

PERCEIVED EFFECT OF FOREST ENCROACHMENT AMONG RURAL HOUSEHOLDS IN THE FOREST AREAS OF ONDO STATE, NIGERIA

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Abstract

The study assessed the perceived effect of forest encroachment among rural households in Ondo State. Data were obtained using an interview guide from one hundred and twenty randomly selected rural households from Okitipupa and Odigbo Local Government Areas of Ondo State. The data were subjected to descriptive and inferential statistics. Findings revealed that 63.3% of the respondents were male, 39.2% were between 31-40 years, 69.2% were married, 60% had between 6-10 households size, 65% were engaged in forest encroachment and 37.5% earned between ₦10,1000-₦150,000 annually. Findings also showed that causes of forest encroachment includes farming activities (85.7%), fuel wood collection (53%) and lack of food (47.5%). Findings also revealed that benefits derived from forest were herbs (90%), fuel wood (89.2%), fruits (80.8 %) and game (77.5%). The perceived effects of forest encroachment by household heads had a mean score of 4.06 and correlation result showed that there is a significant relationship between perceived causes of forest encroachment with age ($r=0.038$) and household size ($r=0.152$). The study concluded that majority of the rural households depend completely on the forest reserve in their quest for survival and this has negative impact on the forest resources of the area. It was recommended that rural households should be encouraged and empowered to venture into other non-farm activities so as to reduce pressure on the forest.

Key Words: Forest, Exploitation, Encroachment, Biodiversity, Rural, Households

Introduction

Over the years, sustainable management of forest resources has been of primary concern due to its potential impact on biological diversity and importance in maintaining global

ecological function. In spite of its importance, the natural tropical high forest has continued to diminish rapidly in the African continent, thus dwindling sustainable forest management (Areola, 2009). It has been predicted that within the

next five years, unless adequate measures are taken, most humid tropical forestland areas in Africa could be transformed into unproductive land and the deterioration of the Savannah into desert will be accelerated (Hunter, 2013).

The level of community's nutrition is sometimes linked to fuel wood as their main source of energy for cooking. In many areas, due to increasing population the existing wood resources are over exploited. It is claimed that there are now places in the Sahel region where fuel wood has become so expensive that it absorbed about half the monthly budget of poor families in the rural areas (Enabor, 2017).

Forest protects the soil from erosion, maintains rates of evapo-transpiration and increases the soil infiltration capacity (Morgan, 1990). In addition to physical contribution to the environment, forests also provide ecological, economic, social, religious and cultural benefits. However, numerous human activities have led to degradation and general decrease of existing forest (Mainagwa, 2010). From the myriad of causes of forest encroachment and depletion, increasing fuel wood usage has been identified as one of the biggest threat to the forest covers. Over 80% of rural dwellers use fuel wood as a primary or secondary energy source (Hassan *et al.*, 2012).

Forests have provided and continue to provide numerous benefits to humanity including a wide range of important resources required for sustainable development. Within developing countries, higher percentage of the rural household extremely depends upon the forest for part of their livelihoods and security (World Bank, 2016). These groups of people are usually the most vulnerable group in the society as they are

at risk from illegal logging and removal of timbers and non-timbers products from the forestland, woodland arson, wildlife poaching and encroachment on both public and private forests.

Forest area in Nigeria started declining during the 1990s at an estimated annual rate of +2.6% or 398,000 hectares per year (FAO, 2005), this was caused by agricultural expansion, desert encroachment, over-harvesting, bush burning, illegal harvesting and de-reservations (Olanrewaju *et al.*, 2018).

More worrisome is the increasing spate of illegal logging in public land in Nigeria and which is also evident in Ondo State. This illegal activity if not checked, will obviously lead to yearly loss in assets and revenue accruing to the state government. Infringement of forest reserve and violation of protected areas have more effects on the local economy of the state as they threaten the conservation of forest resources and biodiversity found in such areas (Ahmed *et al.*, 2016). Over exploitation and degradation of forest resources impose global and local cost such as climate change. The prevalence of forest crime has been on the increase as a result of poor governance, corruption and illegality in the forest sector particularly (Mohammed and Danjuma, 2014).

Tee *et al.* (2018) also discovered that excessive forest encroachment activities among rural dwellers could lead to massive soil erosion, decreased in water quality and dam siltation. Other forest encroachment activities that could hamper the environment include but not limited to setting the forest ablaze in quest for hunting wild animals, cutting down forest trees indiscriminately, setting traps as well as the use of explosive devices in the

forest which leads to destruction of life and properties of rural households.

