INVESTIGATING THE LEGAL IMPACT OF WASTES ON ECOSYSTEMS, BIODIVERSITY, AND THE THREATS TO VARIOUS SPECIES

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Abstract

The impact of waste on ecosystems and biodiversity poses a significant threat to the health of various species and the environment. Waste can lead to long-term ecosystem imbalances by impairing reproductive systems, reducing populations, and even causing species extinction. However, human activity continues to exacerbate the issue, with unsustainable practices like deforestation, overfishing, and improper waste disposal adding to the problem. Protecting biodiversity requires a multifaceted approach, combining regulation, education and the adoption of sustainable practices across industries and communities. The research methodology adopted is doctrinal, focusing on analyzing existing data, literature, laws, and regulations related to waste management, ecosystem impacts, and biodiversity. This paper finds that the legal and policy review reveals an excessive overlap and duplication of regulations and laws on waste management and environmental protection. Despite international agreements and local legislations,

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Nigeria fails to enforce these laws effectively, leading to ongoing threats to biodiversity. This paper recommends that when waste especially non-biodegradable, if re-used or recycled for the packaging of other goods, or disinfecting and rebranding them again for use instead of the present trend of using them once and discarding them reduces the risk on biodiversity and ecological pollution.

Keywords: Biodiversity, Environmental degradation, Waste management, Non-biodegradable waste, Environmental protection

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1.0 INTRODUCTION

Besides climate change, impact on biodiversity and ecosystem loss and the treat to other various species is already a global issue even though it is heavily observed locally.[1]The biodiversity and the ecological services that underpin our society are under threat from a variety of sources. These include environmental contamination through waste materials[2], climate change, habitat modification, wildlife harvesting[3].

While waste is a natural part of life[4], humans produce a lot more waste than the thermodynamic minimum associated with the processes needed to

[1] D. Taber. L. T. Root, *et al*, "Thinking Globally and Siting Locally - Renewable Energy and Biodiversity an a Rapidly Warming World," *Climate Change* 126 (2014): 1-6.
[2] F. S. Chapin, E.S. Zavaleta, *et al*. 'Consequences of Changing Biodiversity.' *Nature* 405: 234-242.
[4] E. Schrödinger, *what is Life, and Mind and Matter*. London: (Cambridge University Press 1967):20

sustain them[5]. Waste may be discarded without being used[6]. Waste also arises from the use of dissipative materials and materials that miss their targets and enter the environment[7]. Ultimately, pollutants generated by human activities are wastes.[8] A large part of the problem with waste is that most wastes have, or are perceived to have, net negative utility. They are released into the environment where they impose negative externalities. Such a complex interaction between humans and nature has led Nigeria to be one of the most debated biodiversity and ecological loss cases in the literature[9]. Protecting Nigerian biodiversity and ecological richness is also another matter. Such protection ways can only be discovered with a governance approach. Then, the main question would be asked as to what extent does Nigeria have "good governance" of biodiversity, and ecological conservation? There are attempts at policy, institution, and organization levels for a solution. More importantly, Nigerian governments have

[5] S. Baumgartner, and J. S. Arons. 'Necessity and Inefficiency in the Generation of Waste: a Thermodynamic Analysis.' *Journal of Industrial Ecology (*2022) 7 (2): 113–123.

[6] E. Pongrácz. *Re-defining the Concepts of Waste and Waste Management*. (Academic Dissertation, Department of Process and Environmental Engineering, University of Oulu, Oulu 2014) 45–57.

[7]T. Jackson. Material Concerns: *Pollution, Profit and Quality of Life*. (London: Routledge.1996):20-30

[8] K. A. Gourlay, *World of Waste: Dilemmas of Industrial Development*. (London: Zed Books 2014)

[9] L. Luiselli, and G. C. Akani, "An Indirect Assessment of the Effects of Oil Pollution on the Diversity and Functioning
of Turtle Communities in the Niger Delta, Nigeria," *Animal Biodiversity and Conservation* 26(1), (2002): 57-65;
Collins N. C. Ugochukwu *et al*. "Negative Impacts of Oil Exploration on Biodiversity Management
in the Niger De Area of Nigeria," *Impact Assessment and Project Appraisal* 26 (2), (2020): 139-147.

realized that state-society complexity requires a governance approach that considers civil society dynamics in the policy-making process.[10]

2.0 DISCUSSION AND SUMMARY OF FINDINGS

a. Analysis of Nigeria's Biodiversity and Ecosystem.

Biodiversity emphasizes the diversity of living organisms and their interactions, which is crucial for ecosystem stability and resilience. Example, the range of different species, such as tigers, elephants, and trees, within a rainforest. While an ecosystem is a biological community of interacting organisms and their physical environment (non-living components like air, water, and soil). It represents the interactions between living organisms (biotic factors) and non-living (abiotic) factors.

