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THE STATE OF WILDLIFE RESOURCES IN NIGERIA: A REVIEW

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Abstract:

Introduction: Nigeria is endowed with a rich diversity of wildlife resources that contribute to the sustainability of the environment, food and livelihood security, human health, the national economy, the maintenance of forest ecological services, and ecosystem health. However, these wildlife resources are under serious threats, and many are vulnerable, even near extinction, due to the increase in human population growth, unsustainable exploitation rate, and destruction of habitats, more pronounced as deforestation, *inter alia*.

Aim: Therefore, this study seek to assess the state of wildlife resources in Nigeria.

Materials and Methods: This study adopted the use of review of different literatures.

Results: Wildlife exploitation follows three overlapping trends that include periods of more abundance, sustainable, and non-sustainable wildlife populations. It is saddening to observe that the exploitation of wildlife has always been found in the third phase, where natural processes of regeneration are not able to cope with the overexploitation of high magnitude. The outcomes of this are loss, displacement, endangered, threatened, and extinction of wildlife species. It is noted that Nigeria has a total of 309 threatened species in the following taxonomic categories: mammals (26), birds (19), reptiles (8), amphibians (13), fish (60), mollusks (1), and other invertebrates (14).

Conclusion: Therefore, the Nigerian government has set up some agencies to enforce wildlife policies to regulate and manage the exploitation of wildlife resources, with an emphasis on the conservation of wildlife populations and habitats and the sustainable utilization of wildlife resources.

Keywords: Sustainable, livelihood, vulnerable, threatened, exploitation, wildlife population

All co-authors agreed to have their names listed as authors.

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1. INTRODUCTION

Wildlife is generally referred to as diverse fauna found in the wild or in environments not inhabited and directly influenced by humans. They include all animals that are outside direct control by man, or that are in their natural state that inhabit different ecosystems that have not been genetically manipulated by man for the purpose of domestication [1]. Wildlife contributes to the sustainability of the environment, food and livelihood security, human health, national, state and local economy, maintenance of forest ecological services, and ecosystem health. This shows that it is an integral part of the Sustainable Development Goals because many of the most vulnerable people depend directly on biodiversity to meet their daily subsistence needs (**Figure 1**). Wildlife also plays significant roles in the socio-cultural components of human life. Globally, it is becoming difficult for humans to live without wildlife resources; they are exploited to satisfy various human needs. Therefore, this study seek to assess the state of wildlife resources in Nigeria.



Figure 1: Contribution of wildlife resources in sustaining world ecosystem, food and livelihood security [3].

2. MATERIAL AND METHODS

This study conducted a comprehensive literature review using search engines such as Google Scholar, PubMed, Web of Science, and Scopus to gather information on the economic value of biodiversity, wildlife abundance and diversity, wildlife development, drivers of wildlife development, and key policies and agencies regulating biodiversity in Nigeria. Keywords included "economic value of biodiversity in Nigeria," "wildlife abundance and diversity in Nigeria," "wildlife development in Nigeria," "drivers of wildlife development in Nigeria," and "biodiversity policies and agencies in Nigeria."

Data were systematically extracted and categorized into themes: economic value of biodiversity, wildlife abundance and diversity, wildlife development, drivers of wildlife development, and regulatory policies and agencies. Cross-referencing and validation were conducted to ensure reliability by comparing findings across multiple sources. An analytical framework was developed to synthesize information, identifying economic benefits, wildlife population trends, factors influencing development, and the roles of regulatory bodies in biodiversity conservation.

3. RESULTS AND DISCUSSION

3.1 Economic value of biodiversity

The value and importance of wildlife resources are enormous and cannot be easily exhausted. These can be generally divided into positive and negative categories. Chardonnet *et al.* [2] classified positive values and the importance of wildlife into four groups. These include the economic importance of wildlife, the nutritional value of wildlife, the ecological role of wildlife, and the socio-cultural significance of wildlife. Likewise, the authors considered the overexploitation of wildlife resources by people, livestock (predation), agriculture (crop damage), and the natural landscape (invasive pests) as counter or negative values of wildlife.

