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Full Length Research

Retrospective survey on the influence of deforestation and biodiversity loss in Owerri West, South-Eastern Nigeria

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ABSTRACT: The purposeful clearing of forested land and its associated loss of biodiversity is rapidly on the increase. This study examined retrospective survey on influence of deforestation and biodiversity loss in Owerri west south-eastern Nigeria. Survey research design was adopted for this study. A total of 119 copies of questionnaire were administered and analyzed using descriptive analysis. Results revealed flora and fauna were seen more in the past 2001- 2010 than in the present 2011-2021 as partitioned in the study. Result showed a significant rate of deforestation and biodiversity loss in the study area. Logging, poverty/unemployment and bush burning are factors with very serious effect on deforestation and biodiversity loss at 46.5, 65.8 and 53.6% respectively. Results further indicated that destruction of wildlife habitat, loss of flora and fauna and climate change were revealed as effect of deforestation and biodiversity loss in the study area, and thus are very serious effect at 57.0, 52.6 and 48.0% respectively. In conclusion, the survey indicated that, deforestation and biodiversity loss is significant in the study area. It is recommended that adequate laws, regulations and implementation of existing laws and policies be upscaled to mitigate deforestation rate and by extension biodiversity loss.

Keywords: Biodiversity, deforestation, fauna, flora.

INTRODUCTION

The conversion of forested areas to non-forest land use such as arable land, pasture, urban use, logged area, or wasteland is known as deforestation. Deforestation is of utmost concern due to increase in human encroachment upon the wild areas, degradation of soil, increase in the resource extraction and in general threatens biodiversity. Nigeria has the world's highest deforestation rate of primary forests (FAO, 2005). A total percentage of one-third of total anthropogenic carbon dioxide emissions is attributed to deforestation (IPCC, 2007). In Africa, majority of the countries depend on deforestation to meet their basic need for energy.

The most critical deforestation occurs in tropical rainforest, which are particularly important to the world due to the nature of habitat that accommodate millions of species/organisms, half of all 5 to 80 million species in the rainforest (NASA, earth observatory, 2003). Deforestation is caused by quite a number of factors such as population growth (Butler and Laurance, 2008; Marcoux, 2000; Stock and Rochen, 2009). Inequitable distribution of wealth and power, is a root cause of deforestation (Global deforestation,2006). Agriculture is also considered an agent of deforestation. Observations also shows that, 60% proportion of global deforestation is attributed to small-scale farmers engaging in shifting cultivation (World Bank, 1991;UNEP, 1992). Cattle grazing, harvesting of woods for charcoal, hunting, logging are all agents of deforestation (Giam, 2017). Due to loss of forests, run-off flows rapidly into the streams, elevating river levels and subjecting downstream cities, Agric- systems filed and villages to flooding. And by extension as trees are lost, it anchors the soil with its roots and causes erosion (Butler, 2019).

One conspicuous impact of deforestation is biodiversity loss. Biodiversity includes the variety of life on earth, thus described in terms of genes, ecosystem and species (Heywood and Baste, 1995). The magnitude of biodiversity loss has been constantly increasing throughout the industrial period. Species are perhaps becoming extinct at

10,000 the natural rate (UNEP,1995). It is evident that rare species have become rarer, while the few common species are becoming more common. However, extinction which is the dying out of species is an end step in a long process of ecosystem degradation, in which a decline in the abundance and distribution of many species is usually accompanied by a rise in the abundance of a few others. When forests are destroyed, wildlife loses their habitats and fragmentation which in turn leads to human interactions, medicinal plants and forest biotopes which are irreplaceable source of new drugs are all gone (Kroker, 2008). The destruction of forests is the greatest driver of extinctions across the globe (Ellen, 2021). Therefore, this study aimed at investigating the influence of deforestation on biodiversity loss in Owerri west, local government area.

MATERIALS AND METHODS

The study area is located at Owerri west in the south eastern part of Nigeria. It is located within latitude 5º24'59.58"N and longitude 6º59'7.25"E and occupies a land area of about 295 square kilometers and estimated population growth rate of about 99,265 using the 2021 population census projection. It lies within the humid tropical climate with annual rainfall and temperature of over 2000 mm and 20ºC temperature respectively.