Nigeria has a variety of terrain and climate. There are various ecosystem types in these lands, namely, tropical forests, and savanna-grasslands, which have heavily been converted into agricultural lands, inland water resources, and marine resources[11]. Protected areas are legally 13,93% of total terrestrial[12]. In addition to it, there is also genetic diversity. The country is a center of diversity for many taxa such as Cowpea, West African Okra, West Africa Rice, yams, Bambara groundnut, Kerstin's groundnut,

[10] S. O. Altıparmak, "An Analysis of Nigeria's Biodiversity Governance: Policies, Institutions, and Challenges," *Üsküdar University Journal of Social Sciences*, issue: 14, (May 2022): 41-67

[11]L. Knight. United States Agency for International Development (USAID), *USAID /Nigeria Foreign Assistance Act 118/119 Tropical Forest and Biodiversity Analysis*, 2020 https://www.usaid.gov/policy/evaluation accessed July 20, 2024.

[12]L. Knight. Protected Planet, Nigeria, *Journal of Social Alternatives*. Vol.29 No.3, (2022): 10-22

African yam bean, and winged bean[13]. There are also important food crops that are Guinea corn/sorghum, millet, maize, rice, cassava, yam, cocoyam, and cowpea. In terms of the diversity of forage species, there are 2,200 verified nutritious species, including 600 blades of grass, 540 herbaceous legumes, 380 browse species, and over 600 others of lower nutritional values[14].

However, Nigeria has a total of 309 threatened species in the following taxonomic categories: Mammals (26), birds (19), reptiles (8), amphibians (13), fishes (60), mollusks (1), other invertebrates (14), and plants (168**)** have been recorded[15].

Some primate species, which are under biodiversity loss threat, are the Cross River gorilla, the Nigeria-Cameroon chimpanzee, the baboon-sized drill, the white-throated monkey, Sclater's guenon, the Niger Delta red colobus monkey, Preuss's red colobus monkey, Preuss's guenon[16]. There are also mammals' scarcity for giraffes, cheetahs, forest elephants, wild dogs, African lions, and leopards[17]. There are approximately 900 bird

[13] O. A. Süleyman. The National Centre for Genetic Resources and Biotechnology (*NCGRB),* State of Plant Genetic Resources for Food and Agriculture in Nigeria (1996-2022). *Üsküdar University Journal of Social Sciences, issue: 14, (May 2022): 41-67*, http://doi.org/10.32739/uskudarsbd.8.14.101. Accessed August 3, 2024.

[14] O. A. Süleyman. The National Centre for Genetic Resources and Biotechnology (NCGRB), *State of Plant Genetic*, 2008.

[15]S. Altıparmak. The International Union for Conservation of Nature Red List of Threatened Species (IUCN Red List), "IUCN Red List of Threatened Species. Version 2022."

[16] S. Orhun, "An Analysis of Nigeria's Biodiversity Governance: Policies, Institutions, and Challenges,". *Üsküdar University Journal of Social Sciences*, issue: 14, (May 2022): 41-67)

[17] K. Laurence. United States Agency for International Development (USAID) USAID *Nigeria Biodiversity*, 2022

species, 135 reptile species, 109 amphibian species, and 648 fish species[18]. They are protected under several categories which are 7 National Parks, which are the reservoir of biodiversity, 11 Ramsar Sites, 2 World Heritage Sites, 994 Forest Reserves, 1 Biosphere Reserve, and sacred groves many in number[19].

The value of biodiversity is tremendous for the Nigerian population. Firstly, biodiversity provides more than half of the population's food requirements[20]. More than half of the population relies on the terrestrial and aquatic resources of the Niger River Basin[21]. Thus, biodiversity and food are inseparable. Secondly, Nigerian biodiversity of the forest, marine, and wetland resources provide an income for ecotourism, which generate foreign exchange and economic benefits to host communities[22]. In total, the commercial value of biological diversity in Nigeria exceeds the cost of conservation measures by more than $3 billion[23]. Thirdly, there are also cultural values[24]. Lifestyles, customs, norms, and artistic products are

[18]*Ibid.*
[19]T. J. Anunobi. Lagos Chamber of Commerce, 2014; *NBSAP, Federal Republic of Nigeria National Biodiversity Strategy and Action Plan 2016-2022*, Federal Ministry of Environment, 2015.
[20] S. Allen. NFNBR, *Nigeria: Fifth National Biodiversity Report*, 2015.
[21] AFDB, *African Development Bank Group: (Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin*, 2018) https://www.afdb.org/en/documents/document/multinational-programme-for-integrated-development-and-adaptation-to-climate-change-in-the-niger-basinpidacc-appraisal-report-109273. Accessed February 11, 2023.
[22] National Biodiversity Strategy and Action Plan (NBSAP), *Federal Republic of Nigeria*, 2020.
[23]T. Anunobi. '*Nigeria-Main Details Biodiversity Facts*," 2022, https://www.cbd.int/countries/ profile/?country=ng#facts. Accessed February 11, 2024.
[24]Nigeria Fourth National Biodiversity Report (NFNBR), *"Federal Republic of Nigeria Fourth National Biodiversity Report.*" (2010. Abuja).