The economic values of wildlife resources can be further subdivided into consumptive and non-consumptive use values. The consumptive uses of wildlife involve the direct exploitation of wildlife resources for food and livelihood security, medicinal uses, and industrial inputs. The non-consumptive uses of wildlife involved the activities of giving value to wildlife without removing the resource. These include the use of wildlife for educational and research purposes, environmental sustainability and protection, national heritage, promotion of tourism with parks and gardens, zoological gardens, game reserves, national parks, and contribution to the national economy. Nigerian National Parks generated about ₦128.67 million and received a total of 29,971 tourists from 2017 to 2019. Their ecological importance involves maintenance of ecosystems such as seed dispersal, pollination, predation, grazing, and habitat modification. Nigeria, as a member of the Convention on Biodiversity (CBD) and a signatory to the Convention on International Trade in Endangered Species (CITES), joins the international communities to celebrate World Wildlife Day every third of March of the year.

3.2 Abundance and Diversity of Wildlife in Nigeria

Nigeria is abundantly blessed with diversities of wildlife resources (Figure 2), which can be attributed to the country's tropical location, size, and ecosystems [4]. Nigeria possesses more than 22,090 vertebrates and invertebrates species of wildlife, including insects and 247 mammals, 1,000 species of birds, and 1,489 species of microorganisms. In addition, the country has 135 reptilian species, 109 amphibian species, and 1,000 fish species, including 266 species that are found in the freshwater ecosystem [5]. Nigeria is known as a global hotspot for primate species, with a great diversity found especially in the forests of Cross River State. Some of the endemic species in Nigeria include 19 freshwater fish species; eight mammals, the white-throated monkey (*Cercopithecus erythrogaster*), Sclater's guenon (*Cercopithecus sclateri*), the Niger Delta red colobus (*Procolobus pennantii epieni*), Fox's Shaggy Rat (*Dasymys foxi*), Gotel Mountain soft furred mouse (*Praomys obscurus*), Savanna swamp shrew (*Crocidura longipes*), Forest Shrew (*Sylvisorex ollula*) and Niger Delta Red Colobus monkey (*Procolobus epieni*); four bird species, the Anambra waxbill (*Estrilda poliopareia*), the Ibadan malimbe, (*Malimbus ibadanensis*), the Jos Plateau indigo-bird (*Vidua maryae*) and the Rock Fire-Finch *Lagonostica sanguinodorsalis*; five reptiles: Dunger's file snake (*Mehelya egensis*), Wormsnake (*Leptotyphlops sp*), Giant forest Gecko (*Cnemaspis gigas*), Ondo forest Gecko (*Cnemaspis petrodroma*), West African worm lizard (*Baikia africana*); four amphibians Nigerian toad (*Bufo perreti*), Danko puddle frog (*Phrynobatrachus danko*) and *Phrynobatrachus rainerguentheri* [1, 5, 6].