The study adopted the survey research design which consisted of direct observation and a structured questionnaire. Multi-stage sampling technique was used to select respondents for the study. Four communities were chosen purposively from the communities in the study area, because of their increasing deforestation rate. Thirty-five households were sampled from each of the four communities, making a total of 140. In administering the questionnaires, families were basically the unit of survey and heads of households were mainly the respondents. A total of 140 copies of questionnaire were administered to families who have been resident for up to ten years and above in the four localities.125 copies of questionnaire were retrieved, 6 were invalid and 119 were valid and used for analysis. Descriptive statistics such as tables, frequencies and percentages were used to describe responses on the influence of deforestation on biodiversity loss by respondents.

RESULTS AND DISCUSSION

Table 1 showed computed frequency and percentage of the socio-economic characteristics, of residents who responded on the influence of deforestation and biodiversity in the study area. 25.2% which is the highest percentage are between the ages of 44-56 years. While the least, 14.3% are between the ages of 18-30 years between the age of 18-30 years. 53.8% of respondents are male, whereas 46.2% are female. 25.2% have no formal education, 20.1, 22.7 and 33.1% have primary, secondary and tertiary educational qualification respectively. Also 25.2% which is the highest percentage have house hold size of 0-3, and the least percentage of 13.6% have house hold size of 10-12. 25.2% of respondents have stayed in the study area for a period between 40 years and above, which is the highest, while 10.1% showed the least number of years respondents have stayed in the communities.

Table 1. Socio economic characteristics of respondents.

Socio-economic characteristics	Frequency	Percentage (%)
Age		
18- 30	17	14.3
31-43	25	21.0
44-56	30	25.2
57-69	26	21.8
70 & above	21	17.6
Gender		
Male	64	53.8
Female	55	46.2
Educational qualification		
Non-formal	30	25.2
Primary	25	20.1
Secondary	27	22.7
Tertiary	38	33.1
House Hold Size		
0-3	29	25.0
4-6	36	31.1
7-9	22	18.5
10-12	17	13.6
12& above	15	11.8
Period of residence in the community		
10-20	12	10.1
20-25	14	11.8
25-30	17	14.3
30-40	37	31.1
40 & above	30	25.2

Table 2 shows responses from the respondents on some of the flora and fauna seen in the study area in the past, from 2001 to 2010 and the present from 2011 to 2021. 68.2% of the respondents saw more *Bambusa vulgari*s in the past 2001-2010, and 32.2% in the present 2011-2021. The past years, from 2001-2010 showed more percentagerate on flora seen in the study area with 89.55% as the highest percentage rate and 57.6% as the lowest percentage rate. Whereas the present from 2011-2021 showed less percentage flora in the study area with 43.2% as the highest percentage rate of flora and 10.6% as the

Table 2. Frequency and percentage of flora and fauna in the study area as seen in the past from 2001 - 2010 and the present 2011- 2021.

Flora	Botanical name	Fauna	Scientific name	Flora past 2001-2010	Flora Present 2011-2021	%Flora past 2001-2010	% Flora present 2011-2021	Fauna past 2001-2010	Fauna Present 2011-2021	%Fauna past 2001-2010	% Fauana present 2011-2021
Bamboo	*Bambusa vulgaris*	Rabbit	*Oryctolagus cuniculus*	82	37	68.2	32.2	84	35	70.8	30.1
Bread fruit	*Artocarpus altilis*	Hyena	*Hyaenidae spp*	78	41	64.9	35.5	104	15	88.5	11.6
Kolanut	*Cola acuminata*	Pigeon	*Columbidae spp*	65	54	57.6	43.2	71	48	60.2	40.3
Christmas bush	*Alchornea cordifolia*	Termite	Isoptera	102	17	86.2	14.5	94	25	78.4	21.8
Native pear	*Dacryodes edulis*	Leopard	*Panthera pardus*	72	47	61.2	39.3	106	13	90.5	9.6
Rubber tree	*Hevea brasiliensis*	Crested Chameleon	*Trioceros cristatus*	68	51	59.5	41.2	98	21	83.1	17.8
African Mahogany	Khaya ivorensis	Gabom viper	*Bitis gabonica*	96	23	81.2	19.3	67	52	58.2	42.2
Iroko	*Milica excelsa*	Grasscutter	*Thryonoms swinderianus*	92	27	77.4	23.2	96	23	81.2	19.3
Okazi	*Gnetum africanum*	Dwarf Crocodile	*Osteolaemus tetraspis*	87	32	73.8	26.9	100	19	84.1	16.8
African Walnut	*Tetracarpidium conophorum*	Tortoise	*Testudinidae spp*	105	14	89.5	10.6	104	15	88.5	11.6
African oil bean	*Pterocarpus mildbraedil*	Snail	*Helicoidea spp*	84	35	70.8	30.1	85	34	71.8	29.1
Uda	*Xylopia aethiopa*	Vulture	*Cathartes aura*	91	28	76.2	24.5	102	17	86.2	14.5
Obeche	*Triplochiton scleroxylon*	Flying termite	*Macrotermes Bellicosus*	83	36	69.2	31.2	66	53	57.5	43.2
Calabash tree	*Crescentia cujete*			101	18	85.2	15.2				
Bitter cola	*Garcinia kola*			75	44	63.8	37.0				