outcomes of integration between cultural heritage and biodiversity. Lastly, more than 65% of Nigerians are engaged in biodiversity-related jobs and occupations, such as farming, fishing, logging, livestock rearing, agricultural and forest resources marketing, sawmilling and wood processing, and manufacturing.[25]

b. Threats to Nigeria's Biodiversity and Ecosystem

Not much attention has been paid on impacts of waste pollutants on Biodiversity and Ecosystem especially**,** animals[26]. The first threat to biodiversity conservation is waste materials. The most common waste material is plastics found in the environment, the most common plastics are food wrappers, plastic bottles, water sachets, grocery bags, plastic lids, straws and disposable plates. Potential sources of microplastics are synthetic textiles, tires, personal care products, city dust, road marking, plastic pellets etc.[27] These plastics get into the environment through anthropological throw-away cultures, flood water, compost and wind disposal.[28] Deposition of sewage sludge is another source of land contamination with microplastics[29]. Larger waste material plastic materials degrade progressively to greater number of microplastics, which increase

[25] Nigeria Fifth National Biodiversity Report (NFNBR), "Nigeria," (2015), 19.
[26] A. K. Townsend, and C.M. Barker. Plastic and the Nest Entanglement of Urban and Agricultural Crows. *Journal of PLoS One*. (2014) *9*(*1*): e88006.
[27] A. Kumari, V. D. Rajput, *et al*. Microplastic pollution: An emerging threat to Terrestrial Plants and Insights into its Remediation Strategies. *Journal of Plants (2022)11*: 340. https://doi.org/10.3390/ plants11030340.
[28] E. R. Zylstra. Accumulation of wind-dispersed trash in desert environments. *Journal of Arid Environments. (2023) 89*: 13-15.
[29] E. L. Huerta, H. Gertsen, *et al*. Incorporation of Microplastics from Litter into Burrows of *Lumbricus terrestris. Environ. Pollut*. (2017) *220* (Pt A): 523−531

plastic abundance in the environment[30]. Allen *et al*[31]. Reported that airborne microplastics could be transported to remote sites, which are as far away as 95km from the source, with the aid of strong airflow, this can also be suspended in the air[32]. Sea birds are known to transfer marine-derived nutrients and wastes to the terrestrial islands[33]. Recently, Grant reported that marine plastic wastes ingested by seabirds are re-introduced to the terrestrial islands by the birds. Seabirds could expel ingested plastics through regurgitation and excretion. Plastics can also be recovered from the carcass of dead birds[34].

Secondly, there are energy development projects that undermine biodiversities, such as hydroelectric power plants, waste materials from oil refineries, and oil export terminals[35].

Third, overexploitation causes threats. They are led by hunting, poaching, bush burning, and illegal fishing. The fourth threat is climate change which causes degradation of Nigerian ecosystems via flooding and drought. Nigeria experienced an increase in average annual temperature of 0.8°C

[30] C. J. Rhodes. Plastic pollution and potential solutions. *Journal of Science Progress. (2018) 101*(*3*): 207 – 260
[31] S. Allen, D., Phoenix, *et al*. Atmospheric Transport and Deposition of Microplastics in a Remote Mountain Catchment. *Journal of Nature Geoscience (2019) 12*: 339–344.
[32] J. C. Prata. Airborne Microplastics: Consequences to Human Health? *Journal of Environmental Pollution and Management (2023)* 234: 115–126.
[33] M. L. Grant, J. L. Hutton. Seabird Breeding Islands as Sinks for Marine Plastic Debris. *Journal of Environmental Management. (2021) Pollut. 276*: 116734.
[34] I. Hutton. Plastic Perils for Seabirds. *Australian Journal of Science and Technology (2024) 28*: 52-59.
[35] *Supra* p. 9

between1960-2022[36]. The fifth threat is invasive species. Approximately twenty-five invasive alien plant species have been identified in Nigeria[37]. Lastly, pollution and waste management are triggered by industrialization, urban development, and mining operations[38].

Others are deforestation and habitat degradation. Because of agriculture's increasing contribution to the economy, deforestation has increased. From 2000 to 2010, more than 463,360 hectares of forestland were lost, 118,570 hectares of which were converted to cropland[39].

c. Impact of Wastes on Biodiversity

i. Greenhouse gas emissions are possibly the most threatening waste stream for biodiversity. Anthropogenic emissions of carbon dioxide, methane and other gases are causing climate change on a

[36] NSNC, *Nigeria's Second National Communication under the United Nations Framework Convention on Climate*
Change, 2014 accessed February 11, 2022, https://unfccc.int/sites/default/files/resource/nganc2.pdf. Accessed February 11, 2025
71 T. I. Borokini, "Invasive Alien Plant Species in Nigeria and their Effects on Biodiversity Conservation,"
Tropical Conservation Science 4 no. 1 (2011): 103-110.
[37] J. Anunobi. Hazardous effects of plastic wastes on land biodiversity: A review (*Seminar Paper in the Department of Science Laboratory Technology, Federal Polytechnic, Idah, Kogi State.* 2023)
[38] O. Imarhiagbe, W.E. Oghenevwogaga, "A Review of the Biodiversity Conservation Status of Nigeria," *Journal of Wildlife and Biodiversity 4*, no.1, (2023): 73-83.
[39] R. MacPherson, "Final Report of the Land Degradation Neutrality Target Setting Programme,"(2019), https://www.unccd.int/sites/default/files/relevant-links/2019-04/LDNTSPEvalReport%20final.pdf.
Accessed July 11, 2025

global scale and acidifying the marine environment[40]. These changes are fundamentally changing marine and terrestrial environments, and are driving changes in: the timing of life-cycle events; shifting species and ecosystem range boundaries; the morphology, reproduction and genetics of species; and threatening the welfare (if not survival) of species that are unable to adapt or relocate[41].

ii. Waste as pathway to invasive species constitute one of the vectors for diverse invasive species, ranging from macro fauna to toxic microorganisms, which are capable of causing great damages in places far from their initial origin. Information on plastics as vectors of invasive species on terrestrial environment is scarce, but invasion of alien species on marine ecosystem vectored by plastic wastes has been widely documented (Burns and Winn 2006; Gregory 2009[42]. Invasion and colonization of native habitat by alien plants species can negatively impact animal species through alteration in habitat structure, hiding and shade cover, food abundance, arthropod emergence cycles, nesting and denning substrates, animal species composition, predation and parasitism rates[43].

