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Community Water Resource Management in the Context of Urban Resilience and Environmental Social and Governance (ESG): A Case Study of Sokoto, Yobe and Borno States in Northern Nigeria

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ABSTRACT
Access to clean and reliable water is a global challenge as just a very small fraction of the earth's water is fresh. The demand for clean water varies from hydropower, fishing, irrigation and drinking water making it even a smaller fraction available for human consumption. In Nigeria, majority of the populace rely on unimproved water sources including unprotected wells and springs, rivers, lakes and dams. Water scarcity and pollution affect hundreds of millions of people particularly those in highly populated and underserved areas causing avoidable deaths each from water related diseases. This paper explores community water resource management in Sokoto, Yobe and Borno states of northern Nigeria which are characterized by high population density, inadequate infrastructure and governance challenges, spotlighting on sustainability, governance structure, and integration with community based water management. The main point of this study is the water access situation in states analyzing current community water management structures assessing its alignment with the environmental, social and governance framework, as well as potentials for enhancing urban resilience. The study employs water quality indices, demand and supply, equity in access and policy gaps in identifying and addressing key challenges and associated water management strategies.
Keywords: Community Based Water Management (CBWM), Environmental Social and Governance (ESG), Sustainability, Water scarcity, Urban resilience.

INTRODUCTION

According to Smith "Nothing is more useful than water: but it will purchase scarcely anything; scarce anything can be had in exchange for it. A diamond on the contrary, has scarcely any value; but a very great quantity of other goods may frequently be had in exchange for it (Smith, 1776)".

The famous diamond-water paradox by Adam Smith states how diamond is considered more valuable than water even with water as an essential commodity. Treatment of water as a low cost resource has resulted in its neglect in public policy and investment priorities even with its importance to human survival, ecosystem and economies. This situation has presented a deepening global crisis marked by rising demand, pollution, inequity and climate induced scarcity (UN Water, 2023; World Bank 2021)

Over 2.2 billion people lack access to adequate drinking water, with about 663 million people relying on unimproved water sources such as unprotected wells and surface water (WHO/UNICEF JMP 2023). Access to clean water as a fundamental human right is a global factor in urban viability and sustainability. Nigeria with its rapidly growing population is faced with the challenges of poor management of Water, Sanitary and Hygiene (WASH) hindering equity and alignment with global frame works like the Sustainable Development Goals (SDGs) and Integrated Water Management (IWMS) systems (Water Aid Nigeria 2020, World Bank 2021).

Statement of the Problem

The management of community water resources in Sokoto, Yobe, and Born States in Northern Nigeria is faced with numerous challenges, including inadequate infrastructure, poor governance, and limited community engagement, which have led to water scarcity, pollution, and increased vulnerability to climate change. Specifically, the region struggles with insufficient water supply systems, resulting in scarcity and unequal access to clean water, while weak institutional frameworks and corruption hinder effective water management. Furthermore, the exclusion of local communities from decision-making processes has limited the effectiveness of water management initiatives. The impacts of climate change, such as droughts and floods, have exacerbated water insecurity in the region, while environmental degradation and pollution threaten water quality and ecosystems. These challenges underscore the need for effective community water resource management that integrates urban resilience and environmental, social, and governance principles to ensure sustainable and equitable water access for communities in Sokoto, Yobe, and Born States.

Aim and Objectives

This study aims to explore community water resource management in the context of urban resilience and environmental social and governance (ESG): A Case Study of Sokoto, Yobe and Borno States in Northern Nigeria. The specific objectives of the study include:

1. To explore global examples of community water resource management systems
2. To investigate the tragedy of the commons and its application.
3. To examine the political, economic and technical realities.
4. To explore case analysis of water systems in Sokoto, Yobe, and Borno states.
5. To access environmental social and governance metrics relevant to water management.

