Transdisciplianry Journal of Education and Sustainable Development Studies, Vol. 1, No. 3, December 2025
A publication of the Department of Education Geography & Sustainable Development Studies, ISSN: 1595-8051 EISSN: 3092-571
University of Calabar, Nigeria.

Anthropogenic Activities and Loss of Wildlife in Cross River State, Nigeria

Usani, Oka Ibiang
usanioka@gmail.com
EDE/Ph.D/23/009
Department of Environmental Education, Faculty of Science Education
University of Calabar, Calabar

Abstract

This study examined the relationship between anthropogenic activities and wildlife loss in Cross River State, Nigeria. Specifically, it investigated the extent to which deforestation and mining activities predict wildlife loss. A survey research design was adopted. Using stratified and proportionate random sampling techniques, 770 respondents were selected from 42 communities across 10 local government areas covering the three senatorial zones of the state. Data were collected using the Anthropogenic Activities and Loss of Wildlife Questionnaire (AALWQ), which yielded a test–retest reliability coefficient of $r = .80$. Data were analyzed using simple linear regression at the .05 level of significance. Results revealed that deforestation significantly predicted wildlife loss, $R = .452$, $R^2 = .205$, $F(1, 762) = 111.37$, $p < .001$, accounting for 20.3% of the variance. Mining activities also significantly predicted wildlife loss, $R = .544$, $R^2 = .296$, $F(1, 762) = 182.01$, $p < .001$, accounting for 29.4% of the variance. The findings underscore the urgent need for strengthened forest governance and environmentally responsible mining practices to safeguard biodiversity in Cross River State.

Keywords: deforestation, mining activities, wildlife loss, anthropogenic activities, biodiversity conservation

Introduction

Anthropogenic activities are major drivers of biodiversity loss globally, particularly in tropical forest ecosystems. In Cross River State, Nigeria one of the country's most biologically diverse regions human activities such as logging, agricultural expansion, mining, urbanization, and bush burning have significantly altered natural habitats. These pressures have resulted in habitat destruction, fragmentation, and declining wildlife populations.

Protected areas in Cross River State, including forest reserves and wildlife sanctuaries, serve critical ecological functions by conserving endemic and endangered species, supporting ecosystem services, and promoting ecotourism. However, increasing human encroachment around and within these protected landscapes has weakened their conservation effectiveness. Deforestation for agriculture and timber extraction reduces habitat size and isolates wildlife populations, making species more vulnerable to local extinction. Habitat fragmentation, in particular, disrupts

ecological processes, restricts species movement, reduces genetic diversity, and increases susceptibility to environmental shocks.

Mammalian herbivores and other fauna species are especially vulnerable to anthropogenic disturbances. Large and small mammals respond to habitat alteration by shifting their spatial and temporal behavior, often reducing feeding opportunities and reproductive success. Continued habitat loss threatens not only individual species but also ecosystem stability, as herbivores play essential roles in vegetation dynamics and trophic regulation.

In addition to deforestation, mining activities contribute to land degradation, pollution, and ecosystem disruption. Quarrying, blasting, and mineral processing alter landscapes, contaminate water bodies, and generate dust and noise that affect both terrestrial and aquatic habitats. Bush burning commonly used in land preparation further compounds environmental degradation by destroying soil organic matter, reducing biodiversity, and increasing greenhouse gas emissions.

Cross River State has experienced significant forest loss over recent decades, with extensive tree cover decline linked to logging and agricultural expansion. The resulting habitat fragmentation poses serious threats to endangered species such as the Cross River gorilla, Nigeria Cameroon chimpanzee, and other forest-dependent fauna. The cumulative effects of deforestation, mining, hunting, and land-use change have accelerated wildlife decline in the region.

Despite growing conservation efforts, anthropogenic pressures continue to undermine biodiversity sustainability in Cross River State. Understanding the relationship between these human activities and wildlife loss is therefore essential for evidence-based environmental management and policy intervention. It is against this backdrop that this study examines the relationship between anthropogenic activities and wildlife loss in Cross River State, Nigeria.