Source: Authors computation, 2022.

least percentage rate. This revealed that deforestation and loss of biodiversity is significant in the study area. Also, percentage fauna seen in the past from 2001-2010 showed 88.5% as the highest percentage fauna rate and 57.5% as the lowest fauna rate. Whereas the present, from 2011-2021 revealed less percentage fauna in the study area with the highest percentage rate as 43.2% and 9.6% as the least fauna precent in the study location. This showed a significant indication of deforestation and loss of biodiversity in the study area. The Figures 1 and 2 shows percentage comparison between flora and fauna seen in the past from 2001-2010 and the present from 2010-2021 in the study area. This revealed that loss of flora and fauna is rapidly increasing and can be attributed to deforestation and biodiversity loss respectively.

Table 3 shows 46.5% respondents, revealed logging to be a very serious effect of factors influencing deforestation and loss of biodiversity, while least percentage of 16.8% revealed low effect. Out of the 119 respondents, 41.3, 28.7, 50.2, 46.5, 42.5, 47.9, 53.6, 50.2, 48.8, 43.9 and 65.8% revealed, fuel wood, craft making, agricultural expansion, settlement/construction, charcoal production, uncontrolled grazing, bush burning,

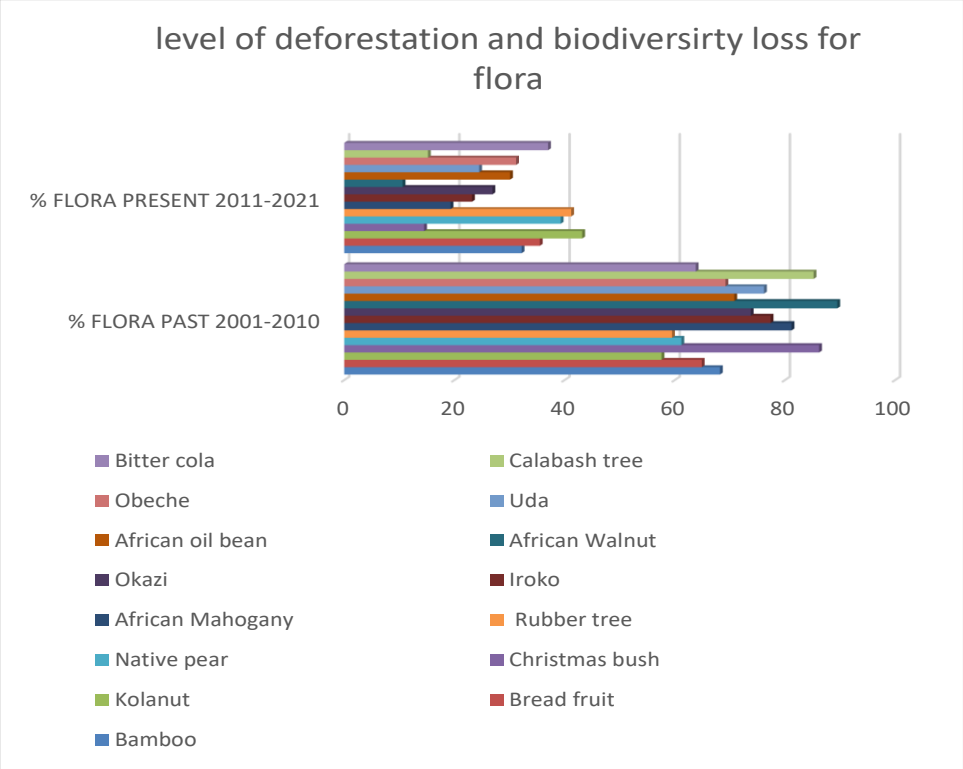

Figure 1. Level of deforestation and biodiversity loss for flora.

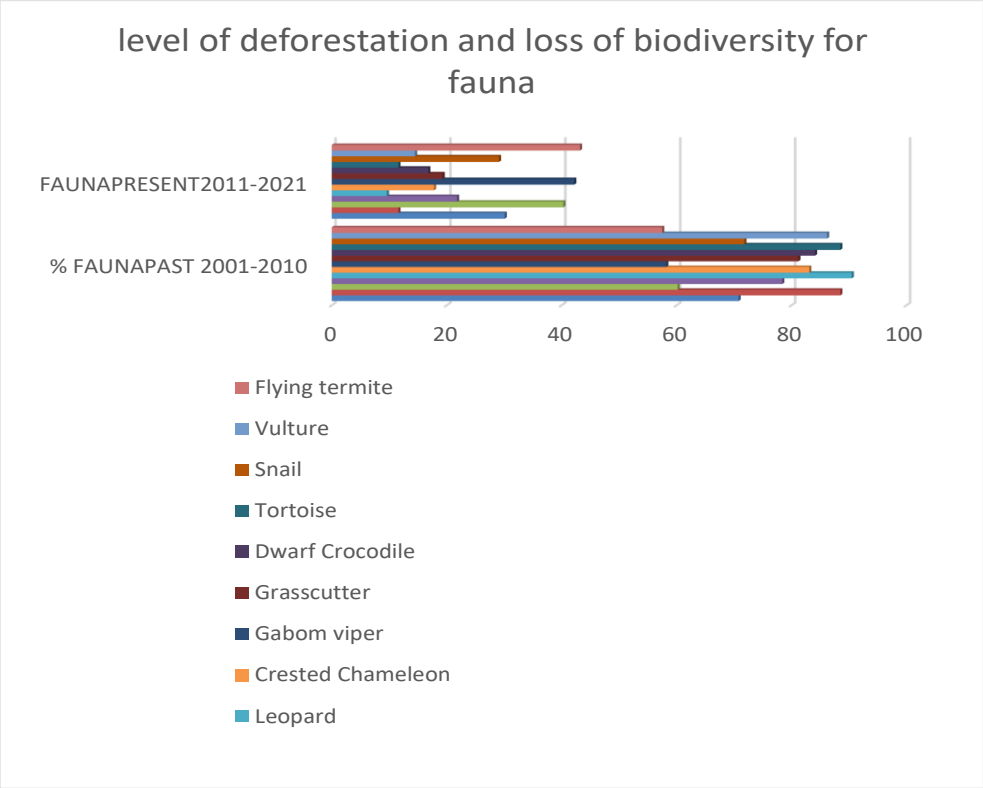

Figure 2. Level of deforestation and biodiversity loss for fauna.

Table 3. Frequency and percentage on factors influencing deforestation and biodiversity loss in Owerri west, Imo state south-eastern Nigeria.

