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The Role of Law in Ensuring Equitable and Sustainable Use of Water in Africa

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Abstract. The article examines the role of law in regulating water quality as a mechanism for achieving sustainable development in Africa. Water remains a vital yet increasingly scarce resource, strengthening public health, food security, energy production, and socio-economic development. However, inequitable distribution, pollution, governance inefficiencies, and the escalating impacts of climate change have intensified water insecurity across the continent. Using a doctrinal research approach, the study highlights the importance of sustainable water use for human needs while safeguarding ecosystems for present and future generations. The paper argues that effective legislation and governance are key to ensuring water quality suitable for different purposes. The article concludes by highlighting how legal frameworks can strengthen water governance, improve resource allocation, and guide policy reforms. It therefore recommends planning, development, implementation, and administration of water quality management policies and effective legal instruments for adequate protection of surface water for sustainable development through legislation guided by empirical facts.

Keywords: Water quality, Legislation, Africa, Climate Change, Public health, Sustainable development.

1. Introduction

Water is a precious natural resource that is indispensable to life, development, and the environment. This universal resource is often taken for granted and abused, particularly in third-world nations such as Africa, where information is neither readily accessible nor disseminated to society. Water can be a source of survival or destruction, depending on its availability, quality, and management. When present in excess, it causes floods and devastation; when scarce, it results in drought, famine, and disease. Water quality is a term used to describe the chemical, physical, and biological characteristics of water, usually with respect to its sustainability for its intended purpose.

The role of the legal system in ensuring water quality for sustainable development is founded on effective legislation. The principle of sustainable development has been applied in international environmental law to champion a shift in resource management, more importantly, in developing a framework for Sustainable Development Goal 6 (SDG 6) on water and sanitation.[1] Sustainable development refers to a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[2] In 2015, SDG 6 on water and sanitation was adopted as part of the 2030 Agenda for Sustainable Development.[3] The importance of Goal 6 is to ensure the availability and sustainable management of water, achieve universal access to safe drinking water, and improve water quality by reducing pollution-related activities caused by industrial and non-industrial waste. Sustainable use of water for the benefit of future generations is highlighted in this paper.

[1] World Commission on Environment and Development (WCED), Our Common Future (Oxford University Press, 1987) 43.
[2] *Ibid*.
[3] United Nations General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1 (25 September 2015).

Our environment is already watered down by both natural and anthropogenic activities, especially in developing countries, due to the quest for development. The problem of unsustainable use of water, water conservation, abusive use of water resources, methods of management of water quality, regulatory framework for water quality management, challenges militating against water quality management in Africa and sustainable development of natural resource in the environment with a view to proposing legal and institutional framework, for advancing water quality for sustainable development will be discussed in this paper.

The article critically examines the following laws and policies governing sustainable water management across Africa: African Union (AU) Agenda 2063 on Water Sustainability and Governance, West Africa Water Resources Policy (WAWRP) 2008, SADC Protocol on Shared Watercourses, SADC Protocol on Fisheries 2001, the National Environmental Standard and Regulations Agency (Establishment) Act 2007, National Environmental (Surface and Ground Water Quality Control) Regulations 2011, National Environmental (Soil Erosion and Flood Control) Regulation 2011, and the National Environmental (Textile, Wearing apparel, Leather and Footwear Industry, Regulations 2009 and thereafter, recommend appropriate pragmatic and preventive policies and measures towards utilization of sustainable water management in African.

The place of regulation and legal oversight of water quality is a critical global concern. Although over two-thirds of the Earth's surface is covered by water, only 3% is freshwater for human consumption, agriculture, and industry. Human activities, increasing population, development, and the wastage of water are placing enormous pressure on the limited freshwater resources, thereby reducing both their availability and quality. In Africa, where water scarcity is pronounced, inefficient use and wastage exacerbate water stress, with pollution further threatening environmental sustainability, public health, and economic development.[4] For instance, Sub-Saharan Africa suffers greater levels of water stress than many other regions in the world.[5] Effective water resource management, supported by regulatory frameworks, legal redress, and judicial oversight, is essential to curb wastage, ensure equitable access, protect freshwater ecosystems, and promote sustainable development across Africa.

Apart from the introduction, this paper is structured into five substantive parts. The first part presents the conceptual framework establishing the foundations for understanding the regulation of water quality within the meaning of sustainable development. The second part examines the key sources of water quality degradation across Africa, particularly Nigeria, identifying the human-induced factors that contribute to the continent's growing water insecurity. Part three turns to the African regional framework, reviewing the policies, instruments, and institutions that shape water quality management at the continental level. This is followed by a detailed analysis of Nigeria's domestic legal framework which highlights national laws, policies, and regulatory mechanisms governing water quality management. Part five addresses the challenges militating against effective water quality management for sustainable development, while the sixth part advances recommendations designed to strengthen governance, legislation, and implementation strategies. The final part concludes the paper by synthesizing the key findings and reflecting on the critical role of law in promoting sustainable water quality management as a cornerstone of Africa's sustainable development.

2. Conceptual Framework

Water is a universal resource that is often taken for granted and mismanaged, particularly in developing regions such as Africa. This is true, owing to the fact that information on the use, availability and quality of water is neither readily accessible nor effectively disseminated to the public.[6] To confirm this, the United Nations Conference on Environment and Development (UNCED)[7] states thus: "in sustainable development… the need for information arises at all

[4] Tatlock W. Christopher, "Water Stress in Sub-Saharan Africa" *Council on Foreign Relations*, (2006), https://www.cfr.org/backgrounder/water-stress-sub-saharan-africa#:~:text=Where%20are%20water%20problems%20most,also%20suffer%20from%20water%20stress. Accessed 13 November 2025.

[5] *Ibid.*

[6] UNESCO, "UN World Water Development Report 2020 : Water and Climate Change" (2020), https://www.unesco.org/en/wwap/wwdr/2020. Accessed 14 November 2025.

[7] Kelly O'Neill, United Nations Research Institute for Social Development (UNRISD Discussion Paper No. 111), "Internetworking for Social Change: Keeping the Spotlight on Corporate Responsibility, (September 1999),

levels, from … senior decision-makers… to the grass-roots and individual levels…. Examples of the information that needs to be shared broadly include … fresh water."[8] Again, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) through its IHP/VIII "Water Security" report states as follows:

Water quality degradation is becoming one of the greatest threats to freshwater sustainability in addition to its negative health and environmental impacts. … A prerequisite for integrated land and water resources management … requires … appropriate data management systems to store and manage historical and real-time data, set up protocols that facilitate data and information access and sharing among different stakeholders … data access and dissemination are very challenging and difficult tasks.[9]

Although water may seem abundant, clean and safe freshwater is increasingly scarce, particularly in developing regions such as Africa.[10] The quality of water is critical for human health, ecosystem integrity, and socio-economic development. Water quality refers to the chemical, physical, and biological characteristics of water and its suitability for a designated use.[11]These characteristics are influenced by substances dissolved or suspended in the water, and scientific measurement is essential to determine whether the water meets required standards. The quality of water needed for domestic washing, irrigation, or industrial purposes differs substantially from that required for drinking or recreational use.