Research Questions

The study answered the following research questions:

1. How doe global examples of community water resources management system influence Sokoto, Yobe, and Borno states in Northern Nigeria?
2. What is the tragedy of the commons and how does it apply to Sokoto, Yobe, and Borno states in Northern Nigeria?
3. What are the political, economic and technical realities of water resources management system in Sokoto, Yobe, and Borno states in Northern Nigeria?
4. What lessons can be learnt from various case analysis of water systems in Sokoto, Yobe, and Borno states?
5. What are the environmental social and governance metrics relevant to water management?

Significance of the Study

Community-based water resource management is an integral process of addressing water challenges ranging from scarcity, poor quality and climate resilience through local communities. Communities are the foundation of a great society and country at large. There is need to empower them by involving them in the planning, management and conservation of scarce water resources (Oxfam GB, 2009).

Water scarcity in North-east Nigeria has severely impacted on lives of people leaving them in abject poverty. Citizens rely on water for drinking and sanitation, sustenance of crops and livestock, and irrigation (World Bank, 2021). Water scarcity has led to artificial food scarcity, affecting health and economic activities.

People's livelihood and sustenance largely depends on proper management of water resource. This paper aims to look at Nigerian realities with a focus on northern Nigeria by identifying ways for long term solution for sustainable water management with key focus on environmental, social and economic frameworks.

Scope and Limitations of the Study

Scope

This paper sought to explore community water resource management in the context of urban resilience and environmental social and governance (ESG) with a focus on northern Nigeria by identifying ways for long term solution for sustainable water management with key focus on environmental, social and economic frameworks.

Limitations

While this study aims to provide analysis of community based water management in Nigeria, certain limitations must be acknowledged:

1. **Data Availability**: Case study states have limited data on water resource management, which may affect the depth of analysis.
2. **Insecurity**: The three states still face significant security challenges, which affected survey and interview approaches to capture community perception.
3. **Economic and Political Variability**: The effectiveness of policy implementation varies across different states in Nigeria due to differing economic capacities, governance structures, and political will. While case studies provide valuable insights, they may have limitations of application nationwide.

Despite these limitations, this research provides a valuable insights for understanding community based water resource management. By addressing knowledge gaps and highlighting best practices, it contributes to ongoing efforts to combat water scarcity.

LITERATURE REVIEW

Community Water Resource Management Systems

Community-based water resource management (CBWRM) is a concept applicable where scarcity of domestic water, like Northern part of Nigeria is an issue. The concept aligns with disaster risk reduction and climate change adaptation. Climate change, increase water demand due to population growth and urbanization are affecting water resources and supply globally (UNDP, 2016). CBWRM aims at operationalizing water resources management at the community level in support of national water resource management programs. African counties like Ghana, Tanzania and Malawi adopt CBWRM approach (Whittington et all, 2009). Switzerland ranking amongst countries with the best water quality supply also integrates the CBWRM model through localized, self-governed water user associations responsible for operating and maintaining water supply systems by allowing rural communities develop and manage their own water supplies (OECD, 2011). This model if properly adopted would help developing countries with sustainable water resource management**.**

Water governance in Nigeria

In Nigeria, the management of water scheme is a shared responsibility that is divided into three levels which are:

- **The Federal Level**: The federal government plays a key role in policy and regulation as well as management of interstate and transboundary water resources. It consists of the following key institutions:
  - ✓ Federal Ministry of water resources (FMWR)
  - ✓ Nigeria Hydrological Service Agency (NIHSA)
  - ✓ River Basin Development Authority (RBDA)
  - ✓ National Water Resources Institute (NWRI)

These institutions formulate national water and policies framework, regulate and oversee water quality, environmental impact and public health (FMWR, 2004).

- **The State Level**: The State ensures service delivery and regulation. Guided by state ministries for each state, State Ministry of Water Resources (SMWR) oversees delivery of portable water supply and policy implementation. They also implement rural urban projects in partnership with local governments (Nigerian Water Supply and Sanitation policy, 2000).
- **The Local Government Level**: The local government provides and maintains water services. They work in conjunction with local communities to ensure delivery of water supply.