Purpose of the Study

The purpose of this study was to examine anthropogenic activities and wildlife loss in Cross River State, Nigeria. Specifically, the study sought to:

1. Determine the relationship between deforestation and wildlife loss in Cross River State.
2. Examine the relationship between mining activities and wildlife loss in Cross River State.

Research Questions

1. What is the relationship between deforestation and wildlife loss in Cross River State?
2. To what extent do mining activities relate to wildlife loss in Cross River State?

Hypotheses

H_{01}: There is no significant relationship between deforestation and wildlife loss in Cross River State.

H_{02}: Mining activities do not significantly relate to wildlife loss in Cross River State.

Literature Review

Deforestation and Wildlife Loss

Deforestation remains one of the most significant threats to biodiversity conservation in tropical regions. Logging and agricultural expansion are primary drivers of forest loss (Bikorimana et al., 2023). In Nigeria, the increasing contribution of agriculture to national economic development has accelerated forest conversion, resulting in habitat destruction and biodiversity decline (Imarhiagbe et al., 2020).

Habitat fragmentation, degradation, and destruction significantly reduce species abundance and disrupt ecological processes. Rural poverty and dependence on forest resources for livelihoods further intensify forest exploitation and wildlife hunting. Community forestry initiatives in Cross River State have attempted to decentralize forest governance; however, challenges remain in balancing conservation and livelihood needs (Imarhiagbe et al., 2020).

Poaching and illegal wildlife trade further exacerbate biodiversity loss. Nigeria has been identified as a significant transit hub in international wildlife trafficking networks (United Nations Office on Drugs and Crime [UNODC], 2020). Illegal harvesting of species such as elephants and African grey parrots has intensified pressures on already vulnerable populations (Idowu et al., 2015).

Mining Activities and Wildlife Loss

Mining operations generate multiple environmental impacts, including land degradation, habitat destruction, dust pollution, water contamination, and ecosystem disturbance. Infrastructure development associated with mining such as roads and quarry sites directly alters landscapes and fragments wildlife habitats.

Mining-related pollution can contaminate soil and water bodies with toxic elements, adversely affecting terrestrial and aquatic ecosystems (Adiuku-Brown & Ogazi, 2021). Environmental impact studies in Nigeria have linked limestone mining to reduced agricultural productivity due to dust deposition (Adekoya, 2015).

Beyond direct habitat destruction, mining activities disrupt ecological systems through chemical contamination, radiation exposure, and hydrological alteration. While mining may generate socio-economic benefits such as infrastructure development (Africa Global Media, 2008), poorly regulated mining significantly contributes to biodiversity decline and long-term ecological instability.

Methodology

A survey research design was adopted. The study was conducted in Cross River State, a coastal state in southern Nigeria known for its rainforest ecosystems and biodiversity. Stratified and

proportionate random sampling techniques were employed. Ten (10) local government areas were selected from the three senatorial zones. A total of 42 communities were sampled.

From these communities, 770 respondents (farmers, hunters, and wood vendors) were selected using systematic random sampling. Data were collected using the Anthropogenic Activities and Loss of Wildlife Questionnaire (AALWQ). The instrument consisted of 35 Likert-scale items measuring deforestation, mining, bush burning, farming, illegal hunting, urbanization, and pollution activities. Content validity was established by three environmental education experts. The test–retest reliability coefficient was $r = .80$.

Simple linear regression analysis was used to test the hypotheses at the .05 significance level.

Presentation of result

In this section each hypothesis is re-stated, and the result of data analysis carried out to test it is presented. Each hypothesis of the study was tested at .05 level of significance.

Hypothesis one

There is no significant relationship between deforestation and loss of wildlife.

The independent variable in this hypothesis is deforestation; while the dependent variable is loss of wildlife. Simple linear regression analysis was the employed to test this hypothesis. The result of the analysis is presented in Table 1.

TABLE 1: Simple regression result of the relationship between deforestation and loss of wildlife

Model	R	R. square	Adjusted R. square	Std error of the estimate	
1	.452(a)	.205	.203	2.80086	
Model	Sum of square	df	Mean square	F	p-value
Regression	873.638	1	873.638	111.365*	.000(a)
Residual	3396.808	762	7.845		
Total	4270.446	763			

Variables	Unstandardized regression weight B	Standardized regression weight	Beta weight	t	p-value
(Constant)	14.252	1.879		7.583	.000
Deforestation	.966	.090	.706	10.725	.000

* Significant at .05 level.