Water quality is assessed against standards that measure compliance with human and ecological needs.[12] Globally, these standards ensure the protection of ecosystems, human safety, and suitability for consumption. The WHO's Guidelines for Drinking-Water Quality (GDWQ) formed an authoritative basis for setting national regulations and standards for water safety in support of public health.[13] In Nigeria, water quality is regulated under the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act 2007, which provides ambient water quality standards.[14] These standards specify water quality criteria, expressed as constituent concentration levels or narrative statements, that ensure the water body is suitable for its intended use.[15] Water quality criteria are elements of the water quality standard expressed as constituent concentration levels or a quality of water that supports a particular use.[16] Water can be classified as "soft" or "hard" depending on the levels of magnesium or calcium salts present, highlighting the variability of natural water resources.[17]

The management of water quality relies on regulatory rules, policies, and laws that guide monitoring, supervision, maintenance, and enforcement. Setting these standards involves political, technical, and scientific decisions on the intended use of the water

https://www.files.ethz.ch/isn/29000/dp111.pdf?utm_source=chatgpt.com accessed 13 November 2025. Check…..Agenda 21: *Earth's Resources – Freshwater* (Chapter 40) (1992).

[8] *Ibid*.

[9]UNESCO-IHP-VII-Water-Security: Responses to Regional and Global Challenges (2014-2021), < https://www.coresta.org/sites/default/files/technical_documents/main/UNESCO-IHP-VIII-Water-Security.pdf?utm_source=chatgpt.com> accessed 13 November 2025.

[10] D.O. Omole and E.O Longe,. "An Assessment of the Impact of Abattoir Effluents on River Illo, Ota, Nigeria" (Journal of Environmental Science and Technology, 1(2008), 54 – 56.

[11] S. A. Bandh and Basharat Mushtag, "Concepts of Water Quality" in *Wastewater Treatment Technology, Springer Water,* https://doi.org/10.1007/978-3-031-86684-5_1, accessed 30 November 2025.

[12] D.L Johnson and Others. "Meanings of Environmental Terms" *Journal of Environmental Quality (USA) Lonsbon* (1997), https://www.futo.edu.ng/school/c/health/public accessed 29 May 2025.

[13] World Health Organisation, "Guidelines for Drinking-water Quality: Fourth Edition Incorporating the First and Second Addenda" (21 March 2022), https://www.who.int/publications/i/item/9789240045064?utm_source=chatgpt.com accessed 14 November 2025. See also the United Nations Environmental Programme (UNEP) "Water Quality" https://www.unep.org/topics/fresh-water/water-quality?utm_source=chatgpt.com accessed 14 November 2025 on water quality policies for sustainable management, and support to assess and improve water quality.

[14] National Environmental (Surface and Groundwater Quality Control) Regulations, 2011, No. 49 Vol 98.

[15] Regulation 35 of the National Environmental (Surface and Ground Water Quality) Regulations 2011.

[16] *Ibid*.

[17] M.A. Rosalind, *Guidebook to Environmental Law* (London; Sweet & Maxwell, 1994) 169.

body. Different uses demand different standards: for instance, standards for industrial effluent discharge differ from those for drinking water. That is why policy-makers and environmental lawyers play a critical role in defining and enforcing legislation to ensure water is maintained at appropriate quality levels for its identified use.

The vast majority of surface water on the planet is neither immediately potable nor acutely toxic. Consequently, water quality is designated use-specific, developed by scientists to assess the impact of pollutants on water, sediment, and biota. These criteria establish maximum allowable concentrations of substances in a given medium to prevent harm when water is used continuously for a particular purpose. The effective implementation of these criteria, supported by legal frameworks and governance mechanisms, will provide a solid foundation for sustainable water management that safeguards public health and drives socio-economic development across Africa.

3. Key Sources of Water Quality Degradation

Anthropogenic activities contribute to the deterioration of water quality.[18] Water resources are broadly classified into surface and groundwater, each presenting distinct vulnerability pathways. Surface water, usually found in lakes, rivers, streams, and reservoirs, is typically characterized by low mineral content (soft water). Surface water is susceptible to diverse contaminations due to its exposure to the open environment, including agricultural runoff, industrial waste, sewage, and animal waste. The increasing scale of urbanization, industrialization, and agricultural expansion has intensified the pollutant load entering surface water bodies.

Contamination of surface water often arises from improper handling and disposal of toxic waste, indiscriminate discharge of untreated sewage, unregulated dredging, and the excessive application of fertilizers and pesticides. Industrial operations including breweries, soap and detergent plants; pharmaceutical, textile, and paper mills; palm-oil processing; and particularly petroleum industries emit effluents containing heavy metals, hydrocarbons, organic load, and hazardous chemicals.[19] Other sources include abattoirs, livestock farms, residential estates, hotels, commercial complexes, waste-management facilities, and hospitals. Effluents, generated during industrial processing or service operations, degrade water quality when released untreated into nearby rivers and streams.[20]

Groundwater contamination poses a different but equally serious challenge.[21] Groundwater is stored in aquifers and accessed through wells and boreholes. It is naturally filtered as it percolates through soil layers, which sometimes remove many pathogens and particulates, generally making it suitable for drinking.[22] However, this filtration process does not eliminate dissolved ions or industrial contaminants. As a result, activities such as indiscriminate siting of boreholes near pit latrines, mining operations, refuse burning, and poorly managed waste disposal increase the risk of groundwater pollution. Because groundwater is recharged through infiltrating rainwater and surface runoff, any chemical or material stored, spilled, or disposed of on land has the potential to leach into the subsurface and contaminate the aquifers.[23]
The most recognized sources of toxic contamination of groundwater are considered below:

3.1 Industrial Effluents and Water Quality

Abattoirs supply meat to a large population in Nigeria, yet most facilities lack adequate wastewater treatment