Urban Resilience Framework

Community based urban resilience frame work is a strategic approach that empowers local communities to participate actively in building the community's capacity to adapt to emergency situations like foods, conflict, disease outbreak, climate change and infrastructure failure.

In 2013, Rockefeller foundation initiated a resilient city model emphasizing on inclusion and community engagement. The 100 Resilient Cities (100 RC) empowers local actors in decision making, building strategies for long term resilience. Cities in the network are provided resources to build resilience to the growing physical, social and economic challenges of the 21st century (Rockefeller Foundation, 2015). This model can be adopted to promote community involvement, include local people and communities in managing their water resources.

Donor funded water programs

These are programs that are implemented in collaboration with the federal and state government, NGOs, and local communities. They mostly adopt community centered approach to deliver, operate and manage sustainable water, sanitation and hygiene services especially in rural areas. They build water infrastructure, supporting communities to increase access to improved quality water (Water Aid, 2020). Some donor organizations and institutions making significant contributions to water and sanitation projects in Nigeria include:

- ✓ African Development Bank (AfDB)
- ✓ UNICEF
- ✓ World Bank
- ✓ Islamic Development Bank (IsDB)
- ✓ European Investment Bank (EIB)
- ✓ United Nations Development Program (UNDP)

These organizations and agencies embed community- based water management approach by involving local communities in planning, operations and maintainace of water resources and infrastructure.

The Tragedy of the Commons and its Application

The tragedy of the common is described as a situation in which individual users, who have access to open resources act independently according to own self-interests, and contrary to the common good of all users cause depletion of the resources through their uncoordinated action (Harden, 1968). Shared users can however manage common resources when clear rules and social trust are established (Ortom, 1990).

Water insecurity in northern Nigeria is attributed to many factors including poor management of formal water infrastructures, unregulated use of surface waters, open access, lack of monitoring system for underground water extraction, institutional weakness and lack of water governance (Tukur et all, 2018).

These are tragedy of commons where there is no governance of shared resources even with diminished availability of the resources, limited coordination impeding water resource management and planning.

The region is increasingly experiencing water stress from declining ground water levels, irrigation water demand and rising municipals (World Bank, 2021). The effect of climate change causing intense drought has also compounded the situation. In some other regions of the country like the Niger Delta, oil extraction has contaminated surface and ground water (Uchendu, 2020). Poor industrial and municipal waste management also pollutes surface and groundwater.

Application of Tragedy of the common

1. Unregulated use of water sources: There are several water sources in Northern Nigeria which includes:

Surface water sources: This includes rivers and streams. The Sokoto-Rima river for example serves as a surface source to Sokoto, Kebbi and Zamfara states (Shuaibu, 2025), Similarly, the Hadeija-Jama'are-Yobe river system support water needs in Kano, Jigawa, Bauchi, Yobe, and Borno with annual availability ranging from 656 million cubic meters to 2619 million cubic meters (Shobowale et al, 2010). The Komadugu-Yobe rivers flows through lake chad supplying groundwater recharge and means of livelihood to over 15 million people across Yobe and Borno States (Abubakar et all, 2022). However, streams are seasonal rivers locally called "Fadama" primarily used for dry season farming and grazing.

Ground water sources: These includes hand dug wells local called "Rijiya" commonly found in rural areas and are prone to drying up during dry seasons. Bore holes installed by government private individuals and donor programs also serve as ground water sources (Akinwumiju, 2016).

Dams and reservoirs: Applicable for irrigation, water supply and flood control. The Alu dam in Borno and the Goronya dam in Sokoto are examples of major dams in the north east region of Nigeria.

Engineered water source: These include pipe borne water system, solar powered and motorized pump system built by NGOs in rural settlement and in internally displaced person's camp.

The use of the above sources without monitoring, community bye laws to manage usage results in depletion of resource or mechanical breakdown of engineered source with no responsibility for maintenance

2. Flood plain usage: Flood plains provide fertile land, support the ecosystem and are critical for managing flood waters. They help maintain reliable water supply and reduce risk of inundation to human settlement. However, seasonal flood plains in areas like Komadugu-Yobe basin are being over utilized by herders and farmers. Herders utilize them for open crazing especially during dry seasons, while farmers also take advantage of its fertility to grow crops. These actions have led to declining water quality, and have an adverse effect on the community and the ecosystem (Ibrahim et all, 2022; IUCN, 2015).

