practices in terms of impacts on land resources degradation. These researchers have not captured the main essence of the effectiveness of tenure practices especially in forest management. For instance, forest tenure is aimed at supporting the development and implementation of adequate and diversified systems that can promote sustainable forest management.

Most forest communities in the study area are involved in tenure systems that can ensure the management of natural resources, but they are not acknowledged and the effectiveness is not established. In addition, the inability of land users to acknowledged traditional tenure rights in project design and implementation results in conflicts which lead to high rate of de-reservation, deforestation, excessive poaching, over exploitation of resources within the reserves (Bassey, 2003).

Research can offer insight into many aspects of tenure practices such as assessment of the different tenure systems and their impact on sustainable forest management, establishment of rights and the effect on forest resources management, effect of tree tenure on forest management and the role of women's right of land ownership on forest ecosystem. This study evaluated effectiveness in tenure practices in forest management resources in Cross River State, Nigeria.

## **2.0 Study Area**

The study was carried out in the rainforest zone of Cross River State, Nigeria. The area is located between longitude 7<sup>o</sup>40" and 9<sup>o</sup>50" East and latitudes 4<sup>o</sup>40" and 7<sup>o</sup>00" North of the equator. The landmass covers approximately 23,074km<sup>2</sup> and lies within the tropical rainforest ecological zone of Nigeria. The forest area occupies about 7610.00km<sup>2</sup> representing 35.2 percent of the total land area of the State (CRSFC, 2011). The forests are stocked with timber and non-timber forest products, which are increasingly being exploited for the daily sustenance of the people (Ajake, 2012).

The forest is characterised by dense primary and secondary regrowth, made up of the highly disturbed, open forest, and presumably forest fallows. In spite of the creation of National Park, forest reserves and the carbon credit economy or green economy which led to the imposition of restrictions on logging, the forests are rapidly being depleted due to the complexity of human activities and conflicts in tenure practices.

### **3.0 Materials and Methods**

Data were collected from eighteen study locations of Agbokim, Ajassor, Akparabong, Okuni, Abo Ebam, Orimekpang, Odonget, Iyamitet, Agoi-Ekpo, Ibami, Ibogo, Idoma, Iko Ekperem, Iwuni Central, Bayatong, Okorshi Bendi II and Busi that have interface with the primary forest and are involved in different tenure practices. The collection of data was through the use of prepared questionnaire and participatory rural appraisal methodologies. The questionnaire also included likert scale questions using a scale of one (1) to five (5) (where five is the highest score and one is the lowest) to assess the effectiveness of the tenure practices in forest resources management across the study locations.

A total of 1,457 sampled household heads representing a household number of 2,906 with the population size of 42,826 (Ajake, 2012) was used for the study survey.

Before conducting the survey, a reconnaissance survey was carried out and research assistants were briefed in detail to streamline the understanding of the objectives of the study, the questions, identification of the target respondents, and to ensure the participatory rural appraisal conducted does not negate the approach of broad debate in grouping meetings and interviews to arrive at a decision on tenure issues under focus. The respondents in this research are from the local communities and staff of forest management institutions. Data were analysed descriptively and quantitatively using statistical package for the social sciences (spss) version 2.0.

### **4.0 Result and discussions**

Land and trees are inseparable companion in the biosphere. The complexity in tenure has inherently resulted in conflicts that have affected forest resources use and management in the rainforest of Cross River State. This study largely examines tenure practices and their impact on forest resources use and management in the study area. The investigation specifically detailed out with the aid of empirical data on the use and management of forest resources. The study also considered the place of women in land and tree tenure practices and the factors affecting rights of tree tenure were equally examined. The result and discussion of findings were presented accordingly.

#### 4.1 Tenure practices and forest utilization and management

The household questionnaire survey and participatory rural appraisal study conducted in the sampled villages identified three main tenure practices in study area influencing forest resource utilization and management. The practices include: land tenure, forest tenure and common property tenure. The data generated from the household survey were also subjected to empirical analysis to determine the variations of these tenure practices and their effectiveness across the sampled villages (Table 1).