[18] Gavrilas Simona and others, "The Impact of Anthropogenic Activities on the Catchment's Water Quality Parameters," *Water,* Vol. 17, (12) (2025). There are also naturally occurring pollutants such as volcanoes and earthquakes.
[19] Mehta Harsha, "Understanding Surface Water Contamination: Causes and Solutions" https://biocascades.com/articles/understanding-surface-water-contamination/ accessed 14 November 2025.
[20] K. Iyeoma et al, "Industrial Effluents and their Impact on Water Quality of Receiving Rivers in Nigeria" http://www.trisanita.org/jades accessed 2 January, 2024.
[21] S. Yang, *Strategies for Controlling Industrial Wastewater Pollution in Beijing in the Urban Environment*
(U.S.A Library Congress, 1995) 166.
[22] Foster, S. and Chilton, P. (2003), "Groundwater: the Processes and Global Significance of Aquifer Degradation," *Philosophical Transactions of the Royal Society B,* (5 November 2003), https://doi.org/10.1098/rstb.2003.1380 accessed 14 November 2025. Vol. 358, Issue 1440.
[23] *Ibid.*

systems. Unlike developed countries, where abattoir systems are mandatory, many abattoirs in Nigeria discharge untreated blood, fats, faecal matter, and animal tissue into nearby rivers and drains.[24] These effluents introduce microbial pathogens, organic pollutants, nutrients, and suspended solids into water bodies, heightening the risk of water-borne diseases. Contaminants can accumulate in streambed sediments, and when the sediments are disturbed, bacteria and pollutants can be resuspended, worsening environmental pollution and posing serious public-health hazards.[25]

3.2 Sewage and Water Quality

Sewage effluent exerts a substantial biochemical oxygen demand (BOD) on receiving waters. As the organic matter decomposes, it consumes dissolved oxygen needed by aquatic organisms, leading to oxygen depletion and the death of fish and other biota. The presence of sewage sludge, which may contain toxic or pathogenic residues, further exacerbates the degradation of water quality also posing risks to public health.[26]

3.3 Agriculture and Water Quality

Agricultural activities are a major non-point source of water pollution in Nigeria. Fertilizers, pesticides, herbicides, and livestock manure applied to farmlands are washed into rivers, lakes, and reservoirs through runoff or leached into groundwater. Excess nutrients, particularly nitrogen and phosphorus, promote eutrophication, leading to algal blooms and oxygen depletion. [27] Soil sediments, salts, and pathogens from livestock operations further degrade water quality, affecting aquatic ecosystems and reducing the suitability of water for domestic, industrial, and recreational uses. Irrigation returns, flows and effluent from large livestock units worsen these effects.

Abusive Use of Water Resources

Water resources in Nigeria are increasingly threatened by unsustainable practices that undermine water quality, availability, and long-term ecological health. These challenges are worsened by limited public awareness, poor environmental literacy, and weak institutional regulation.[28]

3.5 Indiscriminate Drilling of Boreholes

Residents in Nigeria have resorted to private borehole development in response to the failure of the government to provide reliable portable or pipe-borne water.[29] As a result of this, borehole proliferation has increased without any form of hydrogeological assessment, regulatory supervision, or environmental impact assessment. This is why mostly in the urban areas, almost every house has a borehole facility attached to it. This undoubtedly led to sinking boreholes near pit latrines, septic tanks and waste dumpsites; use of inappropriate drilling depths, facilitating contamination of shallow aquifers; and violation of regulations. Studies in Africa, particularly Nigeria, have shown that the proximity of boreholes to sanitation facilities (pit latrines, septic tanks, or waste dumps) significantly increases contamination with faecal coliforms, nitrates, and pathogens, undermining drinking water safety.[30]

3.6 Improper Waste Management

Indiscriminate disposal of solid waste, industrial residues, wastewater, and e-waste contaminates nearby water. This is because waste management systems are weak. Such wastes stream deep into both surface and groundwater sources, introducing heavy

[24] C. Obgonnaya, Analysis of groundwater pollution from abattoir waste in Minna, Nigeria Research Journal of Dairy Science Vol. 2 (4), (2008) 74 – 77.

[25] W. D. Nafarnda and others, "Impact of Abattoir Waste on Aquatic Life: A Case Study of Yola Abattoir" *Global Journal of Pure and Applied Sciences,* vol. 12, (2006) 31 – 33.

[26] Zeng Jie and others, "Influence of Sewage Effluent Discharge on Putative Pathogen Community in Drinking Water Sources: Insights from Full-Length 16S rRNA Gene Amplicon Sequencing" *Journal of Water Health,* 23 (1), (2025) 43-57.

[27] Soon-Jin Hwang, "Eutrophication and the Ecological Health Risk" *International Journal of Environmental Research and Public Health* (IJERPH), (17) (17), (2020) 6332.

[28] Akpabio, E. M, "Water Supply and Sanitation Services in Nigeria: Gaps in Information and Institutional Weaknesses" *Habitat International* (2012).

[29] Nwachukwu, G. A., and Onyenechere, E. C., (2023). "Quality Assessment of Borehole Water in Nigeria" *Journal of Agriculture and Food Sciences.* https://www.ajol.info/index_php/jafs/article/download/262433/247752 accessed 24 November 2025.

[30] Adegbola, A.A., and Brieger, W.R., "Water, Sanitation and Hygiene Practices among Nigerian Households: Implications for Borehole Siting and Groundwater Safety." *Journal of Water, Sanitation and Hygiene for Development,* 10 (4), (2020) 654-662.

metals, endocrine disruptors, pathogens, and persistent organic pollutants into the food web.[31] Most companies lack the equipment for waste treatment before disposal, and dumpsites require appropriate approval for a particular type of waste. Examples of such wastes are wastewater, solid waste, and electronic waste. The disposal of these wastes constitutes groundwater pollution. The implication of this is the attendant hazard it poses to human health, and where such waste is dumped on water, it could constitute a threat to the existence of aquatic life, causing eutrophication, fish mortality, and habitat degradation. Research has shown groundwater contamination from dumpsites in cities such as Lagos, Abuja, Port Harcourt, and Ibadan, where lead, cadmium, chromium, and microbial contaminants were detected at levels exceeding WHO limits. [32] In Onne, Port Harcourt, Nigeria for instance, industrial effluent containing a high level of ammonia from NAFCON, a fertilizer company, was discharged into the Okrika River. This resulted in massive fish killing and socio-economic problems for the fishing industries in the surrounding villages.[33]

