Research Article

An assessment of the effects of deforestation on biodiversity in OJO local government area of Lagos State, Nigeria

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Abstract

This study assessed the impact of deforestation on biodiversity in the Ojo Local Government Area of Lagos State, Nigeria. Three hundred respondents were randomly selected from ten communities of the local government. Primary data were collected with a structured questionnaire in order to address the objectives of the study. Both descriptive and inferential statistics were used to analyze the data collected. Respondents in the study area affirmed that there is deforestation activity in the local government and at a high rate. The study revealed that poverty is the major driver of deforestation in the study area, followed by urbanization and industrialization, while education level is the least factor responsible for deforestation. It was also uncovered that deforestation aids displacement and loss of plant and animal species from their natural habitats. It also leads to the loss of indigenous people's homeland, contributes to erosion and infertility, and results in the loss of plants and animal species used for research, economic, and medicinal purposes. Chi-square analysis revealed that there is a significant relationship between deforestation and displacement of both plants and animal species in the study area. Considering the high rate and effects of deforestation in the study area, it was then recommended that the elected chairman of Ojo Local Government in partnership with various community leaders of the study halt deforestation activity for five to ten years, for the forest to rebound. Raise awareness among the people about the impact of their actions on the forest and initiate comprehensive tree-planting programs with stringent monitoring.

Introduction

The word environment is derived from the French word "ENVIRON" meaning surrounding. All biological diversity depends on their environment to supply them with what they need, including food, water and shelter. These services are mostly provided through the forest.

The forest is described as the heart of the natural resources, as it prevents sheet and gully erosion by reducing surface runoff significantly and also serves as a windbreak [1]. Forest provides shelter for wildlife, serves as camouflage during ward, sources of medicine, food, aesthetic value, and environmental protection. Forest has been heavily degraded through deforestation as a result of tree felling [2]. Deforestation has contributed adversely to environmental sustainability in Nigeria. Such adverse effects include damage to the natural environment from soil erosion, loss of wildlife, and increased desertification [3]. Several studies have shown that forests of all nature are

shrinking at an alarming rate due to deforestation. Statistical data from Mongabay, a U.S-based non-profit conservation and environmental Science news platform, revealed that tree cover in Lagos State was 69, 435 ha in 2001 but between 2001 and 2022, the state had lost a total of 23, 519 ha (61.9%) of her tree cover to deforestation. It is a telling sign that Lagos State is losing its tree cover faster than the forest rebounds naturally [4].

Deforestation in clear terms could be defined as the indiscriminate purging of trees without adequate replacement, thereby leading to loss of biodiversity. According to Ogundele, et al. [5], the conversion of forest to another permanent nonforested land use such as agriculture, grazing, industrial, or urban development is termed deforestation. Mfon [6] similarly defined deforestation as any activity that uses the forest, this could be actions associated with the temporary removal of forest covers such as slash and burn, felling of trees for fuel, and commercial logging. Deforestation is seen as the

process of continuous decrease of vegetation over a long period of time which can result in desertification, drought, and loss of ecosystems. Derouin [7] defined deforestation as the practice of permanently removing or uprooting trees from the ground to give rise to something other than forest. The reasons for deforestation are mainly to ensure that there is sufficient land for cultivation, infrastructure purposes, residential purposes, and manufacturing or industrial purposes [8]. It poses great concern because human encroachment upon wild areas and harvesting of resources has in increased greatly in recent time, causing a severe threat to biodiversity [9].

In a nutshell, deforestation simply means the permanent removal of tree population to pave the way for farming, road, housing and dam construction, grazing, and urban and industrial purposes, without adequately replacing them. As the human population increases, the deforestation rate also increases, causing serious environmental problems, which lead to the loss of medicinal plants, erosion, extinction of plant and animal species, soil infertility, change in climatic conditions, loss of habitat, and displacement of indigenous people.

