

Environmental Impact of Forest Reserves in Ibadan Metropolis

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Abstract

This study was carried out in three selected forest reserves within Ibadan and environs. The reserves selected are Onigambari forest reserve, Eleyele forest reserve and Agodi garden forest reserve with their respective environs. The objective is to appraise the effect of forestry on environmental protection of Ibadan and as a means of improving environmental quality and standard. Data were collected with the use of structured questionnaire and personal interview. Multi stage sampling technique was used. Stage one involved the purposive selection of the reserves and environs (Agodi Garden Forest Reserve, Onigambari Forest Reserve, Eleyele Forest Reserve. 120 questionnaires were distributed and 93 recovered. Data collected were subjected to statistical analysis using frequency Table, percentage and chi-square. The result showed that the highest benefit from forestry activities is timber (26.7%) and collection of leaves (19.8%). Also revealed that the main environmental problem is water erosion (42.4%) and flood (25.3%) the greatest influence forestry has on environment is erosion control (37.8%) There is significant difference between forestry and environmental standard at 0.05 level of significant. $X_{-cal} (32.83) > x^2_{-Tab} (0.103)$. Therefore, Government should encourage forestry project as a means of environmental protection. There should be mass campaign against indiscriminate felling of trees and over exploitation.

Keywords: Forest reserve, environmental protection, urban forestry, Ibadan metropolis

INTRODUCTION: Forest is important to the world's population and its value increases each day as people still use forest as shelter, clothing and food for themselves. Forest is also important storehouse for biodiversity and provides livelihoods for over millions of people worldwide especially many living in poverty and rural areas. Forest products are good raw materials for wood processing and textile industries while providing shelter for wild animals. Forest serves as reserve for soil and water

conservation, oxygen and food chain (Lopez-Vicente and Wu, 2019).

Forest reserve is parcel of state land where harvesting of tree products is excluded so as to determine elements of biodiversity that cannot be found where trees have been harvested. Forest reserve can also be described as an area of land covered with trees and preserved by the government like national park and others. The forest reserve is set up with a vision to

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conserve trees species the forests from being harvested by man. The main importance include: (i) Protection of natural wildlife habitat. (iii) Support reforestation programme by planting trees and other things so as to sustain the biodiversity of plants and animal species. 445 forest reserves have been gazetted spread all over ecological zones in Nigeria (Usman and Adefalu, 2010). But recently, in year 2020, the Finima nature park, when finally gazetted, will be Nigeria's 12th Ramsar site. This was founded by the Nigerian Liquefied Natural Gas Company in 2001; the park covers about 1,000 hectares. It's a combination of mangrove swamps, tropical rain forest and freshwater ponds and harbours birds, snakes, crocodiles, alligators and the salt water hippopotamus. Only 137 reserves are situated in the forest zone housing the bulk of the natural forest resources of the nation. Only 60 out of the 560 species of trees present in Nigeria reserves are commercially important (Haastrup *et al.*, 2020). The global standard against deforestation gave birth to the establishment of reserves in a ratio of forest to land of 30%. Nigeria's forest remaining area is estimated to 4.3 Mha as at 2020. Forest areas have been destroyed, to tune of about 9 percent reduction in forest cover as reported from 2000_-2020. Nigeria's forest loss had its peak in 2017 with a loss of above 55,000 ha annually. In 2020, 40,594 ha of forest was lost, of which one-third was primary forest (Hansen *et al.*, 2013). Most forests are under serious human pressure and interference; therefore require urgent intervention to maintain the overall biodiversity, productivity and sustainability of our environmental resources (Oduntan *et al.*, 2013).

There have been marked serious changes in land use in recent years and forest cover in Nigeria ecosystems. These changes can be attributed to human population

increase, expansion of agricultural land and socioeconomic changes in people well-being which triggered extraction of environmental resources in an unsustainable manner (Suleiman M.S., Wasonga, O. V., Mbau, J.S. and Elhadi, Y. A. 2017). Increasing human population and climate change have been found to have contributed to the loss in vegetation covers (Lepers E., Lambin E.F., Janetos A.C., DeFries, R., Achard, F., Ramankutty, N. and Scholes R.J. 2005). Nations with highest rates of deforestation and forest losses are found on the savanna woodland forests which are poorly protected (FAO 2010 and Green J.M., Larrosa, C., Burgess, N.D., Balmford, A., Johnston, A., Mbilinyi, B.P., Platts, P.J. and Coad, L. 2013). In Nigeria, forest reserve occupies about 10% of the total land area (Usman and Adefalu, 2010).