3.7 Oil Spills in the Oil Industry

Oil spills are one of the major sources of water pollution in Nigeria, particularly in the Niger Delta where decades of extraction, pipeline ruptures or vandalization, artisanal refining, and operational failures have caused extensive environmental devastation.[34] The consequences of oil pollution in our waters include contamination of rivers, streams, wetlands and groundwater; destruction of mangroves and aquatic biodiversity; loss of agricultural productivity; and loss of livelihoods are devastating. The late Prof. Ambrose Alli captured this devastation poignantly: "Vast tracts of agricultural land have been laid waste…surface waters and river courses are invariably contaminated…the aquatic life is destroyed…inhabitants become impoverished and deprived." According to late Professor Ambrose Alli: As a result of oil losses, vast tracts of agricultural land have been wasted, thus becoming unproductive, surface water courses are invariably contaminated and polluted rendering the water undrinkable and the aquatic life is destroyed, the result is great hardship to the inhabitants who become impoverished and deprived. These citizens are therefore compelled to migrate to other towns and villages in search of decent life. [35]

This equally aligns with international findings that oil-polluted water is unsafe for consumption, fishing, irrigation, or domestic use.[36]

The world population has tripled in the last century, and water demand has increased six-fold. [37] Today, over a billion people lack access to safe drinking water, and about 2.4 billion lack improved sanitation.[38] Also, half of all illnesses in developing countries are linked to unsafe water and inadequate sanitation.[39] As water is essential to life, any contamination, whether through drinking, food preparation, or household use,

[31] Ogwueleka, T.C., "Municipal Solid Waste Characteristics and Management in Nigeria" *Journal of Environmental Health Science & Engineering,* 6 (3), (2009) 173-180. https://ijehse.tums.ac.ir/index.php/jehse/article/view/209, accessed 24 November 2025.

[32] Igwe, K. O., and others, "Impact of Discharge Fertilizer Effluents on the Toxicological Profile of Fish Harvested from a Receiving Creek in Okirika, Rivers State," *Waste Technology (WasTech),* 4 (2) (2016) 15-17.

[33] *Ibid.*

[34] United Nations Environment Programme (UNEP), "Environmental Assessment of Ogoniland: Site Factsheets, Executive Summary and Full Report," (2011). https://www.unep.org/resources/assessment/environmental-assessment-ogoniland-site-factsheets-executive-summary-and-full accessed 25 November 2025.

[35] A.F. Alli, *The Petroleum Industry and the Nigerian Environment Proceedings* (1981), at 20, cited in A.M Akatugba, *Legal Framework for Environmental and Sustainable Agricultural Production*, 2 DLR (2006), AT 390 (The Ceremonial Opening Address). See also Amnesty International Report, *The News*, 19 October, 2009.

[36] UNEP, 2011 (note 34.

[37] United Nations Department of Economic and Social Affairs (UNDESA), "Safe Drinking Water, Sanitation, are 'Basic Human Rights': New UN Water Development Report" (19 March 2019), https://www.un.org/development/desa/en/news/sustainable/new-un-water-development-report.html#:> accessed 14 November 2025.

[38]UNICEF/WHO, "Progress on Household Drinking Water, Sanitation and Hygiene/2000-2017,"https://www.unicef.org/media/55276/file/progress-on-drinking-%20water-sanitation-and-hygiene-2019.pdf accessed 14 November 2025.

[39] World Health Organisation, "Drinking Water" (13 September 2023), <https://www.who.int/news-room/fact-sheets/detail/drinking-water#> accessed 14 November 2025.

poses severe health risks including cholera, typhoid, dysentery, hepatitis, heavy-metal poisoning or even death. Without water, man cannot live more than a few days, and for this reason, water must be accessible and safe, because contaminated water, whether for drinking or for cooking, will certainly impact negatively on people's health.[40]

3.8 Sand Mining and Riverbed Excavation

In Nigeria, unregulated sand mining along riverbanks and floodplains is widespread, exacerbated by construction demand. Excessive sand extraction increases turbidity, accelerates erosion, destabilises river channels, alters hydrological flow and depletes groundwater tables.[41] Most activities in Nigeria occur without Environmental Impact Assessment (EIA) permits, in violation of the Environmental Impact Assessment Act.[42] Only project financing institutions such as World Bank ensure that EIA is carried out to ascertain the likely impact of a proposed project on the environment.

3.9 Heavy Metal Leaching

Mechanised and artisanal mining of gold in Nigeria has significantly contributed to environmental pollution, particularly through the release of mercury and other heavy metals into Nigerian rivers and seas. For instance, in States such as Zamfara, Niger and Plateau, mining activities generate contaminated runoffs that infiltrate groundwater systems, posing great risks to drinking water quality, aquatic ecosystems, and public health. Reports have consistently highlighted that these pollutants not only degrade water resources but also accumulate in soils and food chains, thereby intensifying the long-term ecological and socio-economic consequences of unregulated mining practices. [43]

4. Water Quality Management in Africa

4.1 African Regional Frameworks

4.1.1 African Union (AU) Agenda 2063 on Water Sustainability and Governance

The African Ministers' Council on Water (AMCOW) in 2025 at its 14th ordinary session, adopted the Africa Water Vision 2063 and Policy (AWVP63), as a continental framework to achieve inclusive and climate-resilient water security, in alignment with Agenda 2063 and the Sustainable Development Goals. It redefines water as a driver of prosperity: food security, energy, trade, and industry; a bridge of peace acting as shared pathways to cooperation among African nations.

The Africa Water Vision 2063 and its policy framework are to be endorsed at the 39th AU Summit in 2026 to unify African countries around continental priorities and elevate Africa's voice at the UN Summit in 2026 Water Conference.[44]

The African Ministers' Council on Water (AMCOW) plays a critical role in co-ordination of policy and promoting integrated water resources management (IWRM) among African member states. The IWRM includes four basic principles:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development, and the environment.
- Water development and management should be based on a participatory approach, involving users, planners, and policymakers at all levels.
- Women play a central part in the provision, management, and safeguarding of water.

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[40] J. Scamlon, and others, "Water as a Human Right", Paper presented at the IUCN/UNEP Western European Judges Symposium, Rome, Italy and the IUCN/UNEP Eastern and Central European Judges Symposium, lviv Ukraine (May 2003) p. 105.

[41] Akpokodje, E.G. and Akaha, C.T., "Environmental Impact of Sand Mining in Nigeria," *Journal of Sustainable Development in Africa,* 21 (3), (2019) 45-60.

[42] EIA 1992, Cap E12 Laws of the Federation of Nigeria 2004.