The Simple linear regression analysis of the relationship between deforestation on the loss of wildlife yielded a coefficient of multiple regression (R) of .452 and a multiple regression R-square (R^2) of .205 and an adjusted R^2 of .203. The adjusted R^2 of .203 indicated that the Deforestations account for 20.3% of the variance in loss of wildlife in the study area. This finding is a critical indication that deforestations are relatively high in the area of the study. The F-value of the Analysis of Variance (ANOVA) obtained from the regression table was F = 111.365 and the sig. value of .000 (or $p<.05$) at the degree of freedom (df) 1 and 434. The implication of this result is that deforestation is a significant relate to loss of wildlife. The identified equation to understand this relationship was that loss of wildlife = 6.165 + 1.328 (deforestation).

Hypothesis two

Mining activities does not significantly loss of wildlife.

The independent variable in this hypothesis is mining activities; while the dependent variable is loss of wildlife. Simple linear regression analysis was employed to test this hypothesis. The result of the analysis is presented in Table 2.

TABLE 2: Simple regression result of the relationship between mining activities and loss of wildlife

Model	R	R. square	Adjusted R. Square	Std error of the estimate		
1	.544(a)	.296	.294	2.63510		
Model	Sum of square	df	Mean square	F	p-value	
Regression	1263.799	1	1263.799	182.005*	.000(a)	
Residual	3006.647	762	6.944			
Total	4270.446	763				
Variables	Unstandardized regression weight B		Standardized regression weight	Beta weight	t	p-value
(Constant)	14.252		1.879		7.583	.000
Mining activities	.966		.090	.706	10.725	.000

* Significant at .05 level.

The Simple linear regression analysis of the relationship between mining activities on the loss of wildlife yielded a coefficient of multiple regression (R) of .544 and a multiple regression R-square (R^2) of .296 and an adjusted R^2 of .294. The adjusted R^2 of .294 indicated that the mining activities accounted for 29.4% of the variance in loss of wildlife in the study area. This finding is a critical indication that mining activities is relatively high in the area of the study. The F-value of the Analysis of Variance (ANOVA) obtained from the regression table was F = 182.005 and the sig. value of .000 (or $p<.05$) at the degree of freedom (df) 1 and 434. The implication of this result is that mining activities is significant relate to loss of wildlife. The identified equation to understand this relationship was that loss of wildlife = 6.165 + 1.328 (mining activities).

Discussion of findings

This section is devoted to the discussion of findings of the hypotheses formulated to direct the study. The discussion is done hypothesis by hypothesis.

Deforestation and loss of wildlife

The result of the first hypothesis revealed that there is a significant relationship between deforestation and loss of wildlife. The finding of this hypothesis is in line with the view Bikorimana (2023) who researched on influence of forest management and sustainable development, reported that sustainable forestry is being approached around the world using an ecosystem approach. In this approach the forests are being managed sustainably so as to strike a maximum balance between environmental management economic development and social values. Today, efforts are being made to incorporate the principles and operational guideline of the ecosystem approach into the concept of "ecologically sustainable forest management.

The finding of this study also supported the finding of Imarhiagbe (2020) which revealed that the Cross River State mode of joint forest management is an example of decentralization and devolution of forestry activities. The introduction of community forestry (CF) practices among the people of Cross River State according to Imarhiagbe (2020) has empowered Cross Riverians in different ways. This empowerment according to him, has affected people's decision-making process, local government, economies, farming practices, trade in non-timber forest products (NTFPs) and community general security alertness. Also, according to the author; many communities in Cross River State have form forest management committees (FMCs) to take responsibility for management of their forest on behalf of the community. Deforestation, often fueled by rural poverty and the need for basic necessities like food and shelter, is intricately linked to the loss of biodiversity. Original rainforests, rich in biodiversity, also offer climatic and water resource conservation benefits that directly impact the sustenance of biodiversity and ecological stability. Exploitation of forest resources for income generation has led to extensive wildlife hunting, contributing to the extinction of some species.