Deforestation has a plethora of negative impacts on the environment, such as desertification, loss of ecosystem, loss of habitat, loss of biodiversity, land degradation, and soil erosion. It deprived humans and other lives on earth of worthy and valuable services provided by the forest ecosystem, as it interferes with the well-being of the forest, by allowing soil to run into sources of water supply due to the absence of trees to absorb water, thereby causing water pollution (Effect of Deforestation, 2010). The information available from various research works pointed to the under-listed factors as the major causes of deforestation in Nigeria are

- Poverty
- Corruption
- Urbanization
- Wood fuel production
- Agriculture
- Industrialization

By and large, the human race has benefitted immensely both directly and indirectly from biodiversity, provided by the environment for numerous years. Biodiversity is the variety of life on earth, which plays a crucial role in the maintenance of ecosystem balance. Loss of biodiversity is a serious threat to the well-being of humans as it gives rise to a lot of problems like food insecurity, disruptions in the food chain, loss of livelihoods, climate change, and infectious disease outbreaks, amongst others. Considering the importance of biodiversity to human existence, it is then borne on man to ensure various lives on earth are conserved in order to sustain the present and future generations. However, human persistent exploitation of natural resources to meet present needs, through various anthropogenic means, such as deforestation, dredging, agricultural practices, urbanization and land reclamation, and

industrialization amongst others, is putting more pressure on the biological diversity of the environment, thus, driving them into irreparable depletion.

As rural areas strive to achieve urban status, the forest bears the bulk of this change, as trees are indiscriminately fallen down for wood, charcoal production, heavy construction work, industrial development, and population expansion pressure. In view of this, this research project focused on identifying the extent of deforestation, and causes of deforestation and also ascertaining the effects of deforestation on biodiversity in Ojo Local Government Area of Lagos State.

Statement of the problem

The consequences of human activities on the environment can no longer be overlooked, as human population growth is increasing on a daily basis. Many rural areas residents in Nigeria, deplete the forest without prior knowledge of the consequences of their actions on the biodiversity around them. The rate of disappearance of biodiversity on earth is alarming, and happening at a rate faster than which the environment can naturally rebound. Despite the alarming threat and unpleasant circumstances, some countries, states, and local residents of the world are still destroying forests in their surroundings, without recourse to the effects of their own actions.

Prior to this day, the extent of deforestation, causes of deforestation, and its effects on various lives in Ojo Local Government of Lagos State have not been duly assessed. Though, Spatio-Temporal Analysis of deforestation was assessed by Okorie, [10] in the Epe Local Government Area of Lagos. Similarly, Soladoye [11] assessed tree planting efforts in Lagos Island Local Government Area of Lagos State. Sequel to the identified gap above, it is then imperative to assess the effects of deforestation on biodiversity in the Ojo Local Government Area of Lagos State.

Objectives of the Study

The purpose of this study is to assess the extent of deforestation, causes, and effects of deforestation on biodiversity in the Ojo Local Government Area of Lagos State. Explicitly, the study tends to

1. Ascertain if there is deforestation activity in Ojo LGA

2. Find out the level of deforestation in Ojo LGA

3. Established the causes of deforestation in Ojo LGA

4. Evaluate the effects of deforestation on biodiversity in Ojo LGA

Research question

The study was guided by the following research questions

1. Is there deforestation activity in OLGA?

2. What is the level of deforestation in OLGA?

3. What are the causes of deforestation in OLGA?

4. Does deforestation have any significant effect on biodiversity availability in OLGA?

Research hypotheses

For the purpose of the study, the following null hypotheses were formulated and tested.

H_{01}: Deforestation does not aid displacement and loss of plant and animal species from their natural habitat in OLGA.

H_{02}: Deforestation does not significantly have any effect on the socio-economic activities of the residents of OLGA.

Materials and methods

Description of study area

The study was carried out in Ojo Local Government of Lagos State, Nigeria. Ojo Local Government is one of the 20 LGAs and 37 LCDAs in Lagos State, in the southwest geopolitical zone of Nigeria. It is made up of several villages and towns, such as Iba, Oto, Ojo, Irewe, Ilogbo, Isasi, Idoluwo, Ese-Ofin, Ishagira, Okokomaiko, Egan, Ajangbadi, Ilemba, Elete, Ijanikin, Abule, Imude, Ajewanwa, Era, Taffi, amongst others (Figure 1). Ojo Local Government area witnesses two distinct seasons, the dry season (November–March) and the rainy season (April–October), and has appreciable forested areas, where various anthropogenic activities are been carried out. The Yoruba/Benin-speaking people of the state popularly called "AWORI" are the major indigene with other tribes who engage in different economic activities such as crop farming, fishing, and trading. Some are civil servants, artisans, students, and others. Felling of trees, fishing, mat weaving, and planting of crops are the major activities of indigenes in the area.

Sampling procedure

A simple random sampling technique was used to select three hundred respondents (farmers, wood and charcoal merchants students, public servants, and herb traders) from ten villages in Ojo Local Government Area, to ensure fair representation of the entire area.