[43] Anka A. S, "Lead Poisoning in Zamfara State Nigeria: Effects on Environmental Health", (13 March 2024), https://www.intechopen.com/chapters/88255 accessed 17 October 2025. The Za mfara lead poisoning epidemic/outbreak which led to death of over four hundred (400) children was as a result of illegal mining.

[44] Albuquerque Catarina, "Africa Adopts the Water Vision 2063 and Policy: A Continental Compass for Prosperity, Peace, and Resilience" <https://amcow-online.org/africa-adopts-the-water-vision-2063-and-policy-a-continentalcompass-for-prosperity-peace-and-resilience/#:~:text=%E2%80%A2,more%20than%20two%20decades%20of> assessed 16 November 2025.

- Water has an economic value in all its competing uses and should be recognized as an economic good.

Integration and alignment of these four principles into domestic and regional frameworks are essential to achieve sustainable development. Nigeria will benefit from this framework if it integrates it, aligns its regulation, and climate-resilient water infrastructure.

4.2 Sub-Regional (Regional Economic Community) Water Quality Frameworks

The legal basis of the West African regional water policy is rooted in:
the harmonization and coordination of national policies and the promotion of programmes, projects and activities, especially in the field of agriculture and natural resources;[45] and
to promote, coordinate and ensure the implementation of a regional water resource policy in West Africa, in accordance with the mission and policies of ECOWAS.[46]

West Africa has a surface area of more than 6 million km^2 and a population exceeding 260 million.[47] The region is characterized by strong interdependence among its states for water resources. These resources hold immense potential for citizens; however, the region is confronted with situations detrimental to its development. Water availability is under increasing pressure due to shrinking storage, rising demand, pollution, land-use change, and environmental degradation, all compounded by climate change.[48] Access to safe drinking water and sanitation remains limited, while irrigated agriculture remains marginal, with only about 10% of potentially irrigable land cultivated. The potential for hydroelectricity is enormous, but only 16% of this potential is exploited. Climate change continues to intensify these threats, reinforcing the urgent need for sustainable management of water resources.[49]

[45] Article 3 of the Economic Community of West African States Revised Treaty 2008.
[46] Article 2 the Statutes of the Permanent Framework for Coordination and Monitoring of IWRM in West Africa (PFCM-IWRM/WA).
[47] World Population Review, (2025), https://worldpopulationreview.com/continents/western-africa/ accessed 29 November 2025.
[48] World Bank Group, "Water for Planet" (2025), <https://www.worldbank.org/en/topic/waterresourcesmanagement/> accessed 29 November 2025.
[49] *Ibid.*

4.2.1 West Africa Water Resources Policy (WAWRP)

The West Africa Water Resources Policy (WAWRP) 2008 remains the primary framework for water management and water quality governance in the region. The policy provides strategic guidance to member states of the Economic Community of West African States (ECOWAS) to promote the principles of integrated water resources management (IWRM) and achieve sustainable water management.[50] It adopts a holistic approach (IWRM) that considers all water uses and stakeholders, promoting ecologically rational and sustainable use of water resources. It adopts a holistic approach (IWRM) that considers all water uses and stakeholders, promoting ecologically rational and sustainable use of water resources.

Central to the WAWRP are the principles of precaution, prevention, and the polluter-pays doctrine, which collectively aim to safeguard water resources against degradation. The policy integrates water quality objectives by mandating the adoption and enforcement of standards regulating polluting discharges. Its vision is to ensure universal access to safe drinking water and effective waste disposal systems by 2025, to protect public health and biodiversity.[51] Ultimately, WAWRP seeks to contribute to poverty alleviation and sustainable development by guiding ECOWAS member states toward water management approaches that reconcile economic growth, social equity, and environmental preservation.

4.2.2 ECOWAS Water Resources Coordination Centre (WRCC)

The ECOWAS WRCC plays an important role in operationalizing WAWRP. It functions as a regional institution tasked with enhancing resilience to climate risks, including floods, and droughts, through coordinated water resources planning. The WRCC's strategic importance is accentuated by its 2030 Action Plan which prioritises climate-water resilience as a cornerstone of regional adaptation strategies.[52] Complementing these efforts are guidelines on water governance and transboundary pollution control, which provide normative direction for member states in managing shared watercourses.

In practice, WAWRP's principles are operationalized through ECOWAS protocols on water governance and transboundary pollution control. For instance, Nigeria, as a riparian state[53] to several shared watercourses, is subject to cooperative management obligations under these protocols. This illustrates how regional frameworks are translated into national responsibilities, thereby reinforcing the collective approach to sustainable water resource management.[54]

4.2.3 Southern, African Development Community (SADC) Protocol on Shared Watercourses

This Protocol was originally signed on 28 August 1995 by 15 member states but entered into force on 29th September 1998. The original protocol was later repealed and replaced by the Revised Protocol on Shared Watercourses, signed on 7th August 2000, and entered into force on 22 September 2003. It is a model example of strong African cooperation.

The SADC framework for water quality standards and pollution control emphasizes the sustainable management of shared watercourses through regional strategies, common minimum standards, and member state cooperation. Key initiatives include harmonizing water quality standards across member states, ensuring environmental impact assessments (EIAs) for new projects, managing alien invasive species, and implementing coordinated monitoring

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[50] West Africa Water Resources Policy (WAWRP), https://washnigeria.com/wp-content/uploads/2022/11/West-Africa-Water-Resources-Policy.pdf accessed 16 November 2025.

[51] *Ibid.*

[52] ECOWAS Regional Climate Strategy (RCS) and Action Plan (2022-2030), (April 2022), https://ecowap.ecowas.int/media/ecowap/file_document/2022_ECOWAS_Regional_Climate_Strategy_and_Action_Plan_2022-2030_EN.pdf?utm_source=chatgpt.com accessed 18 November 2025.

[53] A riparian state is any country that shares a river or watercourse with other countries. In West Africa for instance, this means nations located along major transboundary river basins such as the Niger River, Senegal River, Gambia River, and Lake Chad Basin. The term riparian comes from the Latin word "ripa" meaning "river bank." A riparian state is therefore a country situated along the banks of a river or stream, with rights and responsibilities for its use and management.

[54] Miguel Roy Whitehead Dos Santos, "Water Cooperation within West Africa's Major Transboundary River Basins" *Regions and Cohesion,* https://www.berghahnjournals.com/view/journals/regions-and-cohesion/13/2/reco130203.xm. Accessed 29 November 2025.

programs to address pollution and protect water resources.