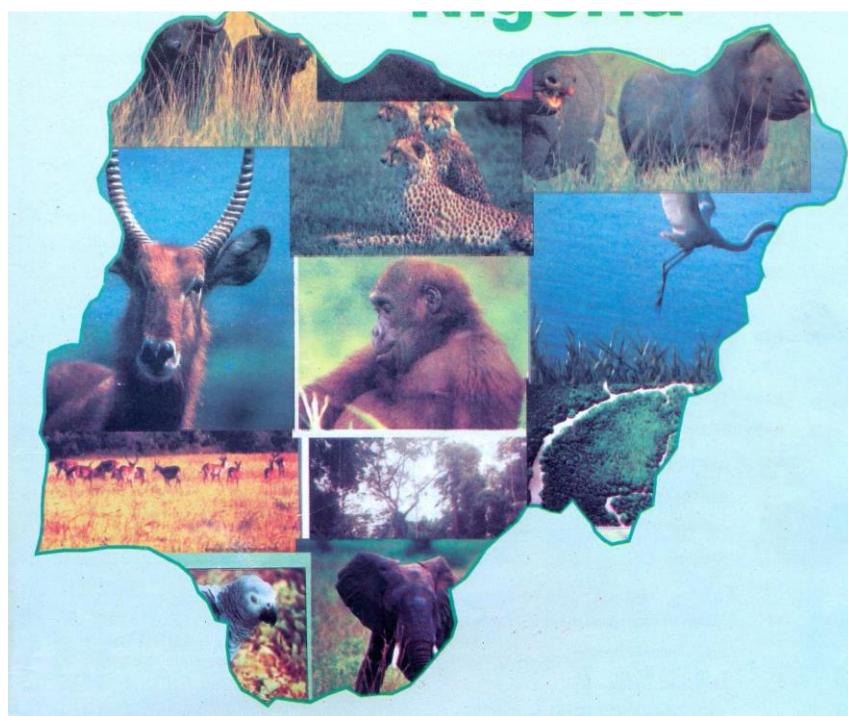


Figure 2: Wildlife Resources of Nigeria [5].

Despite the enormous efforts by individual and conservation bodies in Nigeria, there has been a significant decline and loss of wildlife resources in Nigeria. According to the IUCN Red List 2013, as reported by [7]. Nigeria has a total of 309 threatened species in the following taxonomic categories: mammals (26), birds (19), reptiles (8), amphibians (13), fish (60), mollusks (1), and other invertebrates (14).

3.3 Wildlife Development in Nigeria

The trend in the exploitation of wildlife resources can be viewed in three distinct but overlapping phases; these include periods of more abundance, sustainable, and non-sustainable wildlife populations in relation to their respective rates of exploitation. The sustainable phase is the second phase in which there is a balance between the rate of exploitation and the wildlife population (**Figure 3**). It is expected that harvested populations should not be reduced to densities whereby they can no longer fulfill their ecological role [8]. Unfortunately, natural regeneration of wildlife could not meet up with the exploitation rate [5]. This has resulted to loss, displacement, endangered, threatened, and extinction of wildlife species. Therefore, various tiers of government in Nigeria has recognize the need to conserve our wildlife resources.



Figure 3: Sustainable wildlife exploitation [9].

Establishment of protected areas in Nigeria, dating back to the 17th century, serves as the most important way to conserve wild animals. Forestry began officially in Nigeria in 1896 in the colony and protectorate of Lagos [10]. The Forestry Ordinance was promulgated as the legal instrument for the constitution of forest reserves in 1908. The Forestry Ordinance was revised in 1916 to extend the jurisdiction of the Forest Department to the Northern Protectorate. According to [11]. Nigeria's game reserves were originally forest reserves. Ideas of conserving wildlife in game reserves came up in Nigeria in the early 1930s through colonial officers that urged the government to take up the project [1, 12]. Ezealor [13] identified five categories of protected areas that include national parks, game reserves, forest reserves, biosphere reserves, strict nature reserves and special ecosystems such as sacred grooves.

In 1975, Kainji Lake National Park (the first of its kind in Nigeria) was created. The national park was legally made formal in 1979 by the Decree 46 of 1979. By 1991, five more national parks were created by the federal government, namely: Gashaka Gumti National Park, Old Oyo National Park, Chad Basin National Park, Cross-River National Park, and Yankari National Park. Okomu National Park and Kamuku National Park were created in 1999, bringing the number of National Parks in Nigeria to eight. But in 2006, Yankari was handed over to the Bauchi state government, thus reducing the number of the national parks to seven [1]. In 2020, the establishment of ten more national parks was approved, thereby increasing the total number of national parks to 17, including the first and only marine park in West Africa, which was established in Bayelsa State. In addition to this, Nigeria has over 32 game reserves and other protected areas. Omo Biosphere Reserve was the only biosphere reserve in Nigeria until October 2020. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) had approved three more biosphere reserves in Nigeria to make it four. The newly approved biosphere reserves are Oban and Okwango Biosphere Reserves, both in Cross River State, and the Hadejia-Nguru Bade Biosphere Reserve, cutting across Yobe and Jigawa State. Nigeria also had 27 important bird areas, including all national parks and 60% of the Ramsar sites; 11 Ramsar sites; 2 World Heritage Sites of Sukur Kingdom and Osun Osogbo Grove; 994 forest reserves; and many sacred groves at varying levels of protection [5].