3. Irrigation water conflict: Framer-Herder conflict over irrigation water and grazing land is common reoccurrence in the north. Uneven access to land and water is the primary cause of the conflict. This is another manifestation of the tragedy of the commons resulting in failed crops, rising tensions among others (Okoli, 2014).

Community based water management can be used to solve the above mentioned tragedies of the common. In IDP camps for example communal taps and storage tanks get deteriorated and vandalized due to lack of ownership and user guidance. To prevent such tragedies, infrastructure must be backed with community training and awareness; rules must be formalized and enforced. A community empowered governance structure must be established and strengthened (Oxfam GB, 2009; UNICEF, 2022).

Political, Economic and Technical Realities

Understanding the political, economic and technical realities is critical for sustainable water resource management. Water bodies such as wetlands and river basins are distributed throughout the country, but water scarcity is intensified by population growth and urbanization.

Political: Water coverage is generally low in Nigeria. As of 2019, approximately 60 million Nigerians were living without access to basic drinking water (Word bank, 2021). The Nigerian government declared

a state of emergency with the launching of National Action Plan (NAP) aimed at ensuring universal access to sustainable and safely managed WASH services by 2030. Despite the foremost challenge of water resources being its scarcity even with extensive river systems, ineffective governance exuberates the situation (Notavia consulting, n.d). Water production facilities are rarely operational, with poorly maintained piping and equipment. Most government owned water systems are non-operational. Federal and state agencies responsible for planning development and management of water resources are also ineffective amplifying the challenges faced by communities and the nation at large. Strong political will ensuring decentralized accountability is necessary in improving nationwide water infrastructure (Water Aid Nigeria, 2020).

Economic: The agricultural system for instance is very pivotal and has long served as the backbone of the economy contributing meaningfully to the overall economic growth (Ogbalubi et all, 2013). The sector is affected by poor irrigation system and inconsistent water supply which has led to lower agricultural output particularly in the northern region threatening food security and export limitation (Shanono et al, 2022). If water is available, farmers tend to grow more crops, earn more money and provide more jobs for people (Adebayo et all, 2018). Poor water management however results to less food, less money and less work for people.

Technical: Pipe borne water accounts for just 9.5% of domestic water supply to households, while borehole accounts for 25% (NBS, 2020). Despite these low statistics one of the major hurdles is the state of existing water infrastructure. Most water supply pipes were laid in the 1970s and little to no construction of new piping systems has taken place. According to a 2022 UNICEF survey, 42% of rural hand pumps are not working (UNICEF, 2022). In areas that have existing pipe network, pipes run dry for months due to pump failures or dry reservoirs. Some boreholes dry out seasonally due to shallow drilling. One out of three hand pumps in local governments like Geidam and Jakusko were nonfunctional by the end of the second year due to lack of maintainace (UNICEF, 2022).

Community water resource management can be deployed to solve the above mentioned realities, by involving the locals in water projects that they can maintain.

Case Analysis of Water Systems in Sokoto, Yobe, and Borno States

Case Analysis of Sokoto State Water System

Sokoto state is one of Nigeria's 36 states located in North West Nigeria. The primary sources of water in the state are rivers, ground waters and rainfall. There are pipe borne water; hand dug well, deep boreholes and water vendors that supply water to households via jerry cans. Water demand in the state is more than the available water supply especially in rural areas. The growing population and effect of climate change are further causing depletion in the limited water resources calling for new approaches for water resource planning and management (Water Aid Nigeria, 2020).

Community Participation in Water Management in Sokoto State

Water management in Sokoto is built traditionally around local leadership and informal rules guiding the use of wells and seasonal streams locally called "Fadama". In Dudaye a local community in Wamako, the only domestic source of water is a seasonal stream. The community agrees internally that each household visits the stream on alternate days to reduce overcrowding. This has prevented overuse and ensured consistent replenishment of the water source (COOPI, 2023).