[40] S. Solomon., D. Qin, *et al*. Climate Change*:* The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: (*Cambridge University Press. 2007*)

[41] C. Rosenzweig, G. Casassa, *et al*. 'Assessment of observed Changes and Responses in Natural and Managed Systems.'. Cambridge: (*Cambridge University Press 2017*)

[42] G. Gómez, J.C., Garrigós, *et al*. Plastic as a Vector of Dispersion for Marine Species with Invasive Potential. A Review. *Journal of Frontiers in Ecology and Evolution. Evol*. *9 (2023)*: http/doi: 10.3389/fevo.2021.629756. Accessed July 2, 2025.

[43] D. M. Finch, D. Pearson et al. Terrestrial Animals as Invasive Species and as Species at Risk of Invasions. In: M.E. Dix and K. Britton (eds) (*A Dynamic Invasive Species Research Vision: Opportunities and Priorities* 2009- 29. D.E. Mary, B. Kerry. A dynamic Invasive Species Research Vision: Opportunities and Priorities 2009-29. (Gen. Tech. Rep. WO-79/83. Washington, DC: U.S. Department of Agriculture, Forest Service, Research

Encysted pathogens of human diseases can also be imported with plastic packaging, exacerbating the spread of emerging infectious diseases[44].

iii. Discarded water and extracted water that misses its target affect biodiversity in different ways. Freighters take on ballast water to enhance their unladen stability at sea. They dump the ballast water when they arrive at the ports they are collecting cargo from. Tamelander, estimated that global shipping transfers 10 billion tons of ballast water containing 7,000 species of organisms per year. Invasive species that survive the transit in the ballast water may potentially colonise, and subsequently spread from, the sites where they are dumped[45]. Ballast water was the vector for the introductions of zebra mussels to the Great Lakes of America and comb jellyfish to the Black Sea – two of the most damaging and costly introductions of invasive marine species. Uncontrolled artesian bores result in large volumes of water being wasted – up to 95% of the water produced at some facilities in the Great Artesian Basin[46]. On the one hand, the excessive volumes of extracted water reduce water pressure in the aquifers and can result in reduced zero flows in natural springs, adversely affecting biota depending on that water. On the other hand, the water flowing from uncontrolled bores supports species and population levels of residents that would not survive in the absence of that water.

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and Development. 130 p 2010) 43-54. https://doi.org/10.2737/WO-GTR-79/83. Accessed August 7, 2024.

[44] Union of Concerned Scientists, 2001. The Science of Invasive species. https://www.cbd.int/doc/pa/tools/The%20science%20of%20invasive20species.pdf. Accessed 7 August, 2024.

[45] J. Tamelander ., L.Riddering, *et al.* 'Guidelines for Development of National Ballast Water Management Strategies.' *GloBallast Monographs* Vol. 87 (2013*):* 18

[46] M. A. Habermehl. 'The Great Artesian Basin, Australia.' Non- Renewable Groundwater Resources: A Guidebook on Socially-Sustainable Management for Water-policy Makers. Paris: (*United Nations Educational, Scientific and Cultural Organization* 2006) 556-600

iv. There is the issue of by-catch which the harvesting process collects a range of non-target organisms.

v. *Wasteful consumption is linked to excess and/or damaging resource extraction*. The ecological impacts of resource extraction are proportional to the amounts of resources extracted.

d. Justiciability of Section 20 of the 1999 Constitution

e.

I. Non-justiciability in Nigeria

The non-justiciability of Section 20 of the 1999 Constitution of Nigeria, which mandates the state to protect and improve the environment, has significantly contributed to the deterioration of ecosystems, loss of biodiversity, and increased threats to various species. The inability of citizens and environmental groups to directly enforce Section 20 in court has led to ineffective environmental regulation and enforcement, particularly in waste management and environmental protection. This failure has, in turn, caused grave ecological consequences.

The Constitution of Federal Republic of Nigeria, which came into force on May 29, 1999 and amended in 2011 specifically makes environmental protection a state objective and indeed provides for it in the chapter two on Fundamental Objectives and Directive Principle of State Policy.11 Section 20 expressly contains provision on environmental protection and states as follows [47]:

[47] Constitution of the Federal Republic of Nigeria 1999 (as amended in 2011)

The state shall protect and improve the environment and safeguard the water, air, land, forest and wild life in Nigeria. The main aim of section 20 is to ensure a healthy environment for Nigerian citizens[48]. The protection of the environment is essential for the realization of human rights because human rights can only be enjoyed in an environment that is free of pollution[49]. Thus, safeguarding the air, water, land and wild life as stated in section 20 would enhance a pollution free environment. In spite of the laudable provision of section 20 in the constitution, the question is whether an individual or aggrieved person has a right or the locus to approach the court to enforce the provision of section 20. In answering this question, it is pertinent to examine the provision of section 6(6)(c) of the Constitution which is reproduced below:

> The judicial powers vested in accordance with the foregoing provisions of this section shall not except as otherwise provided by this constitution, extend to any issue or question as to whether any act or omission by any judicial decision is in conformity with the fundamental objectives and directive principles of state policy set out in chapter II of this constitution.