Therefore, in an attempt to address these challenges and proffer a lasting solution to forest encroachment, the study was carried out to assess the perceived effect of forest encroachment among rural households in Ondo State. Specifically, the study determined the benefits derived from forests, the causes of forest encroachment and ascertained the perceived effect of forest encroachment among the households.

Methodology

Study Area

The study was carried out in Ondo State, Nigeria. The State is located in the South-western part of Nigeria with the land area of about 15,195.2 km² which lies

at latitude 7° 10' North and longitude 5° 05' East. The State is predominantly tropical rainforest with some areas of forest savannah to its North and mangrove swamps to its South. The State is characterized by heavy rainfall which ranges between 1500 mm and 2000 mm with climate following the usual tropical pattern; while temperature ranges between 21°C and 29°C with high relative humidity. It is an agrarian state with 18 Local Government Areas. Two Local Government Areas were purposively selected out of the eighteen Local Government areas in Ondo State which are Odigbo and Okitipupa Local Government areas due to the presence of forest resources and occurrence of regular forest activities.

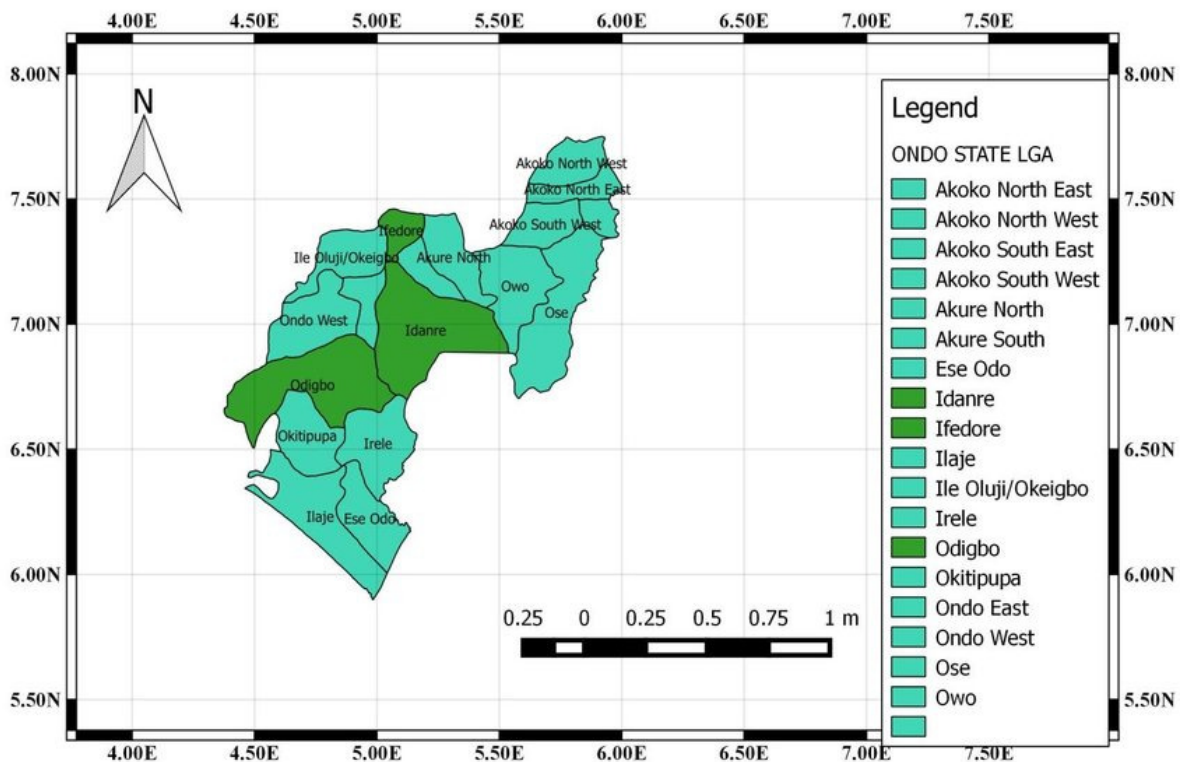


Fig. 1: Map of Ondo State showing the Study Area

Source: Ijagin and Adekunle (2017)

Sample Collection

Three communities were randomly selected from each of Local Government areas thus making six communities for the study. Twenty households were randomly selected from each community thus making a total of one hundred and twenty (120) households for the study. Data were collected from the households with the aid of the interview guide. The data were subjected to descriptive statistics such as frequency counts, percentages and means. The Pearson Product Moment Correlation (PPMC) and the Chi-square were used to test relationship between selected socio-economic characteristics and the perceived effects of forest encroachment by rural households.

