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ASSESSING THE IMPACT OF KADUNA STATE WATER SECTOR POLICIES ON RURAL WATER SUPPLY OUTCOMES

Ahmed Usman

Department of Public Administration
Faculty of management Sciences
College of Communication, Social and Management Sciences
Kaduna State University

Abstract

This study assessing the impact of Kaduna State water sector policies in improving rural water supply. Despite the existence of legal frameworks, policy guidelines, and implementing institutions, many rural communities in Kaduna State continue to experience limited access to safe, reliable, and sustainable water. The study was anchored on Policy Implementation Theory, supported by Public Goods Theory, to explain the gap between policy intentions and service delivery outcomes. A descriptive survey research design was adopted, employing both quantitative and qualitative methods. Data were collected from rural household heads, officials of the Kaduna State Rural Water Supply and Sanitation Agency (RUWASSA), local government officials, and community leaders through structured questionnaires and semi-structured interviews. Quantitative data were analysed using descriptive statistics, while qualitative data were examined through thematic analysis. The findings revealed that although water sector policies and institutions exist in Kaduna State, their effectiveness in rural areas is constrained by weak implementation mechanisms, inadequate funding, limited institutional capacity, and low community participation. A significant proportion of rural water facilities were found to be non-functional or poorly maintained, forcing residents to rely on unsafe water sources and travel long distances to access water. Low awareness of water sector policies among rural dwellers further undermines sustainability and accountability. The study concludes that the challenge of rural water supply in Kaduna State is primarily an implementation problem rather than a policy deficit. It recommends strengthening policy implementation and monitoring, improving funding for maintenance, enhancing institutional capacity, and promoting community ownership of water projects to ensure sustainable rural water supply.

Keywords: Rural Water Supply, Water Sector Policies, Policy Implementation, Community Participation, Sustainable Water Access

1.1 Introduction

Access to safe, reliable, and affordable water is a fundamental human right and a key driver of socioeconomic development (Carchi, Orellana, Martínez & Segovia, 2025). In line with global goals such as Sustainable Development Goal (SDG), which aims to ensure availability and sustainable management of water and sanitation for all government policies play a central role in shaping how water services are delivered, especially in underserved rural

communities. In Nigeria, rural populations often face significant challenges in accessing basic water services, with many relying on unsafe and unreliable water sources for domestic use, agriculture, and livestock (Irene, Irene & Daniels, 2025). Despite concerted efforts by national and sub-national governments, water accessibility remains a pressing concern across rural areas of the country.

In Kaduna State, rural water supply has historically been inadequate, with many communities lacking functional boreholes, pipe-borne systems, or other improved sources of potable water. Reports have indicated that even with budgetary allocations and policy frameworks aimed at improving rural water supply, several rural settlements still struggle to obtain clean and safe water throughout the year (Isukuru, Opha, Isaiah, Orovwighose & Emmanuel, 2024). In some communities, residents trek long distances to streams and unprotected water points, resorting to water that is often contaminated and unsafe for human consumption (Ogbole, Adewuye, Daful, Ojomo, Lifidi, Andrew, & Rimi, 2025). This gap between policy intention and service delivery underscores persistent structural, institutional, and implementation challenges within the water sector. (Daily Trust)

Evidence, indicated that Kaduna State Government (KDSG) has in recent years introduced a range of policy measures, legislative reforms, and programmes to address these challenges. One notable legal framework governing the water sector is the Kaduna State Water Sector Law No. 11 of 2016, which provides for the development, regulation, and management of water resources and services in the state. This legislation is intended to guide sector planning, service provision, resource allocation, and institutional coordination across rural and urban water systems. (kdsg.gov.ng)

Despite these efforts, the effectiveness of water sector policies in translating legal frameworks and government commitments into tangible improvements in rural water accessibility remains unclear. Some observers note positive developments such as increased borehole installations and investments in infrastructure, yet critical challenges persist (Adeoti, Kandasamy & Vigneswaran, 2024). Rural communities still experience sporadic service delivery, inadequate maintenance of facilities, and uneven coverage across local government areas. Furthermore, the sustainability of interventions is often compromised by factors including vandalism, weak community ownership, limited budgetary releases, and institutional capacity constraints. (Daily Trust)

Therefore, there is a need to assess the effectiveness of Kaduna State's water sector policies by examining their formulation, implementation, stakeholder involvement, and impact on rural water access in Kaduna State. This evaluation will identify strengths and weaknesses, guide evidence-based reforms, and support efforts to ensure universal access to safe water in rural communities.