**Table 1: Tenure practices and forest utilization and management**

Sampled villages	Land tenure	Forest tenure	Common property	Total
Agbokim	44	13	41	98
Ajassor	46	16	48	110
Akparabong	108	48	31	187
Okuni	109	51	162	322
Abo Ebam	32	16	41	89
Orumenkpang	36	14	42	92
Odonget	61	49	34	144
Iyamitet	140	126	101	367
Agoi Ekpo	51	72	93	216
Ibami	42	69	64	175
Ibogo	41	18	28	87
Idoma	28	24	31	83
Iko Ekperem	52	41	66	159
Iwuru central	51	58	18	127
Bayatong	29	29	26	84
Okorshie	38	36	35	109
Bendi II	28	27	10	65
Busi I	29	23	13	65
Total	965	730	944	2639
Mean	53.61	40.56	52.44	146.61
Standard deviation	32.13	28.43	37.25	32.60
Percentage	36.57%	27.67%	35.77%	100%

**Source: Fieldwork 2013/2014**

The result shows that land tenure and common property attracts higher population mean scores of 53.61 and 52.44 representing 37 percent and 36 percent respectively, and a standard deviation of 32.13 and 37.25, whereas tree tenure has a mean score of 40.56. The high score on the two land tenure practices as shown in Table 1 is an indication of the level of influence of the practices on the utilization and management of forests.



The narrow mean of differences between the practices implies the impacts of these tenure systems on forest management do not vary significantly. The study also discovered that tenures practices in forest villages of the study area are similar, however there are the exclusive rights of the men. The women and non-indigenes that interact daily with the natural forest ecosystem and owned several plots of farm lands are rarely considered across the study communities.

Forests and tree resources were considered to be common property where everybody has access to exploitation. In a transect walk across the forest ecosystem in all the communities, it was observed that the communities that have interface with the forest ecosystem have no defined boundaries from one another. Based on this, regulation of forest exploitation in these areas was considered very difficult. For instance, the resources of Agoi Ekpo forest was jointly exploited by several communities such as Iyमितet, Ibami, Ababene, Ekuri and Owai, whereas Okuni forest ecosystem was also collectively utilized by neighbouring communities of Etarra, Ekuri Eyeyeng, Akam and Abijan.

It was further observed that significant population of tree species have open access to exploitation, except in a few communities such as Agbokim, Ajassor and Abo, Orimenkpang and Okuni who laid claims to trees within their farmlands. This system of open access to the use of trees has hindered the retention and cultivation of forest tree species in some communities like Okorshie, Bayatong, Bendi, Busi, Iyमितet, Odonget, Ibogo and Iwuru Central. Further investigation was carried out to determine the degree of variation and which tenure practices was more effective in promoting sustainable utilization and management of forest ecosystem in the area. A null hypothesis was formulated for testing as:

*Ho: There is no significant difference in tenure practices and their effect on forest utilization and management in the study area.*

The null hypothesis (Ho) was tested using the household data (Table 1) drawn from the Likert scale questionnaire: One-way analysis of variance (ANOVA) was applied and the results presented in Table 2:

**Table 2: Results of One-way Analysis of Variance of Tenure Practices and Forest Management.**

Source of Variance	Sum of square	Df	Mean square	Cal F-ratio	Table F-ratio
Between Groups	-1878.926	2	939.463	0.873	4.00
Within Groups	54871.167	51	1075.903		
Total	56750.093	53			

Significant at 0.05 level of confidence

The one-way analysis of variance produced a calculated F-ratio of 0.873 which was less than the tabulated F-ratio of 4.00, and was statistically not significant at 0.05 levels. Since the calculated F-value (0.873) was less than the tabulated F-value (4.00), the study accepted that there is no significant difference in the effectiveness tenure practices on forest utilization and management in the study area. This implies that there is no significant difference between the three sets of data with respect to the impact of tenure practices on forest management. However, the impact of these practices such as land tenure, forest tenure and common property on forest resources exploitation and management operated at almost the same level in terms of their effectiveness. The study therefore observed that the flexibility of the practices in the areas was the basis for sustainable forest harvesting and management.