3.4 Drivers of wildlife development in Nigeria

The drivers of wildlife development in Nigeria are many, multifaceted, and interrelated. Sometimes, it is difficult to separate one from the other as one driver initiates another or overlaps with another. The root of all the drivers is the means to satisfy increasing and insatiable human needs. Man employed various techniques and methods to exploit the ecosystems to satisfy needs. This exacerbates every other factor having an impact on the ecosystem [3]. In addition, technology development with the production of sophisticated gear aids in the overexploitation of wildlife in all ecosystems.

- i. **Increased human population:** The ever-increasing population in Nigeria may mean that more people will encroach on protected areas for agricultural activities, human settlement, and livestock grazing. This can also responsible for deforestation, land use changes, and excessive hunting or poaching. This constitutes a great threat to biodiversity, especially since many of these areas have numerous endemic species and few remaining populations of the most endangered species. For example, the Cross River Gorilla (*Gorilla gorilla diehli*) is found in the southern forested areas of Cross River State and protected in the Cross River National Park, and the Savannah Elephant (*Loxodonta africana*) is found in the Yankari Game Reserve of Bauchi State in the north [1, 5, 14].
- ii. **Poverty and subsistence:** Poverty is identified as the biggest threat to the conservation of wildlife resources in Nigeria [5]. Many people living in protected areas lack the resources and money to meet their household's basic needs. Thus, engage in illegal harvesting of wildlife resources from protected areas. These resources can either be used directly to meet household needs or be sold to generate income with which to pay for resources or services. Therefore, as an underlying factor for biodiversity degradation, poverty causes threats to biodiversity in two ways. First, the poor are pushed by the affluent and influential majority to destroy their own source of livelihoods for meager financial returns. Secondly, the poor, due to deprivation, find it difficult to secure any other alternative than to erode the very foundation of their own long-term survival [5, 15].
- iii. **Corruption, Policy, and Legislation Constraints:** Corruption is another major factor responsible for the loss of wildlife resources. Corrupt politicians have aided the de-reservation of many biodiversity-rich areas for non-productive reasons, thereby jeopardizing all past efforts at saving and protecting biodiversity. Biodiversity issues have been relegated to the background and have only been the concern of conservationists, scientists, and environmentalists, despite their significant contributions to the livelihood and economy of rural and peri-urban communities. Poor legislative enforcement has been and still is a glaring setback for biodiversity conservation in Nigeria. The national parks that are a repository of Nigeria's biodiversity have faced serious threats of poaching in recent years, losing not only wildlife but also Rangers to poachers. According to Dr. Ibrahim Goni (the Conservator General of the NPS), Nigeria lost 17 rangers out of 120 deaths of rangers recorded globally by the International Rangers Federation between August 2020 and July 30, 2021. Everywhere in Nigeria, biodiversity-related laws are broken openly in the face of low public awareness of biodiversity and lack of capacity for law enforcement agents to deal with issues of concern. Poor law enforcement on biodiversity has occasionally caused embarrassment for the government and people of Nigeria [5].
- iv. **Effects of climate change:** The National Adaptation Strategy and Plan of Action for Climate Change in Nigeria [16] revealed that climate change is already having significant impacts on Nigeria. According to the report, recent estimates suggest that in the absence of adaptation, rising to between 6% and 30% by the year 2050. The impacts of climate change are expected to exacerbate the impacts of human pressure on biodiversity. This will further diminish the ability of natural ecosystems to continue to provide ecosystem services and may cause the invasion of strange species that are favored by climate change.
- v. **Illegal exploitation, trade, and trafficking:** Nigeria was included as one of the eleven countries identified as countries of "secondary concern" by the CITES Standing Committee at the 65th Meeting (SC65, Geneva, July 2004). This is due to overexploitation, illegal trade, and trafficking in wildlife resources, which is one of the challenges that is negatively affecting

wildlife, particularly those species that have market value in Nigeria. Nigeria has emerged as a key source and transit country for shipments of ivory, rosewood, and pangolin scales (Figure 4). The illegal pangolin trade in Nigeria seems to have grown significantly in recent years. The country was the reported source of at least 51 tons of pangolin scales seized in 2019; this shows that Nigeria is the primary point of export of pangolin shipments [5, 17].

