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CONTENTS

PERCEPTION ON THE EFFECT OF FOREST DEFORESTATION ON THE ENVIRONMENT IN THE CENTRAL ZONE OF TARABA STATE, NIGERIA

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Abstract

The present study conducted in the central zone of Taraba State aims to show the effect of deforestation on the environment. The methodological approach consisted of in-depth interviews and group discussions in addition to the questionnaire survey of 383 respondents from 37 sampled forest community villages randomly chosen from nine districts purposively selected from three local government areas that made up the study area. The findings revealed that logging (49.1 %) and agricultural activities (25.3%) are the major anthropogenic factors leading to deforestation. Over 80% of the respondents rated deforestation activities as generally high. The source of income to the community and revenues to the state government was the respondent's reasons for deforestation. The findings also show that extinction of plant species is the major environmental implication of deforestation while, the imposition of forest guards and enactment of laws as effective measures for curtailing the menace of deforestation in the study area. It was recommended that increased reforestation efforts, sensitization and periodical campaigns against deforestation, and redesign of the existing forestry laws by the state government to curtail incessant incidents of deforestation in the study area be undertaken.

Keywords: Deforestation, Deforestation effect, Forest, Taraba State, Nigeria.

Introduction

Forest is a fundamental, significant, and valuable component of a sustainable environment (Ajake&Anyandike, 2012). Ecosystem services, Biodiversity development, and Economic growth in any nation depend on the proficient use of forests and their resources (Aliyu*et al.,* 2014). Forest provides habitat for wildlife animals, livelihood for humans, and regulation of hydrological cycle, as well as reducing global warming and purifying water (Kanati&Sayok., 2019). According to the Food and Agricultural Organization of the United Nations (FAO), forest refers to land with trees crown cover or equivalent stocking level of more than 10% and covering an area of more than 0.5ha, which includes natural and plantation forest, but not stands of trees established primarily for agricultural plantations such as fruit tree and oil palm plantations and trees planted in an agroforestry system (Abdullahi*et al.,* 2017; Adetoye, 2019; FAO., 2018).

The world forest environment covers 31 percent of the earth's total land area that is more than four billion hectares (Hosonuma et al., 2012). Nigeria was ranked the 11th most biodiversity country in Africa, with over 10% of its total land area of about 947,800 km2 under forest covers (FAO., 2009; Mfon*et al.,* 2014). Nigeria has over 560 tree species, which range from 30 to 70 species per hectare with over 189 metrics tons of biomass per hectare. It has about 60% of its total forest enclosed by Teak trees and about 25% of the forest tree coverage occupied by plantation (FAO., 2009; Mfon *et al.,* 2014; Yusuf *et al.,* 2020). Nigeria has about 445 forest reserves, distributed over five main zones Freshwater mangrove, Lowland rainforest, Savanna, Sudan Savanna, and Sahel (Yusuf, *et al.,* 2020).

However, deforestation has remained the single most important environmental, economic and social problem threatening the existence of the forested environment in Nigeria and, by extension, the

survival of humans on the earth. Deforestation implies changes within a forest that affect the structure and function of the stand or site and thereby lower its capacity to supply products or services (Kanati&Sayok., 2019; Meer, 2018). There are three types of forest degradation; degradation of primary forest, secondary forest, and forest land. Such degradations altered and fragment the earth's forestlands leading to loss of cultural diversity, biodiversity, and carbon storage capacity. It also encourages new waves of species extinctions shortly as some specific species are recklessly exploited and sold in both local and international markets leading to an uncontrolled declination of our forest resources which subsequently encourages soil erosion through the absence of trees serving as windbreakers (Pacheco-Angulo *et al.,* 2017; Sulaiman*et al.,* 2017; Wajim, 2020).

The area occupied by natural forest (excluding plantations), shrubs/grassland in Nigeria between 1976/1978 and 1993/1995 has decreased from 23,439,000 ha, which is 26% of the country's total land area, to 15,097,000 ha 16.6%. Between 2000 to 2005, about 55.7% of the nation's primary forest was lost, and the rate of forest change increased from 31.2% to 3.12% per annum, which are approximately 350,000 to 400 000 hectares per year and the highest in the world leading to her ranking as the most uncertain country in terms of deforestation (Azare*et al.* 2020; Mba., 2018; Mfon *et al.*, 2014). Forest Resources Assessment (FRA) carried out in 2010 showed that Nigeria's forest estate is now less than 10% of the country's land area, which is far below the minimum requirement of 25% recommended by FAO (Abubakar*et al.,* 2018; Adetoye, 2019).