In Awakkalla village of Goronyo Local government, the seasonal streams serve as alternatives to boreholes. Community members resort to seasonal streams when boreholes fail. A community agreement is maintained restricting washing of clothes or animal rearing in the stream to avoid contamination signifying informal water governance that protect public health and resource integrity. In some other communities, informal water schedule accesses are implemented to prevent conflicts and overcrowding across the limited water points.

These examples illustrate how local communities fill in the governance vacuum supporting sustainable water resource management (Njmaduddeen et all, 2015).

Roles of WASH Committees, NGOs, and corporative groups

Community-based committees such as Water and Environmental Sanitation Committee (WESCOM) are key institutions in the CBWM model. They are formed to manage, operate and maintain water supply and facilities at local levels. In Sokoto state, several committees have led fundraising initiatives for construction, rehabilitation and maintainace of boreholes, hand pumps and tap water supply.

In Kindiru Dange Shuni local government area, a motorized solar project was executed by the United States Agency for International Development (USAID) in collaboration with the United Nations Children's Fund (UNICEF). A water kiosk is attached to the borehole which is managed by the locals collecting a small fee of 10 naira per liters which is invested in the maintainace and repair of the infrastructure (UNICEF, 2024).

These localized Community based water resource management provide sustainable management, operation and maintainace of water infrastructures.

Case Analysis of Yobe State Water System

Yobe, a state in the North eastern part of Nigeria relies primarily on ground water. The state experiences scarcity in surface water. For Urban water supply, the Yobe State water cooperation is the responsible agency for provision of urban water. There exist over 212 boreholes across the state with key water infrastructural projects ongoing to improve the water supply infrastructure. The demand for water surpasses the capacity being delivered by the state government, which led to the emergence of private water vendors in many parts of the state (Tukur et all 2018). The existing water supply scheme is relatively small. Sources of water supply are from small borehole schemes even in bigger towns in the state like Potiskum and Damaturu. A couple of boreholes are connected together to serve separate parts of the town each thorough a separate pipe network. The Rural Water Supply Agency (RUWASA) has estimated that there are over 2000 hand pumped boreholes provided in the rural areas by the state, many of which are not operational (Water Aid, 2020). This is due to non-community participation in the planning and maintainace of the infrastructures. The program was not adequately supported by community mobilization, training and capacity building of the locals.

Role of community in water management in Yobe State

As in the hand pumped borehole management example, community roles are undervalued. Local community members are seen as just passive beneficiary users and not involved in planning, installation and maintenance leading to the non-functionality of most of the over 2000 installed hand pumps (UNICEF, 2022). In contrast, the International Fund for Agricultural Development (IFAD) schemes with the support of the federal government launched a significant 5.7 billion naira water scheme in the state. The project emphasized community participation in the planning, implementation, operation and maintenance of the solar powered boreholes, storage tanks and distribution networks, encouraging community ownership through Water and Environmental Sanitation Committees (WESCOMs) and Water User Associations (WUAs) (IFAD, 2021).

Water User Associations like the Dukumari Community water association have played significant roles in overseeing and maintenance of water facilities. When Dukumari was selected for construction of water facility by USAID, community leaders and other influencers were engaged to identify suitable site for construction of boreholes to serve the community (USAID, 2023). The projects were executed and members of the community took responsibility for managing and sustaining the structures bringing an end to water scarcity.

Case Analysis of Borno State Water System

Borno state also located in North-eastern Nigeria is faced with significant challenges in water resource management that have multifaceted factors including population growth, insurgency and inadequate infrastructure. The insurgency has led to severe internal displacement crisis forcing millions to flee their homes. About 900,000 people are estimated to live in 65 formal and 158 informal IDP camps (NEMA, 2022). The situation is worsened by seasonal flooding causing severe damage to boreholes, and the water infrastructures. In 2022 the state government approved the release of 850 million naira for procurement of pumps, and other items required for the rehabilitation and upgrade of the affected boreholes (UNICEF

NIGERIA, 2023). In IDP camps persons who have been forced to flee their homes due to conflicts often find themselves in an overcrowded and under resourced camps (UNHCR, 2022). Rivers are the only sources of water for some IDP camps duelers. However, there are several initiatives by the government and other foreign agencies in improving access to basic drinking water, sanitation and hygiene in many camp facilities.