Data collection

Structured questionnaires were administered to the selected respondents in order to elicit information from them. The questionnaire was administered in both English and the native language to aid effective communication. Deforestation activity, level of deforestation, and effects of deforestation on biodiversity were the variables considered.
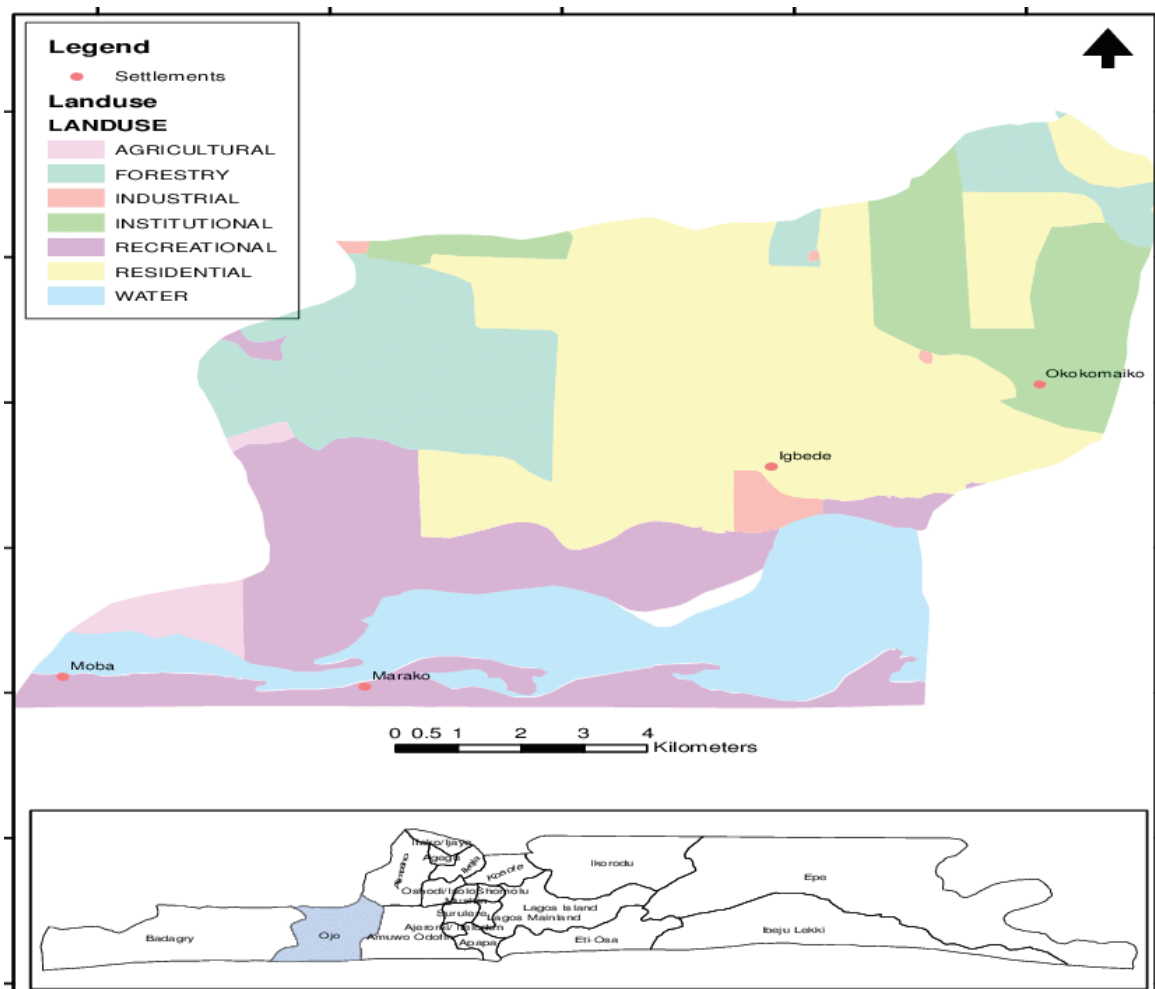

Figure 1: Map of the Study Area.

Method of data analysis

Data collected were analyzed using frequency count, percentage, mean and chi-square.