In most nations or communities, the productivity of the forestlands is safeguarded to provide for the ever-increasing demand for forest recourses. Just at a when raising poverty, unemployment has increased pressure on forest environmental resources as more people have been forced to rely directly on forest resources at an unprecedented rate. Consequently, forest in the study area is under threat from the progressive reduction in the ecosystem and the selective exploitation of species in the last decade while, little or attention has not been paid by the state government, nor is there any law enacted to curtail the incident on it, neither any program of afforestation embarked upon over the years.

From the ongoing, it is obvious that a spatial pattern of deforestation types and causative activity might be required to assess or established the trend and rate of deforestation pattern using satellite imageries while household survey data is required to examine forestland use and the factors influencing such land. Therefore, it is on this premise that this study seeks to assess the exploitation of the forestlands in the central zone of Taraba state qualitatively. The result from this method will assist in a detailed understanding of how unhealthy deforestation is being initiated, the reasons, and the right approach to curtail the change and such information would help to guide in implementing effective forestland use police in Nigeria.

Materials and Methods

Site description

Taraba state lies roughly between latitude 6°30" and 9°36" North and longitude 9°10" and 5°0" East. It is bounded on the North by Bauchi State, Northeast by Gombe, West by Nasarawa and Plateau states, and Adamawa state on the East; Southwest is bordered with Benue State. An international boundary on the South and South-East separates the state from the Republic of Cameroon (Yusuf *et al.,* 2019; Zemba & Yusuf, 2012). Taraba State has a total landmass of approximately 54, 473 km^2, while the study area (comprising of Bali, Gashaka, and Kurmi local government areas) covers 20, 968 km^2 of a total landmass Figure 1.1. The study area has an undulating topography consisting of flat, isolated, and chains of a mountain with elevation ranges between 264 m and 934 m above sea level and a total projected population of about 555,294 persons in 2020 (NPC, 2020). Most of the people living within the area are predominantly engaged in farming, fishing, and lumbering, hunting, and carving as well as cutting trees for sale in towns as firewood.

Climate and vegetation

The study area has climatic characteristics typical of a tropical climatic condition characterized by a wet and dry climate. The wet season lasts on average from March to October. Mean annual rainfall varies between 1158 mm in Bali to over 1500mm in Gashaka Local government area. The wettest months are August and September. The dry season lasts from November to February; the driest months are December and January, with relative humidity dropping to about 15percent. The mean annual temperature is about 28˙oC with maximum temperature varying between 30°C to 34.4°C. The minimum temperatures range between 15°C to 23°C.

Rainfall distribution and topography are the most important factors influencing the pattern of vegetation in the study area with vigorous vegetation during the wet seasons but their foliage wilt in dry seasons. The vegetation cover is mainly of Savannah, dominated by Daniella, providing a limited amount of shade (Firuza *et al.,* 2015; Kanati & Sayok., 2019). The accompanying shrubs and grasses are the *Hymenocardia* and *Andropogon* communities, respectively. The economic trees commonly found include Locust Bean (*Parkia biglobosa*), Shea-butter (*Vitellaria paradoxa*), Mahogany (*Khaya spp*), Sapele (*Entandrophragma cylindricum*), Iroko (*Millicia excels*), and Afra (*Nectophryne afra*). Some cultivated plants include Cashew nut (*Anacardium accidentale*), Date palm (*Phoenix dactylifera*), Mango (*Mangifera indica*), Pawpaw (*Asimina tribola*), Orange (*Citrus spp*), and Guava (*Psidium*) while trees and shrubs for firewood, timber, woodcarving, palm products, fruit gathering, and various construction purposes. Sawmills are fast increasing, while village and gallery forests are reducing in number and size (Kanati & Sayok., 2019).

Methods

The data used for this study were generated through a structured questionnaire survey of 383 sample respondents, mainly head of households from the 37 forest community's villages, prior, randomly selected from the nine districts that were purposively selected from the three local government areas out of the five that made up the study area. The most important consideration in selecting villages was the availability of forests and the high severity of deforestation, posed by increased uncontrolled exploitation of the forests for timber, and the researcher's prior knowledge. The 383 sample size was determined using the Solving formula.