#### ***4.2 Catalytic Role of Land Tenure Systems on Forest Use and Management***

It is obvious that a major challenge of sustainable forest management is the relationship between land and forest resources utilization. Land is the central focus of human manipulations through diverse activities. It affects sustainable forest harvesting and management techniques. However the value of land and the relationship with institutions that develop around it, makes it imperative to be considered in this study. The Participatory Rural Appraisal across the forest villages discovered that there are various rights associated with a parcel of land. These rights determine the use of forest, tree retention and cultivation in the rural farming systems.

Although different groups and customary practices exist such as Ejagham, Boki, Bette, Mbembe, Agoi, Biase etc; the study observed a relatively uniform land tenure practices across the sampled villages. However, Balogun (1994) observes division between land controlled by government and land under traditional land control systems. Therefore cultivation of all lands in Cross River State depends on agreement with either government officials or the relevant village organizations. Five land tenure practices were identified across the eighteen sampled communities. The identification of land tenure practices was based on their frequent occurrence during the interviews and household survey conducted. The five practices include: institutional lands, communal land, individual family land, leasehold and private ownership of land. Furthermore, the household survey on the assessment of the effectiveness of indigenous land tenure practices on forest utilization and management revealed an interesting picture (Table 3). The result shows that family structure control most lands in the area. This accounts for 44.78 mean score representing 66.06 percent and standard deviation of 21.07. Family or individual lands are those which may be inherited by a group of people claiming common ancestor. These lands are transferred from one generation to another.

The high mean score shows that individual or family or inherited land ownership was rated high in terms of ensuring sustainable forest use and management. The findings revealed that most household heads whose ancestors or forefathers had acquired sufficient lands were no longer interested in clearing virgin forest to acquire new farmlands. Rather, they practiced rotational bush fallow system which was believed to offer a solution to the limitations of agricultural production posed by many soils in the area. Most of the soils, especially in the tropical high forest areas are highly weathered, acidic and naturally infertile. It was noted that individual land ownership significantly improves the tree retention and cultivation habits of the land owners. This reduces the continuous pressure on the primary forests. However, individual or family lands ownership was common in Okorshie, Bayatong, Bendi, Busi, Odonget, Iyamitet, Agoi Ekpo, Ibami, Ajassor, Agbokim and Ajassor. It was also found that family lands were used for the development of plantation crops such as cocoa, oil palms, banana, cashew, bush mango, etc. These farms increased the retention and cultivation of forest trees vis-à-vis reducing pressure from the primary forest ecosystem

**Table 3: Effect of Land Tenure Practices on Forest Management**

Sampled villages	Institutional ownership	Communal ownership	Individual or family	Leasehold ownership	Private ownership
Agbokim waterfall	5	7	25	10	4
Ajassor	10	12	36	15	3
Akparabong	2	18	84	32	12
Okuni	11	28	86	13	6
Abo Ebam	2	3	36	0	0
Orumenkpang	3	4	32	3	0
Odonget	6	8	10	4	3
Iyamitet	4	26	81	12	8
Agoi Ekpo	20	12	64	10	4
Ibami	12	10	60	11	3
Ibogo	0	3	50	8	2
Idoma	0	10	28	2	1
Iko Ekperem	6	8	34	7	3
Iwuru central	7	5	40	5	2
Bayatong	0	3	29	1	0
Okorshie	2	4	30	2	1
Bendi	0	3	27	0	0
Busi	0	2	24	0	0
Total	90	166	866	135	54
Mean	5.00	9.22	44.78	7.50	3.00
Std Deviation	5.41	7.73	21.07	7.83	3.22
	6.86%	12.66%	66.06%	10.30%	4.19%

Source: Fieldwork, 2013/2014

Furthermore, communal land ownership attracted a mean score of 9.22 representing 12.66 percent and a standard deviation of 7.73, while leasehold ownership has 7.50 and standard deviation of 7.83. Institutional ownership and private ownership were considered as the least in terms of their impact on forest use and management. Communal lands are areas that have open access to all the indigenous people. Such lands are controlled by the indigenous population and the right of use is always allocated according to need and availability. Most community forests in the area were held under this form of control.