Factors	VLE	LE	ME	SE	VSE	VLE%	LE%	ME%	SE%	VSE%
B1. Logging	0.0	19	24	21	55	0.0	16.8	20.2	17.8	46.5
B2. Fuel wood	3	14	23	32	47	3.2	10.2	19.3	26.9	41.3
B3. Craft making	17	23	24	22	33	14.8	19.3	20.2	18.5	28.7
B4. Agricultural expansion	0.0	8	22	30	59	0.0	6.1	18.5	25.5	50.2
B5. Settlement/construction	0.0	10	18	36	55	0.0	8.2	15.6	31.2	46.5
B6. Charcoal production	4	17	18	29	51	2.5	14.8	15.6	24.8	42.5
B7. Uncontrolled grazing	7	10	17	29	56	4.8	8.2	14.8	24.8	47.9
B8. Bush burning	0.0	14	21	23	61	0.0	10.2	17.8	19.3	53.6
B9. Storms	7	10	19	24	59	4.8	8.2	16.8	20.2	50.2
B10. Erosion	0.0	13	23	26	57	0.0	9.8	19.3	22.6	48.8
B11. Forest pest and diseases outbreak	4	17	20	25	53	2.5	14.8	17.0	21.8	43.9
B12.Poverty/unemployment	0.0	0.0	17	24	78	0.0	0.0	14.8	20.2	65.8

VLE= Very low effect, LE=low effect, ME= Moderate effect, SE= Serious effect, VSE= very serious effect (**Source:** Author's computation, 2022).

Table 4. Effects of deforestation and biodiversity loss in Owerri west, Imo state south-eastern Nigeria.

Effects	VLE	LE	ME	SE	VSE	VLE%	LE%	ME%	SE%	VSE
C1. Destruction and loss of wildlife habitat	0.0	10	15	29	65	0.0	8.2	11.3	24.8	57.0
C2. Flooding	4	19	21	32	43	2.5	16.8	17.8	26.9	37.2
C3 Loss of fauna and flora	0.0	11	18	30	60	0.0	9.2	15.6	25.5	52.6
C4. Climate change	0.0	0.0	24	37	58	0.0	0.0	20.2	32.3	48.0
C5. Decline in forest job opportunities	10	14	19	22	54	8.2	10.2	16.8	18.5	46.8
C6. Intense heat	0.0	16	29	32	42	0.0	12.3	24.8	26.9	36.2
C7. Desertification	8	15	23	28	45	6.1	11.2	19.3	23.7	39.8

VLE= Very low effect, LE=low effect, ME= Moderate effect, SE= Serious effect, VSE= very serious effect (**Source:** Authors computation, 2022).

storms, erosion, forest pest and diseases and poverty/unemployment respectively, to be very serious effects on factors influencing deforestation and biodiversity loss in the study area. Hence,16.8, 10.2, 19.3, 6.1, 8.2, 14.8, 8.2, 10.2, 8.2, 9.8, 14.8% revealed respectively the above mentioned factors to have low effect on deforestation and biodiversity loss in the study area. This study agrees with Achard *et al*. (2002) and Wardell *et al*. (2003) that agricultural expansion is a critical determinant of forest decline and biodiversity loss in Africa.

Table 4 shows that 57.0% of respondents revealed destruction of habitat to have a very serious effect on deforestation and biodiversity loss, whereas 8.2% which is the least shows a low effect. Flooding revealed 37.6% to be a very serious effect of deforestation and biodiversity loss while 16.8% showed a low effect. 52.6% of respondents which is the highest, revealed loss of fauna and flora to have a very serious effect on deforestation and loss of biodiversity while 9.2% showed low effect. Climate change revealed 48.0% and 20.2% as a very serious and moderate effect of deforestation and biodiversity loss in the study

area. Decline in forest job opportunities, intense heat and desertification revealed 46.8, 36.2 and 39.8% respectively as very serious effect, while 8.2 and 6.1% showed low effects of deforestation and biodiversity loss. This is in conformity with Karen (2003), Chiu (2007), IPCC (2007), and Dasgupta *et al*. (200) that, settlement/urbanization, climate change, poverty/ unemployment, and logging are predisposing factors/ conditions of deforestation and biodiversity loss

Conclusion

This study examined a retrospective survey on the influence of deforestation and biodiversity loss in Owerri west south - eastern Nigeria. Analysis indicates that, the past years, 2001 – 2010 experienced increased amount of flora and fauna in the study locations while the present years, 2011 – 2021 as portioned in the study is associated with less amount of flora fauna, and thus is due to rapid deforestation and biodiversity loss in the study area. This study reveals a significant rate of flora and fauna loss, which is an indicator of biodiversity loss due to deforestation influence in the study area. It is recommended that adequate laws and regulations/implementation of existing laws and policies be upscaled to mitigate deforestation rate and by extension biodiversity loss.

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