The objective of water quality standards and pollution control in SADC is to harmonise and uphold common minimum standards for water quality in shared watercourses, and ensure consistency across the region. Member states are therefore committed to preventing the import of pollutants for disposal that could affect shared watercourses, exercising both individual and collective responsibility for controlling alien invasive species, mandating EIAs for development initiatives in watercourses, and encouraging strategic environmental assessments to evaluate potential environmental impacts.[55]

Regional basin management organisations, such as those for the Limpopo and Zambezi rivers play a critical role in implementing these standards and coordinating transboundary water governance.

In addition to the Watercourses Protocol, SADC member states have also entered into various other agreements relevant to water bodies. For instance, the Dar-es-Salaam Declaration on Agriculture and Food Security (Dar-es-Salaam Declaration), signed in 2004, seeks to improve water management and irrigation by allowing member states to allocate a portion of their agricultural budgets to water management and irrigation development, and developing programs to improve flood and drought mitigation and water harvesting technologies.[56]

4.2.4 East African Community (EAC) Water Policies

The East African Community (EAC) has also developed water policies that complement SADC's initiatives, focusing on integrated water resources management, pollution control, and regional cooperation. For instance, the EAC Water Quality Management Policy Guidelines 2021 was developed to address water quality challenges threatening millions of livelihoods dependent on water for health and socio-economic development. The objective is to strengthen prevention and control of water pollution from point and non-point sources, as well as to harmonise water quality standards across member states.[57]

East Africa integrates a gender dimension into water governance, recognizing that women occupy and play a central role in water access, use, and management. Despite this critical involvement, women continue to encounter systematic barriers that limit their participation in decision-making processes.[58]

4.2.5 SADC Protocol on Fisheries

The SADC Protocol on Fisheries, signed in 2001 and entered into force in 2003 is a landmark regional agreement on aquatic ecosystems. Its primary objective is to:

"promote responsible and sustainable use of the living aquatic resources and aquatic ecosystems of interest to State Parties. The Protocol emphasises enhancing food security and human health through sustainable fisheries; safeguarding the livelihoods of fishing communities; generating economic opportunities for nationals in the Region; and ensuring that future generations benefit from these renewable resources; and contributing to poverty alleviation with the ultimate objective of its eradication."[59]

This framework complements the Revised Protocol on Shared Watercourses by extending cooperation beyond water quality to the conservation of aquatic ecosystems. It applies precautionary principle, requiring member states to prevent activities within their jurisdiction from causing excessive transboundary adverse impacts.

The SADC fisheries and watercourse frameworks align with the African Union's Agenda 2063, which positions water and sanitation as strategic assets for inclusive prosperity, regional integration, peace, and human dignity. The vision of a "water-secure and

[55]Revised Protocol on Shared Watercourses in the Southern African Development Community 2000. https://zambezicommission.org/sites/default/files/publication_downloads/revised_protocol_on_shared_watercourses_-_2000_-_english.pdf accessed 29 November 2025.

[56]Southern African Development Community – SADC – Groundwater and Drought Management Project, < https://iwlearn.net/iw-projects/970> accessed 16 November 2025.

[57]East African Community Lake Victoria Basin Commission, "Water Quality Management Policy Guideline"https://www.lvbcom.org/wp-content/uploads/2025/07/Policy_brief-on-EAC-Water-Quality-_M_Policy-Guidelines-2.pdf accessed 29 November 2025.

[58]UNESCO, "Gender Perspective of Water Use and Governance in Eastern Africa: a Systematic Review" (2023) https://www.unesdoc_unescolorg/ark:/48223/pf0000386225 accessed 29 November 2025.

[59] Article 3 SADC Protocol on Fisheries 2001.

resilient Africa with safe sanitation for all" situates water governance as a driver of social transformation, economic growth, food security, poverty eradication, climate resilience, and regional integration.[60]

Regulatory Framework for Water Quality Management in Nigeria

Nigeria has laws and regulations to prevent water pollution and ensure water sustainability. As a result, violations of such laws and regulations lead to penal sanctions and fines. Although enforcement of these laws remains at the periphery, Lagos State has been able to identify offenders and prosecute them, which ultimately results in jail term to serve as deterrents to prospective offenders.[61] Some of these laws and regulations will be examined below:

4.3.1 The National Environmental Standard and Regulations Agency (Establishment) Act [62]

As a primary regulatory agency for environmental protection in Nigeria, the National Environmental Standards Regulation Agency (NESREA) enforces compliance with laws, guidelines, policies and standards on environmental matters; coordinates, and liaises with stakeholders within and outside Nigeria, on environmental standards, regulations, and enforcement.[63] Under regulation 7 (d), the agency has the responsibility to enforce compliance with policies, legislation and guidelines on water quality, environmental health and sanitation, including pollution abatement. For water bodies other than in the oil and gas sector, the agency enforces standards through monitoring.[64] Water pollution is a result of contamination of water bodies, usually caused by human activities, negatively impacting lakes, rivers, oceans, aquifers, reservoirs and human health. As a result, the agency ensures public awareness and environmental education on sustainable management.[65] Public awareness of the impacts may help in curtailing the illegal use of our resources and polluting the water bodies. Distorting or denying the consequences of anthropogenic activities on the environment can perpetuate harmful stereotypes or false narratives that may lead to dangerous consequences.

The achieve its numerous responsibilities under the Act, the agency has the powers to enter and search premises with a warrant issued by a court, take a sample or specimen of any article, open and examine, seize and detain; obtain an order of a court to suspend activities, seal or close down premises including any inland water to protect the environment and prevent pollution.

4.3.2 National Environmental (Surface and Ground Water Quality Control) Regulations 2011[66]

By virtue of section 34 of this Act, the primary purpose of this regulation is to restore, enhance, and preserve the physical, chemical, and biological integrity of Nigeria's surface waters, while safeguarding existing water uses.[67] To achieve this, the regulation establishes standards designed to protect surface waters from pollution. It specifically prohibits the discharge of pollutants, urban runoffs, hazardous wastes, hazardous substances, petroleum products, and solvents into Nigerian waters, except in compliance with the Regulation or prior approval from the designated Agency.[68]

Furthermore, Regulations 6, 7, and 8 explicitly prohibit activities that violate established water quality standards or contribute to the degradation of water resources. Nevertheless, the framework allows for new discharges provided they do not impair existing uses or hinder the attainment of designated uses. For example, discharges into non-portable bodies may be permissible in the form of stormwater releases, provided they meet regulatory conditions and do not compromise environmental integrity.[69]

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[60] African Minister's Council on Water (AMCOW), "Africa Adopts the Water Vision 2063 and Policy: A Continental Compass for Prosperity, Peace, and Resilience" (October 2025), https:/www.amcow-online.org/Africa-adopts-the-water-vision-2063-and-policy-a-continentalcompass-for-prosperity-peace-and-resilience/ assessed 29 November 2025

[61] J Chukwu, "Lagos to Impose N250,000 Fine or Jail Term for Illegal Waste Disposal" *The Telegraph,* (June 2025), https://www.telegraph.ng/news/2025/ accessed 30 November 2025.