The management of community lands was through community laws and regulations. Often times, the community through the council of chiefs and elders revoked their authority and sanction any erring member of the community who indiscriminately use community lands. The recognition of forest a land as communal approves these communities claim of land resources and their commitment to resist exploitation by people from outside. It was found that tree retention and cultivation was difficult since the land can be reverted back to the community after being used by individual members of the community. During interviews, communities such as Iwurru Central, Agoi Ekpo, Iyamitet, Orumenkpang and Okorshie complained that their forest ecosystem was rapidly decreasing due to population expansion. In some areas, such as Agbokim, Abo, Orumenkpang, Okuni, Iyamitet and Ajassor, forest lands are open to all indigenes to use.

A few lands were under traditional institutional control in Iyamitet, Odonget, Ibami, Iko Ekperem and Agoi Ekpo. For instance the Ekpe society is the main instrument of control of such lands from excessive exploitation in Iwurru Central, Ajassor, Okuni, Agbokim and Iko Ekperem. While the Echekira society (yam title holders) and the Ebrambit war dance were used by Iyamitet and Odonget to regulate and control over exploitation of forest lands. However, such lands are reverted back to their original owners after stabilization. Also, most community forest lands reserved for tradition purposes were controlled through the instrument of some societies. For instance in Agoi Ekpo, Obam society was most important tool in protecting badly used lands and community forests meant for cultural initiations.

Similarly, Leasehold land tenure was discovered in Akparabong, Agbokim, Ajassor, Okuni, Iyamitet, Agoi Ekpo and Ibami. It was observed that this system was a contracted arrangements where individual families and communities entered into agreement with some prominent members of their communities and non-indigenes for a period of time. In this case, ownership is only on the land. The occupant has no right to own tree. In this case, tree retention and cultivation was very difficult and the occupants of such lands maximally utilized the land for purposes of attaining their benefits. This system of land ownership does not encourage sustainable use and management of forest resources in the study area.

Other lands privately owned by individuals especially by indigenes are through inheritance and clearance of communal virgin forest. It was observed that indigenes and non-indigenes can buy and sell land. Unfortunately, the market is not available. However the natures of certain land tenure practices are increasing forest resource depletion.

Land tenure systems that do not guarantee continued ownership and control are not likely to ensure sustainable forest resource use and management. In order to determine the effectiveness of land tenure practice on forest management, one way analysis of variance (ANOVA) was applied and the result is presented in Table 4.

**Table 4: Analysis of variance of types of land tenure and the effect on forest management in the study area**

Source of Variance	Sum of squares	Df	Mean square	Cal F-ratio	Table F-ratio	Sig.
Between Groups	21857.376	4	5464.344	45.196	2.45	0.000
Within Groups	10276.722	85	120.903			
Total	32134.100	89				

Significant at 0.05 level of confidence

The analysis of variance used data in Table 4 and produced a calculated F-ratio of 45.196 which was higher than tabulated F-ratio of 2.45, at 0.05 level of confidence. The study rejected hypothesis and confirms a statistically significant difference in the role of land tenure types on forest resources use and management in the study area. This implies that land tenure practices with high mean score (Table 3) such as individual or family land ownership was considered to have promoted sustainable harvesting and management of forest resources. These tenures were either encouraging tree retention and cultivation or ensuring sustainable regulation of forest harvesting. The study further observed that certain land tenures were destructive to the resources of the land and therefore should not be encouraged for purposes of sustainable land use practices in the study area.

#### **4.4 Acquisition of Land in the Rainforest Communities**

The findings revealed several ways in which indigenes and non-indigenes lay claims to land (Table 5). The Participatory Rural Appraisal study through the use of interviews and group discussion with chiefs, elders and specialist groups reveal that land tenure systems in the study communities are always changing depending on the availability of land at certain times.

For instance, it was discovered that in some areas, land tenure systems were developed in a period in which there was abundance of land. But recently, due land shortages as a result of increasing population, there were complaint and stories of land grabbing within the remaining community forests of the adjoining villages.