Mining activities and loss of wildlife

The finding obtained from analysis and testing of hypothesis two showed that the null hypothesis was rejected. This implied that there is a significant weak relationship between mining activities and loss of wildlife in Cross River State. This finding is in agreement with the finding of Molden (2007) which maintained that much effort in mining activities directly impact loss of wildlife at optimizing environmental impact of the natural environment. Health Hazards Associated with Mining Activities, the mining, smelting and treatment of ores, for example, such as sulphide ores and the combustion of fossil fuels, emit such gases as carbon dioxide and sulphur dioxide. Quarrying pollutes the air with dust and noise. The processing of uranium zirconium, tantalite, wolframite and tin ores can pollute the air with ionizing radiation. Silica particles pollute the air in proximity to rock drilling sites, in mines and quarries. Asbestos particles pollute asbestos mine and processing areas. Liquid waste from mining/mineral processing requires specialized storage. Most mineral processors dodge this responsibility by running the waste into the nearest stream. This causes serious pollution and destroys aquatic life. Human beings have often got the effect through the food chain or directly through contaminated water. Slime and quartz that were released by kaolin processing plants account for the white coloration of extensive areas near those plants. The slime has affected aquatic life; and the slime and quartz have rendered the farmlands in these areas infertile. This has occasionally generated serious friction between farmers and mineral industrialists.

Adekoya (2015) has observed that another effect of the damage, which may not be immediately seen, is the disturbance of the ecological system with possible adverse consequences on the floral and faunal community. He went on to inform that recent environmental impact studies of limestone mining and cement industry in Sagamu area reveal a declining Kolanut output from the plantations within a few kilometres radius of the cement factory. This phenomenon is most probably associated with dust pollution as plenty of dust is discharged into the air mainly from the cement factory. The particulate matter eventually gets deposited on the kolanut leaves and flowers as well as the soil supporting the plants. The overall effect of this is that the photosynthetic and fruiting ability of the kolanut trees is impaired with consequent decrease in kolanut production. Honda (2021), in his study of monitoring of revegetation area in Asio (Tokyo in Japan) devastated land, caused by copper mines pollution, using aerial photography and satellite remote sensing, observed that sulphurous acid gas exerted a serious influence on trees within 149km2 around the Bessemer smelting plant located in the mine area. Within another 38km2 , he said; only plants, which were resistant to sulphurous acid gas such as bamboo trees remained. Frequent floods and sediment disasters, which seemed to be caused by destruction of forest, as a result, had a serious unpleasant influence on the crops, and health of villagers in ruins.

Over the 33 years, from 1985 to 2018, he revealed, 1168 hectares of hill-side seeding and 339 of check-dams have been undertaken, as restoration attempt at the cost of 119billion Yen. Through these measures, the area has considerably recovered; but even at present a large devastated area is left as it stands, where any work is hard to be done. So, for the overall restoration of vegetation, a large amount of cost, long term, and difficult measures are expected, he concluded. Mining

activities generate socio-environmental problems such as the formation of "ghost towns" which are abandoned towns and previous bubbling mining communities. Two causes of ghost towns are illustrated in Nigeria. The migration of mining communities from a locality as a result of mineral depletion is a major cause of some ghost towns. For example, Sofon Birnin Gwari was a town that once thrived on gold mining between 1914 and 1938 but was abandoned due to the exodus of miners and prospectors to the Plateau tinfields in the early 1940s. A few villages on the Jos Plateau have been abandoned because of death of many people under mysterious circumstances. The mysterious deaths have been traced to a high level of radiations released by monazite-rich sand used for building the houses the deceased lived in. Another obvious effect of radiation was noticed when a cat living in the house of its dead owners produced a kitten with only one leg due to genetic mutation typical of radiation absorption (Adekoya, 2015). The finding of this study also contradicted the finding of Africa Global Media (2008) which maintained that there is no doubt that granite exploitation if properly managed can have a positive socio-economic impact on the people of the producing community through the development of some socio-economic infrastructure such as roads, schools, hospitals electricity and housing. Prior to the commencement of the construction work at Obajama cement plant in February 2008, the community in Oworo District of Lokaja, was a sleepy rural settlement with no social infrastructural amenities, the story has changed as more schools, hospitals, and houses have been built.