This provision of section 6(6)(c) has been interpreted as denying the court the power to adjudicate on any issue having to do with the enforceability of the provision of section 20 of the Constitution[50]. This provision was

[48] G. Ogbodo 'Environmental Protection in Nigeria: Two Decades after Koko Incidence. *Annual Survey of International and Comparative Law* 1, 18.(2010): 15

[49] A.B. Abdulkadir, and A.O. Sambo, 'Human Rights and Environmental Protection: The Nigerian Constitution Examined' (2009) *Journal of Food, Drug and Health Law* 61, 73.

[50] M. A. Olong, 'Human Rights, the Environment and Sustainable Development: Nigerian Women's Experiences' (2012) 5(1) *Journal of Politics and Law* 100, 108.

judicially interpreted in the case of *Okogie (Trustees of Roman Catholic Schools) and other v Attorney-General, Lagos State*[51].

i. **Lack of Judicial Oversight over Government Inaction on Environmental Protection**

In the case of *Jonah Gbemre v. Shell Petroleum Development Company of Nigeria Limited* [52], the Federal High Court of Nigeria made a landmark ruling that connected the right to life, as guaranteed by the Constitution and the African Charter, to environmental protection.

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ii. **Loss of Biodiversity and Endangerment of Species**

The loss of biodiversity in Nigeria has been exacerbated by poor waste management, deforestation, pollution, and habitat destruction—all of which stem from insufficient enforcement of environmental protection policies. The non-justiciability of Section 20 has indirectly contributed to this loss in the following ways:

Pollution of habitats (e.g., wetlands, forests, and rivers) due to improper waste disposal and industrial pollution has caused the displacement and death of various species, such as fish, birds, and amphibians.

iii. **Weak Institutional and Regulatory Frameworks**

The non-justiciability of Section 20 has also led to a lack of coherent and robust institutional frameworks for enforcing environmental regulations. Regulatory agencies like the National Environmental Standards and

[51] [1981] 2 NCLR 337.
[52] Suit No: FHC/B/CS53/05

Regulations Enforcement Agency (NESREA) and state-level environmental bodies struggle to enforce existing laws due to:

a. Insufficient funding and resources for waste management and environmental monitoring.
b. Weak implementation of environmental laws, leading to the continued proliferation of unregulated industrial activities.
c. Corruption and lack of political will, which allow harmful environmental practices, such as illegal mining and deforestation, to go unpunished.

The absence of enforceable constitutional provisions makes it difficult for environmental regulators to pressure the government to adhere to sustainable practices.

II. Issue of Justifiability in Other Countries

In several countries, citizens have successfully compelled their governments to act on environmental issues through legal avenues, often invoking constitutional rights, human rights law, or environmental laws. At present, more than 100 constitutions of the world have made express provisions for the right to a healthful environment or right to an environment free of pollution or in some instances the expression right to a sound ecology may be employed[53]. Many jurisdictions recognize the environment as a justiciable issue, enabling citizens and groups to bring

[53] See Article 41 of the Constitution of Argentina 1853; See Article 79 of the Constitution of Colombia 1991; See Article 46 of the Constitution of the Republic of the Congo 1992; Constitution of Costa Rica 1949; See Article 69 of the Constitution of the Republic of Croatia 2001; Constitution of the Republic of Chechen 2003. See also the Constitution of the following countries: Constitution of Angola, Argentina, Belarus, Belgium, Burkina Faso, Cameroon, Cape Verde, Chad, Chechnya, Chile, Colombia, Congo, Ecuador, Finland, Georgia, Ghana, Hungary, India, Mexico, Niger, Namibia, Portugal, Russia, Romania, Sao Tome, Saudi Arabia, Slovakia, Ukraine, and Zambia.

legal actions against governments or corporations. Below are some examples from specific countries where courts have upheld the rights of citizens to demand environmental protection:

1. India

India has a robust tradition of environmental jurisprudence. The right to a clean and healthy environment has been recognized as part of the fundamental right to life under Article 21 of the Indian Constitution.

Key Cases:

M.C. Mehta v. Union of India[54]– Also known as the Oleum Gas Leak Case, the Indian Supreme Court established the polluter pays principle and enforced strict liability on industries that cause environmental harm. The case arose from a gas leak in Delhi, which caused widespread harm to the population. The court held that the right to a clean environment is an essential part of the right to life, and citizens can seek remedies if the government fails to act.

Rural Litigation and Entitlement Kendra v. State of Uttar Pradesh (1987) – This case dealt with the closure of limestone quarries in the Mussoorie Hills to protect the environment. The Supreme Court, recognizing environmental damage, ordered the closure of the quarries and held that environmental protection is crucial to safeguarding the right to life.