**Table 5: Response to Establishment of Rights Over Land**

Types of Right	Total Response	Mean	Standard Deviation	Percentage (%)
Clear virgin forest	837	49.24	32.85	40
Family division	262	15.41	18.48	12
Outright purchase	95	5.59	7.13	4
Inheritance from father	668	39.29	25.69	32
Inheritance from mother	145	8.59	9.64	7
Others	107	6.29	4.37	5
Total	2114	20.74	19.63	100%

Source: Fieldwork 2013/2014

The mean score of population responses to land ownership, through clearance of virgin forest tend to be higher with 49.24 representing 40 percent and a standard deviation of 32.85, while that of inheritance from father is 39.29 with a standard deviation of 25.69. The high mean score for the two types of rights implies that land acquisition in the tropical rainforest areas of Cross River State is mainly through clearing of virgin forest and inheritance from father. The quest to acquire land from virgin forest is high especially in Abo, Agbokim, Ajassor, Okuni, Iyamitet, Agoi Ekpo, Ibami, Iko-Ekperem, Odonget where the community forest is still large. Indigenes are sometimes allocated pre-determined area of virgin forest by the council of chiefs or village standing committee since virgin forest was rapidly decreasing in resources. In some forest villages such as Abo, Orumenkpang, Ajassor, Agbokim and Okuni, indigenes are at liberty to survey and demarcate virgin forest lands intended to acquire until a certain time for them to use. The study observed that such demarcations were recognized by the village council. When this happened no other indigene can clear the same area of the forest. However, this method of land acquisition was reported by some households as being destructive and has increased deforestation in the study area.

Although division of land among family members and inheritance from mother received a low mean score of 18.48 and 9.64 respectively, it was discovered that these methods of land acquisition have the same characteristics with inheritance from fathers. And these types of rights are within the control of the household. The division of land among family members and inheritance are through parental lineage.

Lands acquired through these media are not accessible to outsiders or community members except you are a child of that family or ancestral home, and a transect walk across the village territories indicated that tree retention and cultivation are associated with land acquired through inheritance, and since most of the trees are of high economic value, members of the family or household tend to protect and manage trees within their farm lands vis-à-vis reducing pressure from primary forest.

Outright purchase of land in the study area was mainly associated with non-indigenes and few wealthy members of the community who intend to expand individual or family land. This attracts a mean score of 5.59 and standard deviation of 9.64. For non-indigenes, it is rarely possible to buy land in the area. It was also a spatial disparity land acquisition by few non-indigenes who owns land was noticed. For instance people in Agbokim, Ajassor, Okuni, Iyमितet, Agoi Ekpo, Ibogo and Iwuru central acquired land through establishment of relationship with indigenes in marriage or joining age grades. Other forms of land acquisition include gift from wife or husband and renting. The renting of land is dependent on individual relationship with a particular family in the village of resident. To rent land requires a gift to the owner, whether village chief, family head or private individual. Annual rental in terms of cash (income) may also be paid. However, it does not promote tree retention and cultivation in the rural farming systems. This is because planting of trees is seen as a sign of ownership.

The high standard deviation of 32.85 for clearing of virgin forest and 25.69 for inheritance from father indicates that the level of disparity of the distribution of respondents to these rights and their importance to forest management across the villages was very high. This implies that, while some communities may record very low distribution (0 or 2), others have extremely high distribution (98 or 120). In conclusion, it was noted that land rights that may not ensure sustainable use of land resources should be revised.

#### **4.5 Effect of Women's Right of Land Ownership on Forest Management**

Women constitute the bulk of forest users and their daily activities impinge on the forest. However, they contribute to the implementation of community or indigenous forest management decisions in the regulation of forest resources commonly used in the rural areas. Bisong and Ajake (2001) observed that rural women sometimes operate under the general framework of community forest decisions and planning concerning the use and management of community owned forest lands. Women's actual contributions to land development and management in the study area are rarely considered.

Although women have limitations due to their disadvantaged position in land and tree tenure among other things, they have potentials and opportunities to ensure sustainable use and management of forest resources when their rights to land ownership are assured. The Participatory Rural Appraisal and the questionnaire survey considered the various ways in which women establish right of land ownership in the rainforest villages of Cross River State. The responses were taken from both males and females to remove the bias of women being influenced by their position. The household survey data were analyzed using descriptive statistics. The result is presented in Table 6.