[62] (NESREA) ACT 2007.

[63] Regulation 7 (a) and (b) NESREA.

[64] Regulation 7 (h) NESREA.

[65] Regulation 7 (l) NESREA.

[66] Statutory Instrument No. 22 of 2011.

[67] *Ibid,* Regulation 1.

[68] Regulation 13 of National Environmental (Surface and groundwater quality control) Regulations, 2011.

[69] *Ibid*, note 48 Regulation 6, 7, 8 and 10.

However, different challenges affect the implementation of the provision, including underfunding and a lack of technical expertise.[70]

4.3.3 National Environmental (Soil Erosion and Flood Control) Regulation 2011[71]

In Nigeria, the Minister of Environment, acting under the authority of section 34 of the NESREA Act 2007, has introduced comprehensive regulations to address the growing challenges of flood and erosion. These measures are designed to protect human life, minimise economic losses, and protect water resources from pollution caused by soil erosion, flooding, and sedimentation.[72] The regulation establishes technically feasible and economically reasonable standards to promote sustainable land and water management practices. Their objectives include:

- Minimizing soil erosion and siltation that degrade rivers, lakes, and reservoirs.
- Conserving floodplains and vulnerable ecosystems to preserve ecological integrity.
- Preventing environmental degradation linked to persistent flooding and sediment deposition.

A key requirement is that erosion and sediment control systems must be installed before any earth-disturbing construction activity begins.[73] Furthermore, all infrastructure projects are mandated to incorporate flood management strategies such as surface and subsurface drainage, dams, flood walls, diversion channels, and vegetation planting to stabilise soils and regulate water flow.

The agency shall through conduct an inventory of storm water collection systems of towns and cities in the country which shall include catchment basins, manholes, pipes, culverts, ditches, bridges, streams, rivers, ponds, dams and other features of the existing collection systems for the purpose of identifying erosion susceptible areas.[74] The Agency shall further enforce all storm water management programmes by establishing procedures for public participation, monitoring and ensuring compliance with Flood and Erosion Technical Guideline 2005.[75]

The regulations prohibit siting of facilities in high-risk flood-prone areas and therefore empowers the Agency to inspect construction and land-use activities. Strict penalties are imposed for violations under section 19 (1) – (2) of the Regulation. The problem with this regulation is implementation, which if implemented will contribute to global efforts towards integrated water resource management.

4.3.4 National Environmental (Textile, Wearing apparel, Leather and Footwear Industry, Regulations 2009[76]

This regulation prevents disposal of hazardous waste on water or land, without prior treatment.[77] It further ensures that generators of hazardous waste for land filling must provide notification of such to the Agency. This is to prevent illegal dumping of hazardous waste on the environment.[78]In line with water management and quality of water, Regulation 12 states that there shall not be contamination arising from leakage of surface or underground oil fuel or chemical storage facilities likely to cause pollution of the environment including the surface water and groundwater.

By virtue of regulation 17, facilities which discharge effluent into the environment have the mandate to treat their effluent to the permissible level to ensure assimilation by the receiving medium. As a result, every facility is obligated to carry out effective treatment throughout its operation phase; ensure the environmentally sound management and disposal of sludge containing heavy metals; ensure the treatment of toxic organics contained in both effluent and sludge, and ensure that effluent is not diluted to achieve the standards contained in Schedule I to the Regulations.[79]

The requirement for treating effluent to permissible levels ensures that rivers, lakes, and groundwater are not polluted by untreated industrial discharges, to maintain safe water for drinking, agriculture and ecosystems. Heavy metals, and toxic organics in sludge can leach into water if poorly handled. The mandate on environmentally sound disposal prevents long-term contamination of aquifers and soils.

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[70] A.A Adedej. and R.T. Ako, "Hindrances to Effective Legal Response to the Problem of Environmental

Degradation in the Niger Delta, *Nnamdi Azikiwe University Law* J. 5(1), (2005) 437.

[71] Statutory Instrument no 12 of 2011.

[72] Regulation 2 (1) (a) – (c) 2011.

[73] Regulation 2 (2) (b) of 2011.

[74] Regulation 6 (1) of 2011.

[75] Regulation 6 (3).

[76] Instrument No. 34 of Regulation 2009.

[77] Regulation 16 (4) 2009.

[78] Regulation 16 (5) 2009.

[79] *Ibid.*

5. Challenges Militating against Water Quality for Sustainable Development

Notwithstanding the robust regulatory frameworks to regulate or protect water quality for sustainable development in Africa, particularly Nigeria, water quality remains poor and unabated. The main factors undermining water quality and sustainable development in Nigeria and across Africa are corruption, poor infrastructure, pollution, climate change, weak governance, lack of implementation of existing laws, and rapid population growth and urbanization. These act as clogs in the wheel to achieve sustainable development and will be considered hereunder.

5.1 Corruption

Corruption and deliberate underfunding by state governments are major causes of Nigeria's water sector crisis. Mismanagement and corrupt practices within water agencies have left infrastructure in despair.[80] A 2025 civil society report titled "Dry Taps: A Damning Verdict on the State of Water Utilities in Nigeria" found that corruption and deliberate underfunding by state governments are major causes of Nigeria's water sector crisis. Mismanagement and corrupt practices within water agencies have left infrastructure in disrepair.[81] This is exemplified by numerous water schemes initiated but left uncompleted across the state.[82] Some existing water supply systems are old and dilapidated, leading to significant water loss in affected areas.[83]

5.2 Urbanisation and Population Growth

High population density in cities puts a strain on the water supply. This is evidenced by the rising demand outweighing the supply capacity. The increasing need for water in growing cities is also exacerbated by the expansion of impermeable surfaces from buildings and roads, which leads to increased runoff and flooding, and the over-exploitation of groundwater, which also depletes the aquifers. Rapid and unplanned urban growth results in insufficient infrastructure to manage wastewater, leading to contamination and public health risks. High demand for urban use leads to over-extration of groundwater, causing aquifer depletion. Informal settlements lack sanitation, leading to contamination of water resources nearby.