A 5-point Likert rating scale was used to determine the perceived effect of forest encroachment among households in the study area (VH-Very High, H- High, M-Moderate, L- Low and VL- Very Low). A mean score was calculated for each statement and a Grand Mean (GM) was also calculated which determined the overall perceived effects of forest encroachment among households in the study area. The criterion for determination of perception score stipulates that if the Mean as well as the Grand mean is greater than 3.0, the household perceived that the effect of forest encroachment is high. The implication is that forest encroachment is affecting the overall livelihood activities of the households. If the Mean score is less than 3.0, it means the households perceive that the effect of forest encroachment is low suggesting that it is not affecting the overall livelihood activities of the households.

Results and Discussion

Table 1 revealed that 63.3% of the respondents were male while 36.7% were

female. This could be attributed to the fact that rural households in the study area are mostly male headed like most African households while the few that are female headed could be single mothers or have lost their husbands. Male headed households could have a better perception of forest encroachment than the female headed households. In contrast, studies in Rwanda and Sudan observed that males were more likely than females to depend more on forests and other environmental resources (Masozera and Alavalapati, 2004; Adam and El Tayeb, 2014). 39.2% of the respondents were between the ages 31 and 40 years with a mean age of 45 years. This indicates that the household heads were still young and in their active age and will still be involved in one productive activity or the other. Some of these livelihood activities could be dependent on the forest resources around them, hence leading to forest exploitation and encroachment. Findings also revealed that majority (69.2%) of the household heads were married, indicating they have responsibilities to shoulder such as feeding family members, paying house rents, paying school fees among others. The higher the family needs, the more demand is laid upon the natural forest resources that are available in the immediate environment. It was also revealed that 45.0% of the respondents had tertiary education and a total of 95.8% had formal education. This indicates that majority of the respondents had one form of formal education or the other. This relatively high level of education could affect the level of perception of the household and also influence their exploitation of forest resources. Soaga (2008) reported that education improves sustainable management of forest resources. There are greater opportunities

for income generation among educated people thereby reducing their dependence of forest resources. This could be attributed to the notion that people with formal education have diversified livelihood options which may generate significant returns compared to forest-related activities (Masozera and Alavalapati, 2004). Majority (60.0%) of the respondents had a household size of 6-10 persons. The average household size was approximately 7.0 persons. The fairly large household size could have implication in the sense that household heads would need to take drastic effort to feed his members and the forest resources around them could be their next target source for food. The higher the number of household members, the more labour input can be used to the advantage of farming and other livelihood activities (Jaiswal and Bhattacharya, 2013). The size of household is an influencing factor in the extent of use of land as natural resource. The larger the household size, the more the use of land resources to take care of the household members. Findings also revealed that the average annual income was ₦310,260.63. This relatively low annual income could imply that the households would need to look for more means of making ends meet, hence they could be falling back on the resources of the forest in their community to augment their income. Households with higher income usually have a strong purchasing power that enables them to buy more food to compensate for low harvest while the low-income households rely heavily on natural resource extraction from

forestlands around them (Cavendish, 2000; Vedeld *et al.*, 2004).

According to Table 2, source of herbs (90.0%) was ranked the first indicating that the households used forest resources as herbs. This includes the use of leaves, roots and peeled bark of trees for medicinal purpose. Fuel wood (89.2%) ranked the 2nd benefit implying the dependence of the households on wood as the main source of energy. This could be due to the low income generated by the households which could not afford them the use of kerosene or gas cookers. The households find the wood in the forests as cheap and available means of energy. Fuel wood, either burned and transformed into charcoal, or dried, are the major source of energy in both rural and urban areas (Orekan, 2007). Food (82.5%) ranked as the 3rd benefit households derived from the forest. Food includes fruits, meats from animal growing in the wild, leaves as vegetables among others. The households use these non-timber forest products to improve the quality of their feeding. The increasing demand for NTFPs for subsistence and cash income generation has been reported in many developing countries (Ahenkan and Boon, 2011; Shackleton *et al.*, 2011; Steele *et al.*, 2015), this is due to the poor returns from agriculture and other off-farm income activities. Other benefits derived from forests according include the use of forest for farming, source of shelter materials for building, recreation purpose, cultural festival and grazing materials for livestock.