Results

Figure 2 shows that there is high frequency and percentage (243) 81% for the yes responses and (57) 19% for the no responses. This indicates that there is deforestation activity in the study area

Figure 3 reveals that deforestation activity in the Ojo Local Government Area is high. There is high frequency and percentage (220) 73% for the high responses and (80) 27% for the low responses.

Table 1 above, reveals 27% (80) of the respondents chose poverty to be the major cause of deforestation in Ojo Local Area, followed by urbanization and industrialization 23% (69). Both sources of raw material sourcing and population expansion 14% (43) and 14% (41) respectively are ranked third major cause, followed by agriculture 12% (35), while education 11% (32) is identified as the least cause of deforestation in the study area. An indication that poverty is the driver of deforestation in the Local Government Area, as they have to source for their needs through sales of fuel wood, charcoal, and timber amongst other forest products.
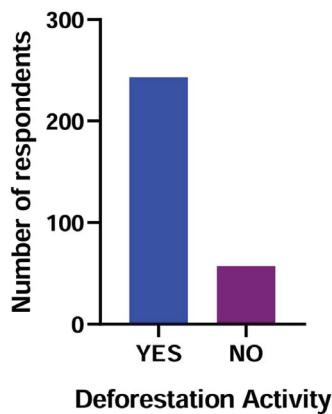
Table 1: Analysis of the causes of deforestation.

S/N	Items	F	%
1	Poverty	80	27
2	Raw material sourcing	43	14
3	Lack of education	32	11
4	Agriculture	35	12
5	Urbanization and industrialization	69	23
6	Population expansion	41	14
	Total	300	100

Source: Field Survey, 2023

Table 2 reveals that 73.9% of the respondents with a mean of 2.22 agreed to the listed items as the effects of deforestation on biodiversity in Ojo Local Government while 25% of the respondents with a mean of 0.75 disagreed with the items. 1.10% of the respondents with a mean of 0.03 are undecided. Items with a mean of 1.50 and above are accepted to be the effects of deforestation on biodiversity in Ojo Local Government.

From Table 3 above, it can be observed that the X^2 value of 65.34 is greater than the p-value of 3.841 at a 0.05 significance level. This implies that deforestation aids the displacement and loss of both plant and animal species from their natural habitat in the Ojo Local Government Area.

The result from Table 4, reveals that the X^2 value of 261.9 is greater than the p-value of 5.991 at 0.05 level of significance. This implies that deforestation enhances the scarcity of forest herbs for traders, and limits access to varieties of plant and animal species for academic students and researchers to work on.

Discussion

Findings from the study showed that deforestation is high in the study. An indication that forest resources are at the receiving end. This calls for urgent action from relevant stakeholders in the study area to forestall deforestation.

Poverty was attested to be the major factor responsible for deforestation in the study area by the respondents, as they have to source for their livelihood through sales of forest trees, charcoal, timber, herbs, and other forest resources [12]. This finding is in line with the submission of John Wajin [13] and Fakoya [14] that poverty is a strong factor driving people into deforestation activity in Nigeria, in order to make ends meet. This is contrary to the finding of Kazeem and Ademu (2017) that farming activity was the major factor responsible for deforestation. As the population increases, also mouths to be fed increase as well. This increases farming activities and when not practiced in a sustainable way, it can lead to depletion of forest resources.

It was established that deforestation contributes to the loss of medicinal plants and herbs, as forests are been cleared for other purposes, leaving behind unsustainable medicinal plant species. This finding is concomitant with FAO [15] that forest ensures the preservation of medicinal plants, for the synthesis of new drugs, but deforestation can destroy them all.

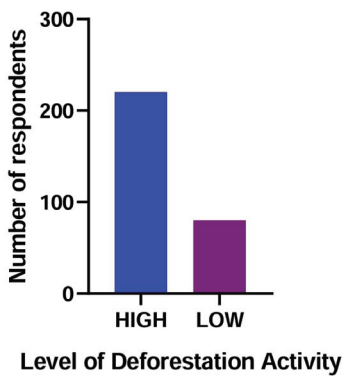**Figure 2:** Analysis of deforestation activity.
Source: Field Survey, 2023.

Figure 3: Analysis of the level of deforestation.
Source: Field Survey, 2023.

Table 2: Analysis of the effects of deforestation on biodiversity.