**Table 6: Women Establishment of Rights over Land in the Rainforest Communities**

Sources of Right	Total Response	Mean	Standard Deviation	Percentage (%)
Husband	273	15.17	10.93	24
Male children	334	18.56	8.45	29
Father	304	16.89	15.09	27
Mother	118	6.56	8.34	10
Outright purchase	46	2.56	2.99	4
Clearing virgin forest	66	3.67	4.39	6
Total	1141	10.57	8.37	100%

Source, Field work, 2014

The findings revealed that, women ownership of land rely mostly on the husband, children and father. This attracts a population mean score from 15.17 to 18.56 representing 80 percent of the total score. Although women are principal stakeholders of forest resources and are involved in the management of these resources, the tradition and native custom of acquiring land are not favourable to them. The lack of right to land ownership in most forest villages such as Iyamitet, Odonget, Agoi Ekpo, Ibami, Bayatong, Okorshie, Idoma, Bendi, and Busi is a major problem affecting women in tree retention and cultivation habits.

Most women are dependent on their husbands, male children and father who have right of land ownership in the family land. Right of land ownership among women vary according to the community in which they live. For instance in Abo, Ajassor, Orumenkpang, Agbokim and Okuni, customs and tradition allow women to inherit land from their husband, children and father. This right is only given to a woman who is the only child of the father or mother when the father marries many wives. In many cases, enlightened women who lost their husbands can inherit land especially when the children are still young.



In Akparabong, Ajassor, okuni, Agbokim, Orimenkpang and Abo women can acquire or inherit land to establish plantation crops. It was also observed that in these communities only a few of them have right to land through clearing of virgin forests. Furthermore, the study discovered that in most villages where women have right to inherit, purchase land and clear virgin forest, they have limitations especially when she is given out in marriage. The male children (brothers) are always presenting obstacle to their sisters who are accused of double standards in issues of inheritance. The opportunity given to rural women to have access to land in most forest villages has promoted tree retention and cultivation in the rural farming systems. The tree species cultivated in their farms are some of the forest products which they rely on for daily sustenance. Since these products are harvested from their farmlands, the pressure on the natural forest system was observed to be systematically reduced in the study area.

## 5.0 Tree Tenure and Forest Sustainability

Trees are important to rural households for several reasons. In many parts of the world, farm and forest trees provide fodder for livestock, medicine, fuel, food, income, raw materials among others (Gregersen, Synder and Dieter, 1989; Ajake, 2012). The value of a tree to human population is the determinant of its ownership. However, there are rights influencing the use and management of forest trees. The household survey collected data on the different rights, factors affecting tree tenure and integration of trees into rural farming systems.

### 5.1 Effects of Tree Species Rights on Forest Management

The Participatory Rural Appraisal and household survey identified several rights affecting trees and with the purpose of determining their role in forest resources management. The household survey captured assessment data on various rights to tree species and presented accordingly (Table 7).

**Table 7: Population Score of the Effect of Tree Species Right on Forest Management**

Rights to tree species	Total	Mean	Std. deviation	Percentage (%)
Right to own	644	36.89	41.07	17
Right to inherit	708	39.33	43.18	19
Right to plant	767	42.61	39.20	20
Right to use	1167	64.28	32.32	31
Right to dispose	316	17.56	15.17	8
Others	119	6.61	11.14	3
Total	3,767	34.88	36.83	100

Source: Fieldwork, 2013/2014

The result of the analysis confirmed that, the people were aware of the existing rights affecting trees that ensure sustainable forest management. The right to use forest trees attracted the highest mean score of 64.28 representing 31 percent and standard deviation of 32.32. The high standard deviation was an indication of the fact that the indigenous people have for several years recognized the utility of trees and therefore adopt measures to protect and manage them. The recognition of the utility of trees and the rights affecting them are associated with most customs and traditions of the study villages.

Further analysis shows that the rights to plant inherit and own tree species attracted the highest score on aggregate. These accounted for 56 percent of the overall assessment. These three attributes were recognized as very effective in promoting and ensuring sustainable forest resources management. When trees are planted, owned and inherited, they constitute the foundation of the socio-economic investment of the rural population. Detailed analysis reveals that the right to use forest tree product is widely known to the entire population including women.