Table 1: Socio-Economic Characteristics of Respondents (n=120)

Socio-Economic Characteristics	Frequency	Percentage	Mean
Sex			
Male	76	63.3	
Female	44	36.7	
Age (Years)			
< 30	9	7.5	
31-40	47	39.2	
41-50	28	23.5	45.0
51-60	24	20.0	
> 60	12	10.0	
Marital Status			
Single	16	13.3	
Married	83	69.2	
Divorce	8	6.7	
Widow/Widower	13	10.8	
Highest Level of Education			
No formal Education	5	4.2	
Primary Education	18	15.0	
Secondary Education	43	35.8	
Tertiary Education	54	45.0	
Household Size (Persons)			
< 5	38	31.7	
6 -10	72	60.0	
> 10	10	8.3	
Annual Income (₦)			
Less than 100,000	23	19.2	
Between 101,000-200,000	50	41.7	310,260.63
Between 201,000-300,000	35	29.1	
Above 300,000	12	10.0	
Major occupation			
Farming	45	37.5	
Trading	33	27.5	
Business	24	20.0	
Civil service	18	15.0	

Table 2: Benefits derived from forest among the households (n=120)

Benefits	Frequency	Percentage	Ranking
Cultural festival	69	57.5	7 th
Recreation	80	66.7	6 th
Food (Fruits, Vegetables and Meat form Wildlife)	99	82.5	3 rd
Herbs (Roots, Leaves and Bark of trees)	108	90.0	1 st
Shelter materials for building	82	68.3	5 th
Fuel wood	107	89.2	2 nd
Grazing	41	34.2	8 th
Farming	85	70.8	4 th

As shown in Table 3, households perceived that forest encroachment was caused by availability of fertile in the forest ($\bar{x} = 4.35$), inadequate information of forest benefits ($\bar{x} = 4.10$) and unemployment ($\bar{x} = 4.01$). Other perceived causes of encroachment include increasing human population in forest area ($\bar{x} = 3.99$) and hunger and poverty ($\bar{x} = 3.87$). Households could resort to farming in the forest areas since the area is considered to be more fertile than other areas where they had initially been carrying out their farming activities. This becomes very important owing to the fact

that the majority of the households are farmers by major occupation. Inadequate information of the benefits derivable from forests can increase the rate of forest encroachment among livelihoods. This information includes but not limited to forest serving as wind breaks, providing fresh oxygen for humanity, reducing the effects of climate change, protecting biodiversity to mention but few. Iftekhar and Hoque (2005) identified lack of employment, population pressure, persistent poverty and insecurity as the major reasons for encroachment in Bangladesh.

Table 3: Perceived Causes of Forest Encroachment (n=120)

Perceived Causes of Forest Encroachment	(SA)	(A)	(U)	(D)	(SD)	Mean
Hunger and poverty	57 (47.5)	23 (19.2)	13 (10.8)	21 (17.5)	6 (5.0)	3.87
Unemployment	39 (32.5)	62 (57.7)	4 (3.3)	11 (9.2)	4 (3.3)	4.01
Availability of fertile soil	69 (57.5)	37 (30.8)	4 (3.3)	7 (5.8)	3 (2.5)	4.35
Inadequate information of forest benefits	49 (40.8)	50 (41.7)	11 (9.2)	4 (3.3)	6 (5.0)	4.10
Increasing human population in forest area	47 (39.2)	43 (35.8)	16 (13.3)	10 (8.3)	4 (3.3)	3.99
Climate change such as flooding, strong wind and erosion	28 (23.3)	34 (28.3)	21 (17.5)	31 (25.8)	6 (5.0)	3.39
Insecurity	33 (27.5)	49 (40.8)	14 (11.7)	17 (14.2)	7 (5.8)	3.70

According to Table 4, the households perceived that forest encroachment could lead to timber shortage in the near future ($\bar{x} = 4.37$), reduction and possible extinction of wildlife population ($\bar{x} = 4.30$), loss of beneficial medicinal plants ($\bar{x} = 4.15$) and reduction in crop yield due to erosion ($\bar{x} = 4.14$). Other effects forest encroachment lead to loss biodiversity ($\bar{x} = 4.10$), forest land depletion and degradation ($\bar{x} = 4.08$), forest desertification ($\bar{x} = 4.02$), climate change ($\bar{x} = 3.87$) and environmental pollution

($\bar{x} = 3.84$). The Grand Mean (GM) of the perception was 4.06 which is above the criterion set for accepting that respondents' perception towards forest encroachment. This is an indication that respondents perceived that forest encroachment is causing a lot of damage in their immediate environment. Forest encroachment results into forest degradation and agricultural stagnation (Iftekhar and Hoque, 2005).