This is owing to the fact that many of the so called protected estates lack sufficient protection and management, so they are faced with the challenges of illegal felling, farmers encroachment, overgrazing by animals, and unregulated collection fuel wood among others. The problem of inadequate governance and lack of political will to safeguard these forest reserves have negatively impacted on the once flourishing and ecologically diverse forest ecosystem and environmental protection of Oyo state (Meduna *et al.*, 2009). This study therefore sought to evaluated the impact of forest reserves in Ibadan metropolis of Nigeria.

METHODOLOGY: The study was carried out within Ibadan metropolis. It covered some forest reserves in Ibadan and their environs. The reserves include Agodi Garden Forest Reserve, Onigambari Forest Reserve, Eleyele Forest Reserve and their

respective environs/areas like Mokola, Festac, Eleyele and Idi Ayunre.

Agodi Garden is located in Ibadan near the center of the sprawling Ibadan metropolis, close to the Oyo State Secretariat on parliamentary road. It is a green lung in the environmental urban settings. It lies on latitude 7° 24' 20" N and longitude 3° 54' 11" E and altitude 193 m. Agodi Garden was completely revived to have a Botanical Garden, swimming pool, Zoo, guest house bar and a restaurant. Agodi Garden has some other attractions embedded in it like playground and playing instruments for children, Water Park and animal cages. Agodi Garden is a place to go for local people and Eco tourists who love natural aesthetics and cosmopolitan environment (Bolanle-Ojo *et al.*, 2020).

Onigambari Forest Reserve lies on latitude 7° 81 N and 7° 31 N longitude 3° 491 E and 3° 221 E. The plot falls within 17 km South-east of Ibadan on the Idi-Ayunre – Ijebu-Ode road. It was located on 2 km away from the nearby road well secured by some forest buffers around. The Onigambari Forest Reserve was declared from Ibadan Forest Reserve by a resolution of the Ibadan city council passed in September 1899 (Ajibode, 2002). Two sections were combined to form one Forest Reserve in 1953 totaling 125.62 km² (Ajibode, 2002). Therefore, tree like *Tectona grandis*, *Khaya*

ivorences, and other Arable crops like *Theobroma cacao*, *Manihot* spp with some exotic trees and crops were planted. The inhabitants of the area are predominantly farmers with relatively low number of hunters.

Eleyele forest reserve is located in Ibadan, Oyo State. Ibadan lies on latitude 7°20'N – 7°25'N and longitude 3°51'E – 3°56'E. Ibadan large city in West Africa has an area of 240 km². The forest reserve surrounds Eleyele river basin (Tijani M., Olaleye, A. and Olubanjo, O. 2012).

The data were collected with the use of structured questionnaires administered to both the foresters and the people living around the reserves. Multi stage sampling technique was used. Stage one involved the purposive selection of the reserves and environs (Agodi Garden Forest Reserve, Onigambari Forest Reserve, Eleyele Forest Reserve and their respective environs/areas like Mokola, Festac, Eleyele and Idi Ayunre.). The second stage involved the random selection of houses around the reserves while the third stage is the administration of questionnaires to a total of one hundred and twenty (120) respondents randomly selected from surrounding houses.

Also personal interview was adopted. 120 questionnaires were distributed and only 93 were recovered. Data collected were statistically analyzed using frequency table, percentage and chi-square test for the test of hypothesis presented in tables.

RESULTS AND DISCUSSION

Table 1: Socio-economic Characteristic of Respondents

Characteristic	Frequency	Percentage
Age		
20 – 29	24	25.8
30 – 39	32	34.4

40 – 49	27	29.0
50 above	10	10.8
Total	93	100.0
Gender		
Male	66	71.0
Female	27	29.0
Total	93	100.0
Educational Qualification		
No formal education	13	14.0
Primary education	16	17.0
Secondary education	17	18.3
NCE/OND	28	30.1
HND/BSc	19	20.4
Total	93	100.0

Source: Field Survey 2022

Table above shows that the highest percentage (34.4) of respondents is within the age bracket 30 – 39 years. This is because they fall within the active and working age. It also revealed that the majority of the respondents are male, that is males are more agile and participate more in forestry activities. NCE/OND had the highest percentage (30.1) followed by HND/BSc (20.4) which means respondents are more literate and they are more enlightened. They are not

novice to what is happening in their environments. This result is in consonance with Onifade, A.O., Oyedeji, O.F., Falana, O.J, Oluwadara, O.P., Adebuseyi, G.A, and Oni, O.A, (2021) who found out that there was a relatively high level of awareness of environmental problems among the respondents around Eleyele and that large majority of the respondents had the knowledge of controlling environmental degradation measures in their areas.