Trees, whether in forest and farm lands, are open to the entire population in that community, except non-indigenes who in most times seek for recognition before they can be allowed to use tree products. However, in some villages such as Ajassor, Agbokim, Okuni, Akparabong, Orimenkpang and Iwuru Central, trees on individual farmlands are restricted to only the owner of the farm until when such farm land regenerated to old fallow, and then the ownership of the trees can be reverted back to the community. It was also discovered that certain trees of high economic value such as bush mango (*Irvingia gabonensis*), native pear (*Dacryodes edullis*), mango (*Magnifera indica*), native kola (*Cola acuminata*) and bitter kola (*Garcina cola*) planted on individual farmlands were restricted to the owner of the farm until when such land is regenerated to secondary forest before ownership of the tree can be reverted to the community. Timber species on individual farms were only used by the owner of the farm for that period of the tenure.

All tree species in the primary forest, secondary forest and old fallow were owned by the community. Therefore, indigenes have right of use of the products from them except for timber harvesting that may require consultation with the chief or council of chiefs before use. The right to use trees may be temporal (in case the trees are in food crop farm) and permanent (incase such trees are within tree crop farm). The study discovered that tree crop farm encourages people to retain or cultivate forest trees since they are sure of the rights to use them for a long period. But in food crop farms only a few trees are retained during forest clearance. Planting of trees is difficult since the fanner is aware that his right over the trees ceases immediately he harvests his crops especially in communal lands. These findings confirmed the study of Ajake (2012) in the rainforest villages of Cross River State.

Similarly, trees are inherited depending on the type of land tenure. For instance, all trees in individual or family lands are inherited by family members. However, in a communal land, a person can use the products of the trees but cannot inherit or own the trees. The right to dispose of trees which attracted a means score of 17.56 and standard deviation of 11.14 is also dependent on the land tenure practices. Trees on forest and communal land can only be disposed by the village chief in consultation with the council of elders. Other tree rights that were not frequently indicated and visible for assessment attracted 6.61 mean score representing 3 percent.

Few trees are rented periodically for use especially by non-indigenes at agreed sum of money paid to the tree owner that may be community or individual for the period specified by the agreement. Most forest trees in plantation farms are under such tenurial arrangements.

## **5.2 Analysis of Factors Affecting Rights of Tree Tenure**

Several factors were identified as affecting rights of tree tenure (Table 8). These factors include: culture and tradition, nature of the land tenure, tree value and nature of the tree. The factors were frequently ticked by the respondents across the eighteen communities during the survey. The result shows that tree value and the nature of land tenure are the main factors affecting rights of tree tenure in the study area. These factors accounts for 71.50 and 48.50 mean representing 39 percent and 27 percent respectively. The mean score for tree value tend to be higher than others. This shows that the value of trees across the forest villages was the main determinant of tree retention and cultivation, as well as ownership. From the PRA, it was discovered that the study population retained or cultivated trees in farming system because of their value in terms of economic, socio-cultural, medicine, food, ecological function, agronomic, provision of shelter etc. Trees were owned by households for the purposes of improving crop yields and daily income in their farmlands.

**Table 8: Factors Affecting Rights of Tree Tenure**

Sample villages	Culture and tradition	Nature of land tenure	Nature of tree	Tree value
Agbokim	20	36	29	42
Ajassor	18	44	31	61
Akparabong	49	108	64	182
Okuni	34	72	40	174
Abo Ebam	20	38	14	41
Orimenkpong	24	42	26	42
Odonget	38	46	20	62
Lyamitet	82	104	43	136
Agoi Ekpo	18	72	36	98
Ibami	26	68	44	64
Ibogo	19	34	24	39
Idoma	24	28	23	54
Iko Ekperem	36	30	33	64
Iwuru central	14	29	30	68
Bayatong	16	27	20	38
Okorshie	26	38	21	51
Bendi	21	29	20	38
Busi	17	28	16	40
Total	502	873	625	1287
Mean	27.89	48.50	29.17	71.50
Std Deviation	16.30	25.63	13.01	46.09
(%)	15%	27%	19%	39%

Source: Fieldwork, 2013/2014

The nature of the land tenure varies according to study settlements as earlier considered. The land tenure practices in area include: institutional ownership, communal ownership, individual or family land, leasehold and private ownership (Table 3). The study observed that land tenure such as individual or family land ensures the retention and cultivation of forest trees vis-à-vis ownership. Although communal land operates an open access system whereby trees are accessible to all members of the community, these activities can be regulated through community institutions, laws and regulations for sustainable use and management. Under this arrangement tree tenure was the responsibility of the entire community.