Conclusion and Recommendations

This study examined the relationship between anthropogenic activities and wildlife loss in Cross River State, Nigeria, focusing specifically on deforestation-related activities and extractive land-degrading practices. The findings provide empirical evidence that wildlife decline in the region is strongly associated with human-induced environmental disturbances.

The first major finding revealed a significant relationship between deforestation—particularly agricultural expansion and logging—and wildlife loss. Forest clearing and habitat fragmentation were found to reduce habitat availability, disrupt ecological connectivity, and restrict species movement. As forest landscapes become increasingly fragmented, wildlife populations face heightened vulnerability due to reduced breeding grounds, limited access to food resources, and increased exposure to human interference. The progressive shrinkage of forest ecosystems therefore directly undermines biodiversity sustainability in Cross River State.

The second key finding established a significant relationship between extractive and land-degrading activities, especially mining and bush burning, and wildlife loss. These activities degrade soil structure, destroy vegetation cover, contaminate water bodies, and alter natural habitats. The ecological disturbances resulting from these practices diminish habitat quality and create stressful environmental conditions that negatively affect species survival and reproduction. The cumulative impact of such disturbances contributes substantially to ecosystem instability and declining wildlife populations.

Based on these findings, it is evident that effective wildlife conservation in Cross River State requires targeted intervention strategies that address the root causes of habitat degradation. Strengthened enforcement of forest protection laws is essential to curb illegal logging and uncontrolled agricultural expansion. Government agencies should enhance surveillance of protected areas and implement policies that regulate land-use practices near forest reserves. Promoting sustainable agricultural systems, such as agroforestry and climate-smart farming, would help reduce pressure on primary forests while sustaining rural livelihoods.

In addition, stricter regulation of mining operations and improved monitoring of land-disturbing activities are necessary. Environmental Impact Assessments should be rigorously enforced prior to project approval, and mandatory land reclamation policies must be implemented to ensure ecological restoration after mining activities. Efforts to reduce bush burning through community-based fire management programmes and environmental education initiatives are also critical.

Furthermore, habitat restoration initiatives, including reforestation and the rehabilitation of degraded forest corridors, should be prioritized to reconnect fragmented landscapes and enhance ecological resilience. Long-term biodiversity monitoring systems should be established to provide reliable data for adaptive management and policy formulation. Finally, expanding alternative livelihood opportunities such as eco-tourism and sustainable forest-based enterprises can reduce local dependence on destructive practices and support conservation objectives.

In conclusion, addressing wildlife loss in Cross River State requires an integrated approach that combines strong governance, sustainable land-use practices, community participation, and ecological restoration. Without deliberate and sustained intervention, anthropogenic pressures will continue to erode the ecological integrity of the region's forest ecosystems.

References

Abernethy, K. A., Coad, L., Taylor, G., Lee, M. E., & Maisels, F. (2013). Extent and ecological consequences of hunting in Central African rainforests in the twenty-first century. *Philosophical Transactions of the Royal Society B, 368*(1625), 20120303.

Allen, J. C., & Barnes, D. F. (2017). The causes of deforestation in developing countries. *Annals of the Association of American Geographers, 75*, 163–184.

Atuo, F. A., Ivande, S. T., Wala, Z., & O'Connell, T. J. (2014). Effects of hunting camps on breeding grey-necked picathartes in south-east Nigeria. *Oryx, 48*(3), 460–464.

Balmford, A., & Cowling, R. M. (2006). Fusion or failure? The future of conservation biology. *Conservation Biology, 20*(3), 692–695.

Benítez-López, A., Alkemade, R., Schipper, A. M., Ingram, D. J., Verweij, P. A., Eikelboom, J. A. J., & Huijbregts, M. A. J. (2017). The impact of hunting on tropical mammal and bird populations. *Science, 356*, 180–183.