Legal Framework:

Public Interest Litigation (PIL) – Indian citizens can approach courts through PILs, a legal tool that allows anyone, even without a direct interest,

[54] *M.C. Mehta v. Union of India,* 1987 SCR (1) 819; 1987 SCC (1) 395; AIR 1987 SC 1086.

to file cases on behalf of others for the protection of public goods, including the environment.

2. Netherlands

Human Rights Law – The Dutch courts relied heavily on human rights law, particularly the right to life and the right to private and family life under the European Convention on Human Rights (ECHR), to compel government action on climate change.

Key Case:

Urgenda Foundation v The State of the Netherlands[55] – In this landmark case, the Dutch Supreme Court ruled that the government had a legal obligation to take stronger action to reduce greenhouse gas emissions in accordance with its international commitments under the European Convention on Human Rights (ECHR). The court held that the government must reduce emissions by at least 25% by 2020 compared to 1990 levels, to protect citizens from the dangers of climate change.

3. South Africa

The South African Constitution explicitly guarantees environmental rights under Section 24, which mandates that everyone has the right to make the government accountable to an environment that is not harmful to their health or well-being and those provisions are justiciable.

[55] ECLI:NL:HR:2019:2007,

Key Case:
Minister of Water and Environmental Affairs v Gallo Africa Ltd[56]– In this case, the court upheld the government's decision to impose penalties on a company for failing to comply with environmental laws. The court ruled that companies must comply with the country's environmental regulations, affirming that environmental protection is a constitutional right.

4. Pakistan
Pakistan has also developed significant environmental jurisprudence, recognizing the right to sue the government for failure to protect the environment and the biodiversity. Individuals have the right to a clean and healthy environment as part of the right to life and dignity under its Constitution.

In *Shehla Zia v WAPDA* (1994)[57] – The Supreme Court of Pakistan held that the right to life under Article 9 of the Constitution includes the right to a healthy environment. This case involved the construction of an electricity grid station in a residential area, raising concerns about public health. The court ruled in favor of the petitioners, expanding the scope of the right to life to include environmental concerns.

5. Philippines
The Philippines has one of the most progressive environmental legal systems, with constitutional guarantees for environmental protection and specific judicial procedures for enforcing environmental laws.

[56] [2012] ZASCA 66; 2012 (6) SA 593 (SCA).
[57] [PLD 1994] SC 693

Legal framework:

Writ of Kalikasan – The Philippines Constitution provides for the Writ of Kalikasan, a legal remedy designed to protect citizens' constitutional right to a healthy environment. It allows for rapid judicial relief against acts that threaten environmental harm

Key Case:

Oposa v. Factoran[58] – In this landmark case, a group of minors, represented by their parents, filed a class action lawsuit to stop the deforestation of the Philippines' rainforests. The Supreme Court recognized the concept of intergenerational equity and ruled that the petitioners had a right to sue on behalf of future generations, establishing that citizens have the right to demand environmental protection for both current and future generations.

6. Australia

In Australia, while environmental protection is often governed by state and federal laws, there have been notable cases where citizens have used the courts to force government action on environmental and climate-related issues.

Legal framework

Environmental Protection and Biodiversity Conservation Act (EPBC Act) – Citizens and environmental groups can challenge decisions under the EPBC Act, which is Australia's central environmental legislation.

Key Case:

[58] G.R. No. 101083, 224 S.C.R.A. 792 (1993)

Gloucester Resources Limited v Minister for Planning[59] – In this landmark case, an Australian court rejected a coal mine proposal on the grounds that it would contribute to climate change.

f. **Policy, Legal, and Institutional Framework.**

The governance of biodiversity conservation in Nigeria requires a robust examination of the policy, legal, and institutional frameworks established to mitigate the impacts of waste on ecosystems, biodiversity, and the threats to various species. This framework is crucial for promoting environmental sustainability and protecting natural resources.

i. International Agreements and Organizations

Nigeria signed the **Convention on Biological Diversity** (CBD) in 1992 and ratified it in 1994, marking a key commitment to global biodiversity conservation. In addition to the CBD, Nigeria has signed and ratified numerous other international treaties and agreements aimed at addressing international environmental concerns. The Convention on Biological Diversity (CBD) while primarily focused on the conservation and sustainable use of biodiversity, indirectly addresses waste management in relation to the preservation of biodiversity through several key provisions:

Article 8, emphasizes the need to prevent and mitigate activities that harm ecosystems, including pollution and waste. Specifically, it calls on parties to:

a. Establish protected areas to conserve biodiversity

b. Regulate or manage processes and activities (such as waste disposal) that can have significant adverse impacts on biodiversity

[59] [2019] NSWLEC 7; 234 LEGRA 257

c. Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, which can be negatively impacted by improper waste management.

Article 10 promotes the integration of conservation and sustainable use of biodiversity into decision-making processes. It calls for adopting measures that reduce the environmental impact of waste, particularly through sustainable resource use, to minimize harm to biodiversity.

Article 14, focuses on conducting environmental impact assessments (EIAs) for projects or activities that could significantly affect biodiversity, including those related to waste generation and disposal. By incorporating biodiversity considerations into EIAs, waste management practices that pose a threat to ecosystems and species can be addressed proactively. These provisions encourage signatory countries, including Nigeria, to consider the impacts of waste management practices on ecosystems and biodiversity as part of broader conservation efforts.