It was further revealed that private people who wish to own trees, purchase land from the community or family lands. The nature of trees also determines the right of ownership.

The Participatory Rural Appraisal study indicated that trees that are not positively related with crops and which are difficult to manage are negatively affected by right of ownership. This implies that, they are not encouraged for ownership. Most importantly, but with the least mean score of 27.89 and standard deviation of 16.30 was the culture and tradition of the people which greatly affected the right of tree ownership across the study villages. For instance, trees such as Oil palm (*Elaeis guineensis*), Udara or Star apple (*Chrysophyllum albidum*), Mimosup (*Baillonella toxisperma*), Umbrella tree (*Musanga cecropiodes*), Iroko (*Melicia excelsa*), Native kola (*Cola accuminata*), Bitter kola (*Garcina cola*), *Alstonia congensis*, *Pynanthus angolensis*, Native mango (*Mangifera indica*), *Ceiba pentanda* (Silk cotton tree) etc are culturally very significant.

Oil palm tree was extracted for its wine used for specific cultural ceremonies and palm kernel oil is used to dispel evil spirit. The seeds of *chrysophyllum albidum* and *Baillonella toxisperma* are used as ankle and waist rattlers by cultural dancers. The wood of umbrella tree (*Musanga cecropiodes*) was used for xylophone. The ritual rattle, wooden gong and bell are made from *Alstoinia congensis*, the seeds of Native kola (*Cola accuminata*), are used for cultural entertainment. Trees such as *Chrysophyllum albidum*, cotton tree (*Gossipium spp*), are protected and valued for particular cultural occasion. *Baphia sapida* is a symbol of fecundity, while *Ceiba pentandra* is associated with burials and place where mental illness is treated etc. All these trees are owned by the community for cultural reasons. In order to determine which factor affected tree tenures' rights in the study area, one way analysis of variance was applied to test hypothesis two as presented.

*Ho: Factors affecting right of tree tenure are not significantly different in the study area.*

The above hypothesis was tested using the one way analysis of variance. The results are presented in Table 9.

**Table 9: One-way Analysis of Variance of Tenure Practices and Forest Management.**

Source of Variance	Sum of square	Df	Mean square	Cal F-ratio	Table F-ratio
Between Groups	15979.779	3	5326.592	13.197	2.76
Within Groups	27445.544	68	403.611		
Total	43425.319	71			

Significant at 0.05 level of confidence

The analysis of variance produced f-ratio of  $13.197 > 2.76$  at 0.05 levels of significance. The hypothesis was rejected and it was established that there is statistically significant difference in the factors affecting rights of tree tenure in the study area. This implies that tree value and nature of the land tenure with higher population mean score (Table 8) are considered as the most significant factors that determine the people's right of tree tenure across the study communities.

## 6. Conclusion

Tenure comes in a bewildering diversity of forms and should not be undermined in forest resources management. The tenure systems, though similar in the study, evolved in different forest communities to meet specific needs of particular people in specific environment. Land and forest tenures in the study area were seen as the basis for tree planting by indigenous population conservation of the natural forest ecosystem. The management and control of land as observed in the area was dependent on who has the right to use, own and inherit the resources. Based on the findings, the study recommended the following:

- (1) Land tenure practices that allow the cultivation and retention of indigenous forest tree species, and other species, should be recommended to all villages that have interface with natural forest ecosystem. This improves the condition of the soil and reduces frequent pressure on the primary forest.
- (2) Land and forest tenure reforms should capture the women and grant them more access to land ownership since they are the ones that have daily interface with natural forests and farmlands and can ensure forest tree species retention and cultivation in the rural farming systems.
- (3) Land and tree rights that may ensure sustainable use of land resources should be encouraged among the rainforest dwellers.
- (4) Periodic assessment of tenure practices in the forest villages is required to understand changing tenure patterns and their impacts on the primary forest.

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