5.3 Lack of Awareness and Poor Public Enlightenment

The Environmental Impact Assessment (EIA) Act 1992 mandates compulsory consultation with stakeholders in the process of environmental monitoring and management. However, reports indicate that integrated water resource management in Nigeria continues to face significant challenges due to weak institutional frameworks and poor stakeholder participation, which in turn undermines national development.[84]

Investigations reveal that regulatory agencies have no comprehensive environmental data or community-based management programmes.[85] Although the EIA Act and the NESREA regulations provide for public participation, these provisions are often treated with glove hands. As a result, local communities lack access to environmental study documents that outline how monitoring should be conducted to prevent pollution and ensure sustainable resource management. This is also critically undermined by the Constitution of the Federal Republic of Nigeria that does not mandate environmental data as a public document.

5.4 Improper Waste Management

[80] Obinna Nwaoku, "Report Uncovers Corruption, Neglect in Nigeria's Water Sector" *The Guardian*, (20 March 2025), https://www.guardian.ng/news/report-uncovers-corruption-neglect-in-nigerias-water-sector/ accessed 22 November 2025.

[81] Environ News Nigeria, "Report Blames Perilous State of Water on Corruption, Limited Funding by States" https://www.environewsnigeria.com/report-blames-perious-state-of-water-on-corruption-limited-funding-by-state/ accessed 22 November 2025.

[82] *Ibid.*

[83] Adeniran, A. B., "New Pipes, Old Ways: Water Infrastructure Failure, Power, and the State in Nigeria" *The Australian National University, Australia,* (2022).

[84] Martins Grace and others, "Sustainable Water Resource Management in Nigeria: Challenges, Integrated Water Resource Management Implementation, and National Development" *International Journal of Trendy Research in Engineering and Technology* (9) (1) (2025).

[85] A Framework for Environmental Reporting in Nigeria's Extractive Industry, https://neiti.gov.ng/cms/wp-content/uploads/2023/05/NEITI-Environmental-Reporting-Framework-16523.pdf accessed 30 November 2025.

Most homes and companies lack the requisite equipment to properly treat waste before disposal. The Improper disposal of waste products from our homes, offices, industries, *et cetera* could contaminate nearby water. Dumping sites ought to get approvals before they are used for a particular type of waste. Examples of such wastes are: wastewater, solid waste, and electronic waste. The disposal of such waste could also constitute groundwater pollution. The implication of this is the attendant hazard it could pose on human health, where such waste is dumped on water, it could constitute a real threat to the existence of aquatic life[86].

5.5 Poor Regulatory Oversight

Nigeria lacks reliable, periodic, and accessible environmental data on water quality monitoring.[87] This undermines accurate decision-making by government and agencies. Without data, decisions are made on assumptions, weakening the credibility and effectiveness of water policies. The absence of reliable water quality data undermines governance, enforcement, climate resilience, public health and sustainable development. It creates a vicious cycle where weak monitoring leads to poor decisions which in turn worsen environmental degradation and erode trust in institutions.

6. Recommendations on the Challenges to Water Quality for Sustainable Development

The following are recommended to improve water quality management across Africa and Nigeria:

6.1 Strengthen Monitoring and Data Systems

It is important to build a reliable system for collecting water quality data across rivers, lakes, boreholes, and treatment plants. Establishing regular, transparent water quality sampling and reporting frameworks will ensure early detection of pollution, making it possible to act before contamination spreads. Regular sampling will also ensure that water quality trends are tracked over time. Publishing results openly, using digital platforms and Geographic Information Systems (GIS) by the agencies will help to identify hotspots of pollution and areas of risk of flooding.

6.2 Public Awareness and Education

Education and public awareness are important in strengthening water quality management. Training on modern water management practices, and technical knowledge on proper sampling, treatment, and pollution control methods ensure effective monitoring.

There should be proper education on the importance of water sanitation, good waste disposal methods, and the danger of hazardous wastes. Farmers and industries should also be educated through extension services about the dangers of certain chemicals used by them (pesticides, herbicide).

6.3 Improve methods of Measuring Water Quality

One of the primary responsibilities of the government agencies responsible for water resources is to collect data for the provision of social amenities for communities. Establishing a unitary system of drinking water would make it easier to maintain a unified standard of water quality for all citizens. Under such a system, private boreholes would be phased out, as many of them drill without permits from regulatory agencies, and do not have the wherewithal to meet required standards, centralizing water supply will help in enforcing strict standards, and monitoring would become more effective to meet the criteria for safe drinking water globally.

6.4 Adequate means of Waste Management

The method of disposal of hazardous waste and waste generally in Nigeria is by disposal in landfill. This involves indiscriminate burying of waste which is not environmentally friendly because buried waste can leach into the soil and contaminate underground water. The management of solid and Hazardous waste regulations provides for factors that should be considered before permits for landfills are granted; one of which is the construction of a leachate collection and renewal system operated to remove accumulated liquid from the system as quickly as possible. Many landfills across the country do not comply with any of the requirements under the regulation as requisite permits are not obtained before commencement.

[86] O. Obinna, "The State of Environmental Monitoring in Nigeria. A case study of Niger Delta" A Report Submitted to the Environmental Policy Group, Wageninten University in Partial Fulfillment of the Requirement for the Award of Master of Science (M.Sc.) Degree. September 2011.

[87] S.U. Wali and others, "Challenges and Opportunities for Sustainable Water Resources Management in Nigeria: A Review" *IIARD International Journal of Geography & Environmental Management* (11) (10) 2025.

6.5 Appropriate funding

Lack of available data may be linked to poor funding. Proper funding of the agencies responsible for environmental management by the government will go a long way in ensuring water quality management and enforcement of trans-boundary movement of hazardous waste.

6.6 Stringent Penalty

Stiffer sanctions are necessary to curb environmental infractions and to deter prospective offenders or environmental polluters. The amount to be paid by offenders should be commensurate with the offence committed.

7. Conclusion

This paper has demonstrated that the core issue in water quality management in Africa, particularly Nigeria, is not the absence of laws but the effectiveness of their implementation. By ex-raying existing legal frameworks, it is clear that the way forward lies in strengthening enforcement, improving data systems, enhancing stakeholder engagement, and integrating education and awareness into governance. Water quality management must move beyond legal aspiration to a lived reality, to ensure that Africa's rivers, aquifers, and wetlands are protected for present and future generations. This can only be achieved through synergy between strong laws, transparent institutions, and informed citizens. With these, Nigeria and Africa can achieve sustainable water management and fulfill the vision of clean water for all.