Table 4: Perceived Effects of Forest Encroachment (n=120)

Perceived effects of forest encroachment	VH (%)	H (%)	M (%)	L (%)	VL (%)	Mean
Reduced crop yield due to soil erosion	60 (50.0)	36 (30.0%)	12 (10.0%)	5(4.2%)	7(5.8%)	4.14
Timber shortage in the near future	58 (48.3)	52(43.3%)	8 (6.7%)	0(0%)	2(1.7%)	4.37
Reduction and extinction of wildlife species	61 (50.8)	43(35.8%)	8 (6.7%)	7(5.8%)	1(0.8%)	4.30
Loss of biodiversity	57 (47.5)	39 (32.5%)	9 (7.5%)	10(8.3%)	5(4.2%)	4.10
Environmental pollution	37(30.8)	50 (41.7%)	15 (12.5%)	13(10.8%)	5(4.2%)	3.84
Desertification	39(32.5)	58 (48.3%)	14 (11.7%)	4(3.3%)	5(4.2%)	4.02
Forest land depletion and degradation	45(37.5)	49 (40.8%)	20 (16.7%)	2(1.7%)	4(3.3%)	4.08
Climatic change	35(29.2)	54(45.1) %	18(15.0%)	6(5.0%)	7(5.8%)	3.87
Loss of beneficial medicinal plants	56(46.7)	42(35.0%)	11(9.2%)	6(5.0%)	5(4.2%)	4.15

Grand Mean: 4.06

The result of the relationship between the socio-economic characteristics of the households and the perceived effect of forest encroachment as shown in Table 5 shows that major occupation of the household head ($\chi^2 = 25.378, p < 0.05$) and household size ($r = 0.194, p < 0.05$) were significantly related to the perceived effect of forest encroachment. This implies that the major occupation of the household heads can influence their perception of the effect of forest encroachment. Being predominantly farmers, the household heads were able to perceive more the effect of forest encroachment suggesting the need for them to engage in some other non-farm income generating activities. Similarly, the number of persons in each household can determine the view of the household

heads on the effect of forest encroachment. The larger the family size, the more the perception of the effect of forest encroachment. Age ($r = -0.007, p > 0.05$) and income ($r = -0.077, p > 0.05$) were negatively correlated to perceived effect of forest. This implies that as age of the household heads increases, they perceived less of the effect of forest encroachment. Long years of experience with forest encroachment could result to trivializing such issues hence the reason for the negative relationship though not statistically significant. In the same vein, as household income of the increases especially from activities carried out in the forest area, the households tend to perceived less of the effect of forest encroachment.

Table 5: Relationship between the socio-economic characteristics of household heads and perceived effect of forest encroachment

Socio-economic characteristics	χ^2	Df	r-value
Sex	0.025	1	
Marital status	5.381	3	
Major occupation	25.378*	4	
Educational level	2.785	3	
Age of household head			-0.007
Household size			0.194*
Annual income			-0.077

* $P \leq 0.05$

Conclusion

Households in forest areas of Ondo state perceived that forest encroachment was caused by the availability of fertile soil in the forest, inadequate information on the benefits derivable from forests as well as unemployment. The major effects of forest encroachment as perceived by the households include scarcity of timber in near future, reduction and possible extinction of wildlife species and loss of beneficial medicinal plants. Occupation and household size were significantly related to the perceived effect of forest encroachment.

Recommendations

Based on the findings of this study, the following recommendations are made:

- i. Households should be encouraged to engage in farming activities outside the forest area through the provision of improved farm inputs such as fertilizers and improved seeds and seedlings.
- ii. There should be increased awareness creation through the extension arm of the Ministry of Agriculture and Natural resources on the benefits of forests and the need to avoid encroaching into the forest.
- iii. Households should be empowered by the government and non-governmental agencies to engage in some other non-farm income generating activities as this will reduce the pressure on the forest.

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