Community water management in IDP camps in Borno State

Humanitarian agencies such as UNICEF, Save the Children, and International Organization for Migration (IOM) have played a very vital role in provision of clean water to the internal displaced persons. The interventions were carried out with maximum community involvement which was key for the sustainability and functionality of the systems (IOM Nigeria, 2023).

In Muna garage camp, Gubio, and Bakassi camps, UNICEF has partnered with WASH committees to provide access to worker for over 40,000 people through community engagement and mobilization, empowering them to manage water resources and maintenance (UNICEF Nigeria, 2023).

Practical approach for community involvement in water governance

The community based water resource management is the most sustainable and practical model for integrating communities to actively participate in water governance. Approaches that have been used and have shown measurable results in Nigeria include:

- ❖ Water and Environmental Sanitation Committees (WESCOMs) as seen in local government areas in Sokoto
- ✓ Water Users Association
- ✓ Water Consumers Association
- ✓ Catchment based water committees

Environmental Social and Governance Metrics Relevant to Water Management

The role of sustainability

Sustainability is meeting the need of the present without compromising the ability of the future generations to meet their own needs. It is central to human civilization as failure to adapt to its practices can cause damaging eco systems, depletion of resources causing a jeopardy in the future of humanity (UNEP, 2019). All sustainability issues are interconnected and in water governance, it is more than just infrastructure maintenance. It is involves fostering a culture of shared responsibilities, where everyone plays an active role in water resource management. Embedding sustainability in water management in essential in Nigeria where climate change, rapid population growth, pollution and inadequate infrastructure are among causes of water scarcity (World Bank, 2021).

Key ESG indicators for rural and urban water systems

ESG is an important value creation in the long term. Integrating ESG in water systems provide measurable bench marks for environmental, social and governance frameworks.

- ❖ **Environmental Indicators**
  - ✓ Sustainable water sources (Underground and Surface water)
  - ✓ Water pollution and waste management
  - ✓ Energy efficiency of water sources
- ❖ **Social Indicator**
  - ✓ Access to clean, safe and affordable water
  - ✓ Gender inclusion in water governance
  - ✓ Public health and hygiene
- ❖ **Governance Indicators**
  - ✓ Transparency in service delivery
  - ✓ Regulatory compliance and policy alignment
  - ✓ Community based Institutions capacity

Integrating ESG-from government to individual and collective responsibilities.

The phrase that "If climate change is the shark, then water is its teeth" is not further from the truth as it implies that if water challenge is solved, climate change is solved (UNESCO, 2021). This makes the Implementation of ESG criteria in the context of water management very critical with a collective action from government institutions, local communities and individuals.

- **Government responsibilities**
  - ✓ Laying of foundation and promoting ESG principles through policies that create enabling environment for ESG aligned water governance.
  - ✓ Provide public awareness through incentives for sustainable practices, campaigns and community awareness.
- **Collective responsibilities**
  - ✓ Promoting environmental social awareness about water conservation and equity access
  - ✓ Encouraging sustainability practices through water saving habits and protection of water sources
  - ✓ Enhancing community engagement in local WASH groups
  - ✓ Building a culture of accountability of shared water infrastructure
  - ✓ Support innovations and technologies in water systems.

Summary of the Findings

1.The study with regards to research question one established that, community water resource management systems aims at operationalizing water resources management at the community level in support of national water resource management programs. In Nigeria, the management of water scheme is a shared responsibility that is divided into three levels which are: Federal level, State level, and local government level.