Thus:

Where

n = the sample size,

N = the population size,

e = limited sample error (0.05) at 95% confidence level

The proportion of the 383 respondents in each sampled village was obtained using Cochran, 1977 proportion allocation techniques formula.

Thus:

Where:

nh = the number of the individual sample villages

Nh = the number of residents in the individual villages

N = the total number of residents in the sample villages

n = the number of questionnaires to be distributed among the sample Villages.

The investigation was undertaken between November, to February 2020, during the peak of deforestation activities and when the amount of rainfall causing significant obstruction to accessibly is deficient and forest clearance for agriculture accelerated.

The interview scheduled had five sections(A-E), eliciting information on the socio-economic characteristics of the residents, their perceptions about deforestation and its causes, the socio-economic impacts of deforestation activities, the implication of deforestation, and the measures of curtailing forest degradation menace in the study area. The interviews were conducted in respondents' homesteads in the early morning or late afternoons and at the field (forest). Since some of the respondents were non-literate, they were interviewed by enumerators, and their responses were filled in the questionnaire. In cases where a selected household head was unavailable, a random substitute was included. In addition to the formal survey, in-depth interviews and group discussions were also held with the residents to obtain additional information and supplemented by field observations. The data were analyzed using the frequency and descriptive statistics modules of the statistical Package for Social Sciences (SPPS) software version 22 for the window.

Results and Discussion

This section presents the results and outcomes of the field survey. The first segment addresses some demographic characteristics of the respondents. The second covers the people's perception about deforestation and its causes in the study region. The third examines the Socio-economic effects of deforestation activities in the study region. The fourth covered the environmental effect of deforestation in the study region. Lastly, the fifth section covers the measures of curtailing forest degradation menace in the study area.
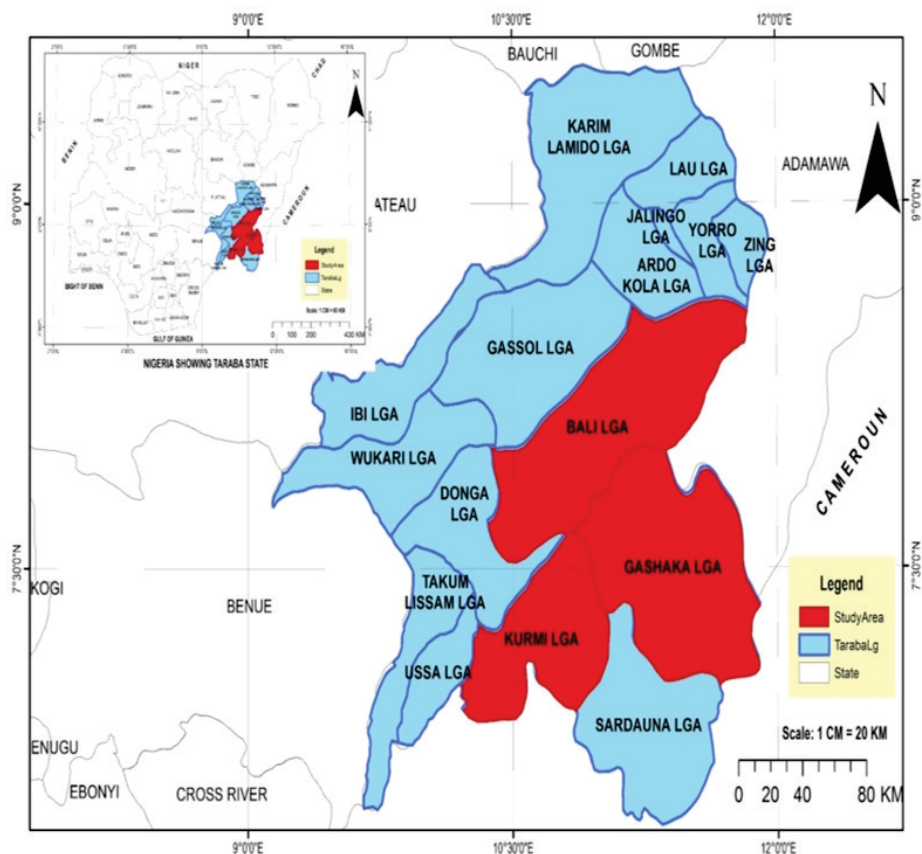
Figure1: Nigeria showing Taraba State and the Study area
Source: Department of Geography Taraba State University