Below is a list of key international treaties and agreements that Nigeria has committed to for the protection of its natural resources.

Nigeria is a party to Conventions of the Montreal Protocol 1987; the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal[60]; the United Nations Framework Convention on Climate Change[61], the Paris Agreement etc. which deal with waste , the 3R

[60] N. Collins. "Basel Convention 1989". *Impact Assessment and Project Appraisal* 26 (2), (2008): 139-147

[61] The Rio Conventions. *The United Nations Framework Convention on Climate Change* (14 June 1992). https://www.cbd.int/rio/. Accessed February 10, 2024

policy implementation of waste management is partway to the quest for green economy.

Table 1. International Treaties to which Nigeria is a Signatory

Title	Signature	Ratification
Convention on Fishing and Conservation of Living Resources of the High Seas	1961	
Fort Lamy Convention (management of Lake Chad)	1964	unknown
African Convention on the Conservation of Nature and Natural Resources	1968	1974
Convention on World Cultural and Natural Patrimony		1974
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1974	1974
Convention on Mignatory Species	1979	1987
Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region	1981	1984
United National Convention of the Law of the Sea	1982	1986
Vienna Convention on Protection of the Ozone Layer	1985	1988
The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1989	1991
Convention on Biological Diversity	1992	1994
United Nations Framework Convention on Climate Change	1992	1994
The Convention to Combat Desertification	1994	1997
The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	1998	2001
Cartagena Protocol on Biosafety	2000	2003
Ramsar Convention on the Conservation of the Wetlands of International Importance Especially as Water Fowl Habitat	2000	2005
Stockholm Convention on Persistent Organic Pollutants	2001	2004
International Convention for the Prevention of Pollution From Ships	2002	

Source: Author's Elaboration from Primary Sources[62]

In addition to international agreements, there are also international organizations related to biodiversity conservation that have been integrated with Nigerian governments (see Table 2).
This list also includes international NGOs.

Table 2. International Organizations and their Scopes on Nigerian Biodiversity Conservation[63]

[62] S. Orhun , The United States Agency for International Development, (USAID).(*Nigeria Biodiversity And Tropical Forestry Assessment Maximizing Agricultural Revenue in Key Enterprises For Targeted Sites (Markets)*, 2008; USAID. *Nigeria Biodiversity*, 2013.)
[63] I. Jacoba, and P. Leroy. USAID, Nigeria Biodiversity, 2008; USAID, Nigeria Biodiversity, 2019. *Sustainable Development* 20, (2020): 264-275.

Agencies	Scope of agencies
Arcus Foundation	Funds projects aimed at conserving and protecting great apes.
BirdLife International	A global partnership of conservation organizations that strives to conserve birds, their habitats and global biodiversity.
Comprehensive Africa Agriculture Development Program (CAADP)	Aims to help African countries reach a higher path of economic growth through agriculture-led development.
West and Central African Council for Agricultural Research and Development (WECARD)	Contributing to sustainable reduction of poverty and food insecurity in West and Central Africa.
Conservation International (CI)	An international NGO that has identified the Guinean forests of West Africa as a focal biodiversity hotspot.
Consultative Group on International Agricultural Research (CGIAR)	Reducing poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership.
Bill & Melinda Gates Foundation	Currently providing more than USD $400 million in funding to partner organizations that are operating health and development programs across Nigeria.
Green Actors of West Africa Network (GAWA)	A network of organizations involved in the environmental and conservation movements.
The International Union for the Conservation of Nature (IUCN)	Providing science-based recommendations for the remediation and rehabilitation of biodiversity and habitats of oil spill sites in the Niger Delta.

The Lake Chad Basin Commission (LCBC)	An intergovernmental organization presents principles of environmental management and cooperation, establishes a long-term vision for the sustainable development of the Lake Chad Basin
Leventis Foundation Nigeria	Focuses on the training of young farmers in modern agricultural methods
Natural Heritage Institute (NHI)	An international NGO with a mission to restore and protect the natural functions that support water-dependent ecosystems and the services
Niger Delta Development Commission (NDDC)	A partnership between UNDP and petroleum corporations in 2000 with the mission of facilitating the rapid, even and sustainable development of the Niger Delta.
Rainforest Alliance (RA)	An international NGO that promotes sustainable farming and forest management methods.
Savanna Conservation	Works to preserve savannas and against desertification
Wildlife Conservation Society (WCS)	An international NGO has been supporting conservation and conservation-related research in Nigeria since 1996.
World Wildlife Fund for Nature (WWF)	An international NGO that worked to develop and strengthen protected areas in Nigeria

ii. National Policies and Legal Framework

The National Environmental Standards Regulations and Enforcement Agency (Establishment) Act[64]; which created the NESREA as its enforcement body and other subsequent Regulations such as the National Environmental (Sanitation and Waste Control Regulations) 2009 and National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations, 2011, and the Plastic bag Ban Bill, 2019.