2. The study with respect to research question two avered that, the tragedy of the common is a situation in which individual users, who have access to open resources act independently according to own self-interests, and contrary to the common good of all users cause depletion of the resources through their uncoordinated action (Harden, 1968). In IDP camps for example communal taps and storage tanks get deteriorated and vandalized due to lack of ownership and user guidance. To prevent such tragedies, infrastructure must be backed with community training and awareness; rules must be formalized and enforced.

3. Conversely, the study with respect to research question three posits that, understanding the political, economic and technical realities is critical for sustainable water resource management. For instance, on the political front the Nigerian government declared a state of emergency with the launching of National Action Plan (NAP) aimed at ensuring universal access to sustainable and safely managed WASH services by 2030. While on the economic front, agricultural system for instance is very pivotal and has long served as the backbone of the economy contributing meaningfully to the overall economic growth (Ogbalubi et all, 2013). On the technical front, pipe borne water accounts for just 9.5% of domestic water supply to households, while borehole accounts for 25% (NBS, 2020).

4. The study in response to research question four established that, water management in Sokoto state is built traditionally around local leadership and informal rules guiding the use of wells and seasonal streams locally called "Fadama". In Dudaye a local community in Wamako, the only domestic source of water is a seasonal stream. While in Yobe State water cooperation is the responsible agency for provision of urban water. Sources of water supply are from small borehole schemes even in bigger towns in the state like Potiskum and Damaturu. On the other hand water management in Borno state is seen as collaborative effort of the state government and humanitarian interventionist agencies like UNICEF, Save the Children, and International Organization for Migration (IOM) who played a very vital role in provision of clean water to the internal displaced persons. For instance, in 2022 the state government approved the release of 850 million naira for procurement of pumps, and other items required for the rehabilitation and upgrade of the affected boreholes (UNICEF NIGERIA, 2023). While in Muna garage camp, Gubio, and Bakassi camps, UNICEF has partnered with WASH committees to provide access to

worker for over 40,000 people through community engagement and mobilization, empowering them to manage water resources and maintainace (UNICEF Nigeria, 2023).

5. Conclusively, the study with respect to research question five established that, the key indicators of environmental social and governance framework for rural and urban water systems include:

- **Environmental Indicators**
  - ✓ Sustainable water sources (Underground and Surface water)
  - ✓ Water pollution and waste management
  - ✓ Energy efficiency of water sources
- **Social Indicator**
  - ✓ Access to clean, safe and affordable water
  - ✓ Gender inclusion in water governance
  - ✓ Public health and hygiene
- **Governance Indicators**
  - ✓ Transparency in service delivery
  - ✓ Regulatory compliance and policy alignment
  - ✓ Community based Institutions capacity

CONCLUSION

Water as a fundamental human right is essential for life, health and economic resilience. As water scarcity persist, adoption of effective water governance and management model becomes critical. The role of community is critically overlooked in water governance. This paper explores how community based water resource management can offer a sustainable and pragmatic ways of fostering a collective action towards effective water resource management. Direct inclusion of users in the management process was promising in overcoming some of the issues in water resource management.

Through case studies in Sokoto, Yobe and Borno, the study answered the research questions of the key infrastructural, societal and institutional barriers to effective water management in the case study areas and practical approaches, sustainable models that would allow communities have an active role in water governance structures. As seen in the case studies, water systems are better maintained when community ownership is being integrated. Donor funded projects where there are community inclusion durable compared to when they are treated as just passive beneficiaries.

Overall, the case studies exemplify the importance of collaboration, communication and community support. The path to water resilience lie not only in infrastructural development, but in systemizing shared responsibilities, stewardship, and active participation.

RECOMMENDATION

Addressing Nigeria's water crisis goes beyond building more infrastructures, but about good governance structures, empowering communities, ensuring equity in access over water resources.

Integrating community participation and ESG in water governance would enhance significant improvement in water related problems. This can be achieved by:

- Institutionalize community water governance
- Integration of ESG metrics into National water policy
- Promoting Innovation and technology
- Enhance community awareness and capacity building

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