Table 2: Benefits derived from forestry activities

Benefits	Frequency	Percentage
Timber	35	26.7
Pole	26	12.2

Fuelwood	15	11.5
Erosion	18	13.7
Leaves collection	26	19.8
Medicinal herbs	12	9.2
Watershed	9	6.2
Total*	131	100.0

*Multiple responses :Source: field survey 2022

Table 2 above shows that the highest benefit from forestry activities is the timber which carried 26.7% of the respondents. Timber production is the main focus of forestry. Next to it is the collection of leaves (19.8%) ie few people plant trees for watershed management. The results agree with Diouf (1997) assertion who found that forest trees species are very important landed gene banks on Earth that should be conserved. Agbeja and Akindele (2016) also corroborates the assertion and reported that the availability of differ tree species have attracted people in Ibadan,

Tree species in forest reserves found in urban landscape have different benefits that they provide to people such as food (edible fruits), medicine (herbs), soil and water conservation, relaxation etc. (Agbelade *et al.* 2016b). The trees help in preventing soil erosion, so help to increase the vegetation cover of the area. Ibadan forests have reduced carbon emission in the city due to the larger volume of trees. The trees also give several other services such as aesthetic value, release of quality air, water conservation, provision of shade (micro climate), protection of fountains and swimming pools, protection of wild animals habited within and host of others (Agbeja and Akindele, 2016).

Table 3: Environmental Problem

Variable	Frequency	Percentage
Flood	25	25.3
Wind erosion	23	23.3
Water erosion	42	42.4
Others	9	9.1
Total*	99	100.0

*Multiple responses: Source: Field Survey, 2022

Table 3 revealed that the main environmental problem in Ibadan metropolis is water erosion which carried 42.4% and followed by flood of 25.3%. This is as a result of climatic condition of Ibadan, which has rainfall in a year. This corroborates the assertion of Onifade *et al.*, (2021) who reported that among

environmental hazard in Ibadan study area, erosion was found top of the list. Flood continues posing threats on people because they live far from forest reserves that supposed to be their shield. so residents are vulnerable to environmental hazards like flooding.

Table 4: Influence of forestry on Environment

Variable	Frequency	Percentage
Climate amelioration	22	19.8
Erosion control	42	37.8
Soil stabilization	28	25.2
Fresh air	12	10.8
Water management	7	6.4
Total*	110	100.0

*Multiple responses: Source: 2022

Table 4 above showed that the greatest influence forestry has on environment are the erosion control, which takes 37.8% and soil stabilization/reclamation followed (25.2%) water management recorded the

lowest influence (6.4%). The forests generally play pivot roles in the protection of soil, environment ameliorating and protection of water resources.

Test of Hypothesis

Table 5: Impact of Forestry in protecting environment

Variables	Observed (O)	Expected (E)	(O – E)	(O – E) ²	$\frac{(O - E)^2}{E}$
Saves money	25	22.2	2.8	7.84	0.35
Fuel wood	25	22.2	2.8	7.84	0.35
Infrastructure	18	22.2	-4.2	17.84	0.76
Cooling/Moderates temp.	10	22.2	-4.2	148.84	6.70

Fresh Air	33	22.2	-12.2	116.64	5.25
Total	110		10.8		13.44 = X^2

Forestry has significant impact in protecting environment

Table 6: Ho: Forestry has no impact in protecting an environment

Variable	Frequency
Saves money	25
Energy substitute (fuelwood)	25
Infrastructures	18
Cooling/moderate temperature	10
Fresh air	33
Total	110

Statistical Analysis using chi-square

$$X^2_{\text{Cal}} = 13.44$$

$$X^2_{\text{Tab}} = 0.711 \text{ at } 4(\text{df}) \text{ at } 0.05 \text{ level of significance}$$

Since $X^2_{\text{Cal}} (13.44) > X^2_{\text{Tab}} (0.711)$, then forestry has significant impact in the protection of an environment as shown in appendix II.