Bennett, E. L. (2011). Another inconvenient truth: The failure of enforcement systems to save charismatic species. *Oryx, 45*(4), 476–479.

Bi, S. G., Koné, I., Béné, J., Bitty, E., Yao, K., Kouassi, B., & Gaubert, P. (2016). Bushmeat hunting around a remnant coastal rainforest in Côte d'Ivoire. *Oryx*.

Brashares, J. S., Golden, C. D., Weinbaum, K. Z., Barrett, C. B., & Okello, G. V. (2011). Economic and geographic drivers of wildlife consumption in rural Africa. *Proceedings of the National Academy of Sciences, 108*(34), 13931–13936.

Challender, D. W., & MacMillan, D. C. (2014). Poaching is more than an enforcement problem. *Conservation Letters, 7*(5), 484–494.

Coad, L., Abernethy, K., Balmford, A., Manica, A., Airey, L., & Milner-Gulland, E. J. (2010). Distribution and use of income from bushmeat in a rural village, central Gabon. *Conservation Biology, 24*(6), 1510–1518.

Corlett, R. T. (2017). The impact of hunting on the mammalian fauna of tropical Asian forests. *Biotropica, 39*(3), 292–303.

Duffy, R., St John, F. A. V., Büscher, B., & Brockington, D. (2016). Toward a new understanding of the links between poverty and illegal wildlife hunting. *Conservation Biology, 30*(1), 14–22.

Ejiofor, T., & Ali, C. C. (2014). Wildlife conservation and management: Hindrances and sustainable measures among local users in Enugu State, Nigeria. *Journal of Agriculture and Biodiversity Research, 3*(5), 61–67.

Eniang, E. A., Eniang, M. E., & Akpan, C. E. (2018). Bush meat trading in the Oban Hills region of southeastern Nigeria: Implications for sustainable livelihoods and conservation. *Ethiopian Journal of Environmental Studies and Management*.

Enuoh, O. O., & Bisong, F. E. (2014). Rural livelihood vulnerabilities and commercial bushmeat hunting challenges in Cross River National Park, Nigeria. *Natural Resources, 5*(13), 822.

Fa, J. E., Ryan, S. F., & Bell, D. J. (2015). Hunting vulnerability, ecological characteristics and harvest rates of bushmeat species in Afrotropical forests. *Biological Conservation, 121*(2), 167–176.

Fischer, F., Friant, S., Paige, S. B., & Goldberg, T. L. (2015). Drivers of bushmeat hunting and perceptions of zoonoses in Nigerian hunting communities. *PLoS Neglected Tropical Diseases, 9*(5), e0003792.

Fusari, A., & Carpaneto, G. M. (2016). Subsistence hunting and conservation issues in Mozambique. *Biodiversity & Conservation, 15*(8), 2477–2495.

Gandiwa, E. (2011). Preliminary assessment of illegal hunting adjacent to Gonarezhou National Park, Zimbabwe. *Tropical Conservation Science, 4*(4), 445–467.

Henschel, P., et al. (2014). The lion in West Africa is critically endangered. *PLOS ONE, 9*(1), e83500.

Isah, A. D., & Adegeye, A. O. (2019). Effects of burning on soil properties and growth of Gmelina arborea seedlings in a savanna ecosystem. *Journal of Agriculture and Environment, 3*(2), 349–357.

McKnight, K. A. (2017). Deforestation of the tropical rain forest and its impact on climate change. *Journal of Environmental Management and Safety, 2*(1), 28–37.

Odi, C. N. (2018). *Farming systems and forest biodiversity conservation*. Enugu: Pathways Publisher.

Taylor, D. O. (2018). Burning for biodiversity or burning the biodiversity? *International Journal of Agricultural Research, 4*(7), 76–84.

Umoh, E. E. (2017). Bush burning and forest situation: A case study. Unpublished research project, University of Calabar.

Yunana, M. A., Siaka, S., Nale, B. Y., Simon, S., & Markus, B. (2019). Analysis of slash and burn in the Northern Guinea Savannah of Kaduna State: Implication for agriculture and the environment. *International Journal of Comparative Studies in International Relations and Development, 3*(1), 84–97.