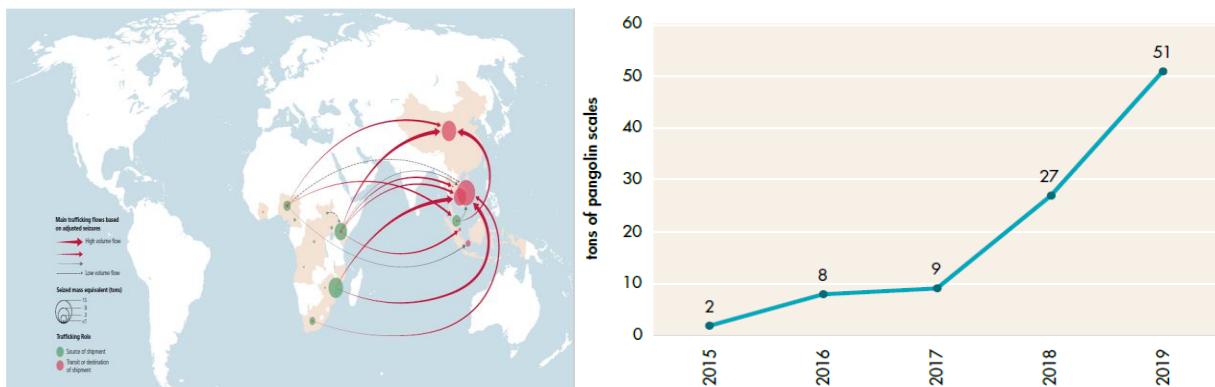


Figure 4: Trafficking flow map - Elephant ivory (2014-2018) and Pangolin scale shipments involving Nigeria as a source or destination, 2015-2019 (tons) **Source:** [17].

3.5 Key Policies and Agencies

It is obvious that unsustainable exploitation as a result of anthropogenic activities is the major threat to the survival and existence of wildlife in Nigeria, just as it is in other countries of the world. Wildlife policy is a set of legislative rules and guidance that aims to regulate and manage the exploitation of wildlife resources, with an emphasis on the conservation of wildlife populations and habitats and the sustainable utilization of wildlife resources. Some of the laws and regulations that protect wildlife and their habitats in Nigeria are: The wild animals Acts (1963, 1965, as amended in 1975); The Endangered Species Acts 1985, as amended in 2015; The National Wildlife Species Protection Act: The Endangered Species (Control of International Trade and Traffic) ; Sea Fisheries (Fishing) Acts 1971, 1972, 1992; Inland Fisheries Decree No. 108; The Forestry Ordinance, 1937; The FRIN Act 2018; National Parks Act 1979, 1991, and 1999; NESREA Act 2006.

- i. The National Wildlife Species Protection Act: The Endangered Species (Control of International Trade and Traffic):** It was enacted on 20 April 1985. It was amended in 2015, and it is now referred to as the Endangered Species Act 2015. It is an Act to provide for the conservation and management of Nigeria's wildlife and the protection of some of her species in danger of extinction as a result of overexploitation or habitat change as required under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species of Wild Animals (CMS) and its daughter agreements and protocols, and the Convention on Biological Diversity (CBD), to which Nigeria is a signatory. To achieve this, the Acts divided wildlife resources into first, second, and third schedules based on their severity for conservation. However, the Acts established the prohibition of hunting and trading of wildlife flora and fauna in these schedules, as well as regulating their trade if necessary with the issuance of permits and certificates. The agencies involved in the implementation of the policies are divided into two. The first are those that represent the Scientific Authorities of CITES in Nigeria designated under this Act. These include the following: the Forestry Research Institute of Nigeria (FRIN); the National Park Service (NPS); the National Institute for Oceanography and Marine Research (NIOMR); the National Institute for Freshwater Fisheries Research (NIFFR); and the National Institute for Horticultural Research and Training (NIHORT). The second category of agencies involved in the implementation of the policies are those that are involved in the enforcement of the Acts. These include the following: The Nigeria Customs Service (NCS); Nigeria Police Force