The results of the demographic characteristics of respondents in Table 1 indicated that greater percentages of the residents (57.4%) in the research area were mainly middle-aged >35-50 years. This suggests, therefore that, the sampled respondents are still in their economically active stage. Peasant people of the middle-aged are more enthusiastic and have more physical vigor and family responsibilities than the young and old people (Yusuf, 2014). Consequently, they can influence many deforestation activities, especially in terms of increased rates and hectares of deforested land.

On the literacy level, the greater percentage of respondents sampled (96.6%) are literate. Among those, the majority forming 49.1%, had post-primary education. The low proportion of illiterates in the respondent's groups implies that the majority of them are in a better position to be aware or understand deforestation implications and its conservation practices. Similarly, over 79% of the respondents have some form of occupation, with the majority 76% living within 1km from the nearest forest. Hence, this can lead to an increase in the use of forests and forests products, and consequently the destruction of forest habit and loss of biological

diversity of both plants and animals. Table 1 shows the respondent's responses based on their perceptions.

On the major cause of deforestation in the study area, as indicated in Table 2, 88.0% of the respondents indicated anthropogenic factors while only 12.0% reported natural factors. The low percentage of the respondents that reported natural factors is reflective of the people's level of awareness and literacy level, as indicated in Table 1. In addition, the major anthropogenic activities responsible for deforestation are logging activities (49.1 %) and agricultural activities (25.3%). These results about logging and agricultural activities followed up similar results obtained by Agidew & Singh (2017); Bekele *et al.* (2018) in Ethiopia and are consistent with studies elsewhere in Nigeria (Ajake & Anyandike, 2012; Aliyu *et al.,* 2014; Am, 2018).

Over 80% of the respondents rated deforestation activities as generally high, while only 2.1% rated it very low. This finding is consistent with the result earlier reported by (Mba., 2018; Meer, 2018)that Nigeria's annual deforestation rate of the forest is the highest in the world and puts it on the place to lose virtually all its primary forest within few years if no

Table 1: Educational and occupational status of respondents

Demographic Variables	Frequency	Percentage
Age group (years)		
Young (17- 35)	122	31.9
Middle (>35-50)	220	57.4
Old (>50)	41	10.7
Total	**383**	**100**
Educational level		
Primary	45	11.7
Post Primary	188	49.1
Diploma/NCE	94	24.5
Degree	43	11.2
Informal Education	13	3.4
Total	**383**	**100**
Occupation of respondents		
Public Servant	86	22.5
Private Sector employees	92	24.1
Self-employed	124	32.3
unemployed	81	21.1
Total	**383**	**100**

Source: Field survey (2020)

Table 2: Perception on the rate of deforestation and causal factors

Assessment of deforestation	Frequency	Percentage	Cumulative Percent
Very huge	171	44.6	-
High	141	36.8	81.4
Undecided	40	10.4	10.4
Low	23	6.0	8.1
Very low	8	2.1	-
Total	**383**	**100**	**100**
Major causes of deforestation			
Anthropogenic Factors (Man-made Factors)	337	88.0	
Natural Factors	46	12.0	
Total	**383**	**100**	
The activities that cause deforestation			
Logging	188	49.1	
Extension of Farmlands	97	25.3	
Fuel consumption	15	3.9	
Overgrazing	19	5.0	
Construction and other uses	18	4.7	
Natural factors (Bush fire)	46	12.0	
Total	**383**	**100**	

Source: Field survey (2020)

adequate regulations and controllable exploitation is taken. Indeed, transect surveys in the entire area confirmed that the peoples are acquainted with the deforestation rate from observations of their surroundings, where forested areas have been altered and fragment. Also, as recognized from the in-depth interviews, most people stated that inadequate regulations and uncontrollable exploitation or illegal logging are instrumental to the rapid rate of accelerated deforestation in the area. This observation explains the general awareness among the people of deforestation and its implications in the research area.