Table 7: Effects of Human Activities on Forest Reserves

Variables	Much effect	Slight effect	No effect	Rt
Yes	27 (22.68)	15 (12.6)	- 6.72	42
No	(4.32)	-2.4	8 (1.28)	8
Ct	15	15.5	8	50

	Much effect	Slight effect	No effect	Rt
Yes	27	15	---	42

No	---	---	8	8
Ct	27	15	8	50

Statistical Analysis showed

$$X^2_{-Cal} = 50.0$$

$$X^2_{-Tab} = 1.145 \text{ at } 5 \text{ (df) at } 0.05 \text{ level of significance}$$

Since $X^2_{-Cal} (50.0) > X^2_{-Tab} (1.145)$, then human activities have significant effect on forest reserves as shown in appendix III. It was confirmed that human presence influence the disappearance of terrestrial mammals in all forest reserves studied and supported

the findings that identified environmental problems having serious adverse socio-economic and ecological impact on society or community. Forest reserves are vulnerable to anthropogenic pressures (Bruner *et al.*, 2001). Restricted areas are very efficient at preventing land cultivation but not at preventing felling of trees, anthropogenic fire, animal grazing, and poaching, which are caused mostly by people from nearby communities.

Table 8: Human activities and forest reserves

Observed (O)	Expected (E)	(O – E)	(O – E) ²	$\frac{(O - E)^2}{E}$
27	22.68	4.32	18.66	0.82
15	12.60	2.4	5.76	0.46
---	6.72	-6.72	45.16	6.72
---	4.32	-4.52	18.66	4.32
---	2.40	-2.40	5.76	2.40
8	1.28	6.72	45.16	35.28
		0		50

Table 9: Ho: Forestry activities do not improve environmental standard

Variable	Frequency
Improved	43
Undecided	17

Not improved	6
Total	66

Statistically

$$X^2_{-Cal} = 32.83$$

$$X^2_{-Tab} = 1.103 \text{ at } 2 \text{ (df) at } 0.05 \text{ level of significance}$$

Since $X^2_{-Cal} (32.83) > X^2_{-Tab} (1.103)$, then forestry activities do improve environmental standard as

shown in appendix III. This in agreement with Sale and Agbidye (2011) who reported that agricultural practices are the main factors of deforestation in Nigeria which lower the environmental standard leading to climate change.

Table 10: Improvement of forestry activities on environment

Variables	Observed (O)	Expected (E)	(O – E)	(O – E)²	$\frac{(O - E)^2}{E}$
Improved	43	22	21	441	20.05
Undecided	17	22	-5	25	1.14
Not improved	6	22	-16	256	11.64
Total	66		0		32.83 = X²

Forestry activities improve environmental standard

CONCLUSION AND RECOMMENDATION:

From the above, it can be concluded the growing influence of forest reserves in environmental protection especially in erosion control is clear. Forests have great impact on the living standard of people living around. It offers comfort, enjoyment and satisfaction. Forest has controlled many environmental disasters caused by developmental anthropogenic activities. Many eroded soils have been brought back by the roots and crown formed by trees. People around the reserves enjoy fresh air. Nature is appreciated better with forests in place. Most, if not all the anthropogenic activities have negative effects on forest reserves. Many of these

activities utter soil structure and texture i.e. causing loss soil fertility, erosion and environmental degradation. Nevertheless, the result presented has made it clear that three planted around the city/state need to be properly managed with higher level of expert so as to give maximum protective measure on the nearby environment.

Base on the findings or this study, the following recommendations are made to ensure a continuous existence of forest in Ibadan as a whole and Nigeria at large.

- Government through ministry of Environment should support the growing trees as a means of environmental protection.
- Government at all levels should encourage forestry projects by disbursing more money for the projects.
- All inputs, tools and equipment even personnel should be provided for efficient management of the forest reserves.
- Forest management staff should be afforded the opportunity to attend training programme and seminar in the field of forest and environment.
- There should be mass campaign against indiscriminate felling of trees and over-exploitation.
- Government should encourage individual participate in planting trees even private forest.
- The mass populace should be educated on the importance of trees in their areas and be encouraged to plant trees in their surroundings.
- There is also the need to improve on the infrastructure system and provision should be made for stable employment.

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