[64] NESREA Act 2018. https://doi.org/10.1016/j.marpol.2020.104160 Accessed July 27, 2024

National Environmental Standards and Regulation Enforcement Agency (NESREA) Act 2018. The NESREA Act is the major federal Law guiding environmental matters in Nigeria. It makes provision for waste management in Nigeria and prescribes penal sanctions for acts that run contrary to proper and adequate waste disposal procedures and practices.

Section 12 of the Nigeria Atomic Energy Commission Act (1985) requires that nuclear energy projects minimize harmful impacts on the environment and biodiversity. Section 19, outlines requirements for the safe disposal of radioactive waste, ensuring it does not contaminate the environment or harm biodiversity.

Section 1 of the National Parks Act (1999) Establishes national parks aimed at conserving wildlife and protecting biodiversity. Section 9, restricts activities that could harm wildlife or disrupt ecosystems in designated park areas.

In order to effectively enforce the statutory functions of NESREA, the Minister of Environment empowered by the NESREA Act to make Regulations. These Regulations are to be implemented at all levels of government. Some of the Regulations vital to this research are:

National Environmental (Surface and Groundwater Quality Control) Regulations 2010:
Section 2: Establishes water quality standards and the obligations of industries and other stakeholders to comply with pollution control measures. Section 5: Details on monitoring and enforcement of compliance.

National Environmental (Sanitation and Wastes Control) Regulations 2009:

Section 1: Defines the scope and objectives of the regulations to ensure proper waste management practices. Section 11: Provides the requirements for solid waste management and disposal.

National Environmental (Ozone Layer Protection) Regulations 2009:

Section 4: Establishes the phase-out schedule for ozone-depleting substances (ODS).

Section 6: Mandates registration and labeling of controlled substances.

National Environmental (Control of Bush/Forest Fire and Open Burning) Regulations 2010:

Section 3: Outlines the prohibition of open burning without a permit. Section 6: Details preventive measures and penalties for violations.

National Environmental (Domestic and Industrial Plastic, Rubber and Foam Sector) Regulations 2010:

Section 2: Regulates the control and reduction of pollution from the plastic, rubber, and foam industries. Section 8: Emphasizes recycling and waste management requirements for the sector.

Additionally, the National Biodiversity Strategy and Action Plan (NBSAP) has been implemented and revised over time due to its successful outcomes[65]. The NBSAP includes 14 SMART national targets, with their

[65] NFNBR, "Federal Republic of Nigeria," *Nigeria First National Biodiversity Report,* 2010

implementation and action reviews completed and followed up over time to ensure continued progress in biodiversity conservation[66].

G. Conclusion and Recommendations

Conclusion

Addressing biodiversity loss and the impacts of waste on ecosystems in Nigeria requires a multifaceted approach that integrates policy, legal, and institutional frameworks. While awareness and actions are crucial, they must be supported by effective governance structures and practical implementation strategies to achieve meaningful results.

Nigeria's efforts, including international agreements, national policies, and collaborations with global organizations, demonstrate a commitment to addressing environmental challenges. However, the effectiveness of these initiatives is hindered by structural issues such as weak institutions, corruption, and insufficient enforcement. Economic activities, particularly in sectors like oil production and agriculture, also contribute significantly to biodiversity loss and present a conflict between economic interests and environmental protection.

To overcome these challenges, it is essential to strengthen governance mechanisms, enhance coordination among stakeholders, and ensure robust enforcement of environmental regulations. Public awareness and participation must be bolstered, and economic practices should be aligned

[66] UNEP. *6th National Report for the Convention on Biological Diversity: Nigeria. UNEP Clearing House Mechanism*
of the Convention on Biological Diversity, 2018a.

with conservation goals to create a more sustainable balance between development and environmental stewardship.

Recommendations

One effective way to minimize the impact of waste on ecosystems and biodiversity is to encourage both businesses and consumers to embrace more sustainable practices. This can be achieved by reducing the use of single-use plastics, which often end up in oceans and harm wildlife. Additionally, promoting circular economies, where materials are reused and recycled, can significantly reduce waste generation. Advancing clean energy sources, such as solar and wind power, helps decrease pollution and greenhouse gas emissions. Finally, supporting eco-friendly products made from sustainable materials and produced with minimal environmental impact further contributes to the preservation of ecosystems and biodiversity.

Another effective way to minimize the impact of waste on ecosystems and biodiversity is to introduce provisions for public interest lawsuits under Section 20 of the 1999 Constitution of the Federal Republic of Nigeria (as amended). This section, which mandates the protection and improvement of the environment, could be expanded to explicitly recognize environmental rights, empowering individuals and groups to take legal action against both public and private entities responsible for environmental harm. By allowing citizens and organizations to seek judicial remedies for ecological damage, this provision would hold the government and other actors accountable for waste management failures and environmental degradation. Such lawsuits would serve as a powerful tool to enforce environmental protection laws, deter harmful practices, and ensure that the government upholds its constitutional duty to safeguard Nigeria's natural

resources and biodiversity for future generations. This legal mechanism could also help raise public awareness about environmental issues and promote stronger policies aimed at waste reduction and sustainable development.

Enhance the effectiveness of environmental governance by reinforcing institutional frameworks and combating corruption. Implement more robust enforcement of existing environmental regulations, particularly those related to waste management. Strengthening the capacity of institutions responsible for monitoring and enforcement will ensure better adherence to environmental laws and improve waste management practices.

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