To determine the socio-economic implications of deforestation, respondents were inquired to state the level of their acceptance to a specific set of statements, that is, to state if they agreed or disagreed. The results in Table 3 revealed that the respondents agreed that deforestation activities caused uncontrolled forest land cover change and degradation with a mean value of 1.97 and a standard deviation of 0.840. A significant proportion of the respondents also agreed that logging activities provide a source of income to the community and revenues to the state government, with mean values of 2.01 and 2.06 and standard deviations of 0.888, and 0.857 respectively. Similarly, a considerable proportion of the respondents agree that logging of African Teak can cause dispersion and extinction of vegetation and animal species, with a mean and standard deviation of 2.00 and 1.003, respectively.

Similarly, as recognized from the in-depth interviews, people perceived deforestation to be severe in the study area but are reluctant to accept that deforestation is an individual problem in their environment, and they do not see it as a problem because the benefits the derived outweigh deforestation problems.

The environmental implications of deforestation as depicted in Table 4 showed that 48% of the respondents cited extinction of plant species as the major environmental implication caused by deforestation while 3.7% of the respondents showed that it led to loss of carbon sinks. During the transect surveyed, most people interviewed confirmed the above findings when they stated that deforestation encourages new waves of species extinctions shortly as some specific species are illegally exploited and sold in both local and international markets leading

Table 3: Respondents Perception on Socio-economic impacts of deforestation

	N	Minimum	Maximum	Mean	Standard. Deviation
Deforestation causes uncontrolled land cover change and degradation	383	1	5	1.97	.840
Provide income to the Communities	383	1	5	2.01	.888
Provide Revenue to the State	383	1	5	2.06	.857
Cause dispersion and extinction of vegetation and animal species	383	1	5	2.00	1.003
Valid N (listwise)	**383**				

Source: Field survey (2020)

Table 4: Respondents Perception on the effect of deforestation

	Frequency	Percent
Loss of Biodiversity	92	24.0
Extinction of Plants and wild species	184	48.0
Increased soil erosion	93	24.3
Low Carbon sinks and crop yield	14	3.7
Total	383	100.0

Source: Field survey (2020)

Table 5: Respondent Perception on Mitigation measures to curtail Deforestation

	Frequency	Percentage
Enactment of Laws	119	31.1
Imposition of Forest Guards	154	40.2
Severe Punishment to Defaulters	98	25.6
Establishment of Forest Reserve	12	3.1
Total	**383**	**100**
Reason (s) for Conservation		
Food/ protection	**153**	40
Cultural/ Religious values	**58**	15
Medicinal values	**92**	24
None of the above	**80**	21
Total		**100**

Source: Field survey (2020)

to an uncontrolled declination of the forest resources, which subsequently encourages wind erosion through the absence of trees serving as windbreakers.

It is evident from Table 5 different mitigation options perceived by the respondents to curtail the menace of deforestation in the study area. From the survey 40.2% and 31.1% of the respondents mentioned imposition of forest guard and enactment of laws as effective measures, while 3.1% of the respondents cited establishment of forest reserves as the best option. Food/ protection (40%) and Medicinal values (24%) were the respondent's chief reason (s) for forest Conservation. This finding with regards to the measures to curtail the menace of deforestation provides support for Abdullahi *et al.*(2017); Adetoye, (2019) conclusion that the deforestation menace can be effectively curtailed when the legal framework is clear and not neglected. Also, all the respondents interviewed confirmed high degree of awareness and perceptual experience of the deforestation problem. For instance, one of the people interviewed expressed the opinion that both public and private institutions have not given due attention to forest conservation.

Conclusion

The main thrust of this study is to assess the perception of forest community dwellers on the effect of forest deforestation on the environment in the central zone of Taraba State, Nigeria. The results show that logging (49.1 %) and agricultural activities (25.3%) are the major anthropogenic factors leading to deforestation. Over 80% of the respondents rated deforestation activities as generally high and extinction of plant species was the major environmental implication of deforestation. It was further established that people perceived deforestation to be severe in the study area but are reluctant to accept that deforestation is an individual problem in their environment. In addition, do not see it as a problem because the benefits derived outweigh deforestation problems. The chief contributing factor to deforestation has been the forest serving as both the source of income to the community and revenues to the state government. The study recommended that increased reforestation efforts, sensitization and periodical campaigns against deforestation, and redesign of the existing forestry laws by the state government to curtail incessant incidents of deforestation in the study area be undertaken.

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