(NPF); Interpol; and the National Environmental Standards and Regulations Enforcement Agency (NESREA)

ii. **National Biodiversity Strategy and Action Plan (NBSAP) 2016-2020:** NBSAP was developed based on the objectives of the Convention on Biological Diversity (CBD), of which Nigeria became a member in 1994. The objectives of the convention are: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of benefits arising from the utilization of genetic resources. Therefore, Nigeria modeled and revised her NBSAPs in collaboration with various international organizations, such as the Convention on Biological Diversity (CBD), the Global Environment Facility (GEF), and the United Nations Environment Programme (UNEP). The NBSAP is a process by which countries can plan to address the threats to their biodiversity [18]. These NBSAPs guide the conservation and sustainable utilization of biodiversity, access to genetic resources, and the fair and equitable sharing of the benefits arising from their utilization. It is an important document that provides information on biodiversity and its threats and analyzes the institutional and legal frameworks that govern biodiversity issues in our country. The aim of NBSAP is to urgently establish measures to conserve dwindling resources and reduce further damage to biodiversity. NBSAP had undergone revisions over time in Nigeria. These include the first edition in 2001, the fourth in 2010, the fifth in 2015, and the latest revision that covered 2016 to 2020. These biodiversity-related conventions and policies include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the Convention on the Conservation of Migratory Species of Wild Animals (CMS); the Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR); the World Heritage Convention (WHC); and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). All of these make significant contributions to the sustainable management and use of the world's biodiversity. Activities to implement other conventions and agreements can be included in national biodiversity strategies as a means of achieving collaborative implementation of the Strategic Plan for Biodiversity 2011–2020 and its Aichi Targets [18]. All government ministries and agencies are involved in the implementation of these NBSAPs.

4. CONCLUSION

Most species that were originally common in Nigeria are becoming rare. This shows that if nothing is done to put this under control, the number of vulnerable wildlife species will continue to increase, and in twenty years, more wildlife species will have been lost or become extinct in Nigeria. In addition, habitat loss and its destructive impacts on the wildlife population show that biodiversity is being lost at a disturbing rate in Nigeria. The implication of this is that in twenty years, there may be ecological crises, and those that depend on wildlife resources for their food and livelihood security will become vulnerable to hunger and poverty. This shows that wildlife conservation is an integral part of the Sustainable Development Goals.

Nevertheless, wildlife is a renewable resource. It has the ability to replenish its depleting population through natural reproduction. If exploitation of wildlife resources can be put under control, such that sustainable utilization is encouraged, it is obvious that wildlife can be restored. That is when the exploitation of wildlife is far below their natural recruitment and their habitats are safe from destruction. Therefore, to avoid further loss and extinction of wildlife species that will lead to ecological crises, wildlife conservation should be prioritized accordingly.

COMPETING INTERESTS

The corresponding authors state that there is no conflict of interest.

AUTHORS' CONTRIBUTIONS

Stephen Olubusoye Ajagbe and Abiodun Solomon Kehinde contributed to the study's conception. All authors were involved in the review of literatures and written of the manuscript. Stephen Olubusoye Ajagbe, Olajumoke Celinah Odeyale and Ruth Oluwaseun Ajagbe wrote the first draft, and Stephen Olubusoye Ajagbe, Musiliyu Oladipupo Mustafa and Indogest Gabriel Akinyemi were responsible for the revised edition. All authors read and approved the manuscript.

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