S/N	Items	AGREEF	%	Mean Score	Undecided F	%	Mean Score	Disagree F	%	Mean Score
1	Clearing of forest aid displacement and loss of animal and plant species in their natural habitat	220	73.0	2.20	0.00	0.00	0.00	80	27.0	0.80
2	Logging of forest trees drives some arboreal animals away from their natural home	220	73.00	2.20	5.00	2.00	0.05	75.0	25.0	0.75
3	Deforestation interferes with the homeland of indigenous people living in forested areas	208	69.0	2.08	2.00	1.00	0.02	90.0	30.0	0.90
4	Unregulated removal of forest trees contributes to erosion	227	76.0	2.27	3.00	1.00	0.03	70.0	23.0	0.70
5	Forest tree roots act as pressure absorbers for soil	184	61.0	1.84	0.00	0.00	0.00	116	39.00	1.16
6	Burning of forest distort microorganisms contributing to soil fertility	193	64.0	1.93	0.00	0.00	0.00	107	36.00	1.07
7	Burning of forest trees aids the release of stored CO_2 into the environment and climate change	221	74.0	2.21	4.00	1.00	0.40	75.00	25.00	0.75
8	Deforestation aids the degradation of biodiversity	255	85.0	2.55	5.00	2.00	0.05	40.00	13.00	0.40
9	Logging of forest trees aids shortage of fuel wood	268	89.0	2.68	6.00	2.00	0.06	69.00	23.00	0.69
10	Herb traders, academic students, and researchers have limited access to varieties of plant and animal species due to deforestation	225	75.0	2.25	6.00	2.00	0.06	69.00	23.00	0.69
	Total	2191	73.9	2.22	31.0	1.10	0.03	748	25.0	0.75

Source: Field Survey, 2023

Table 3: Chi-square analysis revealing a relationship between deforestation and loss of plant and animal species

Variable	Agree	Disagree	Df	p-value	X^2	Decision
Deforestation aids displacement and loss of plant and animal species from their natural habitat	220	80	1	3.841	65.34	Significant

Source: Field Survey, 2023

Table 4: Chi-square analysis revealing the relationship between deforestation and loss of plant and animal species.

Variable	Agree	Undecided	Disagree	df	p-value	X^2	Decision
Herb traders, academic students, and researchers have limited access to varieties of plant and animal species due to deforestation	225	6	69	2	5.991	261.9	Significant

Source: Field Survey, 2023

Deforestation enhances the displacement and loss of plant and animal species from their natural habitat, contributes to soil erosion and infertility, and aids increase in the release of carbon dioxide (CO_2) into the atmosphere as trees which help in absorbing CO_2 have been cut off. This finding is in concomitant with the finding

In addition, Chi-square analysis revealed that the relationship between deforestation and the loss of plant and animal species from their natural habitat was significant. This indicates that deforestation significantly contributes to the extinction of plant and animal species.

In summary, it could be deduced from the finding that deforestation has created a negative impact in the study area. It affects the climatic condition of the communities, aids reduction in raw materials availability, depletes oxygen availability for human consumption, reduces soil water, causes wildlife habitat loss, and increases the amount of carbon dioxide in the environment amongst others.

Conclusion

The study concludes that deforestation has a significant effect on biodiversity in Ojo Local Government Area of Lagos State, as Chi-square analysis reveals that it aids displacement and loss of plant and animal species from their natural habitats, and also contributes to the loss of economic and academic research species. From the study, it was discovered that the majority of the respondents chose poverty as the major cause of deforestation in the study area. It was also discovered that the rate of deforestation in Ojo Local Government Area is on the high, and if not swiftly addressed, biological diversity within the area would become a thing of the past.

Recommendation

From the foregoing, it is therefore recommended that,

1. The Local Government Chairman of Ojo Local Government in alliance with the mayor of Oto-Awori

Local Council Development Area and Iba Local Council Development Area should halt deforestation activity for at least a period of 5-10 years through the law, in order for the forest to rebound.

2. Government at Local, State, and Federal should appropriately address the issue of poverty, as farmers and parties who sporadically engage in deforestation should be trained on fish farming practices and other empowerment activities, to divert attention away from deforestation. This will technically reduce poverty from the lowest level of governance.

3. Public enlightenment and, a house–to–house campaign on the effects of deforestation should be embarked upon by various environmental agencies in conjunction with NGOs in the study area, to educate the people on the need to conserve the forest for sustainability.

4. Forest laws should be reintroduced in Ojo Local Government Area of Lagos State, to serve and check on defaulters of forest policies.

5. Yearly comprehensive tree planting programs with stringent monitoring should be a compulsory exercise in the study area.

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