1.2 Problem Statement

Access to safe and reliable water remains a persistent challenge in many rural communities of Kaduna State, despite the existence of comprehensive water sector policies, legal frameworks, and institutional arrangements established by the state government (John & Balogun, 2025). Over the years, Kaduna State has enacted laws, developed policy guidelines, and invested public resources aimed at improving rural water supply through borehole

construction, rehabilitation of water facilities, and collaboration with development partners. These efforts are intended to align with national water policies and global commitments such as Sustainable Development Goal 6, which seeks universal and equitable access to safe water. However, empirical observations and reports indicate that a significant proportion of rural dwellers in Kaduna State continue to experience inadequate access to potable water (Sunday, 2023). Many communities rely on unsafe sources such as streams, ponds, and shallow wells, while existing water facilities in some areas are either non-functional, poorly maintained, or insufficient to meet population needs. Long distances to water sources, seasonal water scarcity, and frequent breakdown of infrastructure remain common challenges. This situation raises critical concerns about the effectiveness of existing water sector policies in translating policy intentions into sustainable service delivery outcomes at the rural level.

Furthermore, the gap between policy formulation and implementation suggests possible weaknesses in institutional coordination, funding mechanisms, monitoring systems, and community participation (Omweri, 2024). While agencies such as the Kaduna State Rural Water Supply and Sanitation Agency (RUWASSA) are mandated to implement rural water programmes, questions remain regarding capacity, accountability, and the sustainability of interventions. The absence of systematic policy evaluation has also limited the ability of policymakers to identify what aspects of the water sector policies are working, what is not, and why.

Consequently, without a clear assessment of the effectiveness of Kaduna State water sector policies, efforts to improve rural water supply risk being inefficient, unsustainable, and disconnected from the actual needs of rural communities. This study therefore seeks to address this gap by evaluating the effectiveness of Kaduna State water sector policies in improving rural water supply, with a view to generating evidence-based insights that can inform policy reform, enhance service delivery, and promote sustainable access to safe water in rural areas.

1.3 General Objective

The general objective of this study is to evaluate the effectiveness of Kaduna State water sector policies in improving rural water supply.

2.1 Conceptual Review

2.1.1 Concept of Water Accessibility

Water accessibility refers to the availability, affordability, reliability, and physical access to sufficient quantities of safe water for domestic and productive use (Zambrano-Monserrate & Sanchez-Alcalde, 2024). According to international standards, access to potable water implies that water sources are located within a reasonable distance, are functional throughout the year, and meet basic quality requirements for human consumption (Mishra, 2023). In rural areas of developing countries, water accessibility is often constrained by inadequate infrastructure, poor maintenance, seasonal variability, and weak institutional support.

In Nigeria, rural water accessibility remains a critical development challenge (Okafor, Ude, Okoh & Eromonsele, 2024). Many rural communities depend on unimproved water sources such as rivers, streams, ponds, and shallow wells, which expose households to waterborne

diseases and undermine public health outcomes. The situation is further aggravated by population growth, climate variability, and insufficient government investment in sustainable water infrastructure.

2.1.2 Public Policy and Water Sector Governance

Public policy refers to the decisions, actions, and inactions of government aimed at addressing societal problems (Howlett, M. (2023)). In the context of water supply, public policy encompasses laws, regulations, strategies, institutional arrangements, and funding mechanisms designed to ensure equitable and sustainable access to water. Effective water sector policies are expected to define roles and responsibilities, promote coordination among stakeholders, ensure accountability, and provide mechanisms for monitoring and evaluation.

Water sector governance in Nigeria operates within a federal structure involving federal, state, and local governments. While the federal government provides broad policy direction, state governments such as Kaduna State are primarily responsible for water service delivery, particularly in rural areas. Institutions like Rural Water Supply and Sanitation Agencies (RUWASSA) are created to operationalise state policies. However, policy effectiveness often depends on the capacity of implementing institutions, adequacy of funding, political commitment, and community engagement.

2.1.3 Rural Water Supply in Kaduna State

Kaduna State has adopted several policy and legal instruments to improve water supply, including sector reforms aimed at strengthening regulation, promoting sustainability, and encouraging stakeholder participation. Rural water supply initiatives in the state typically involve borehole construction, hand-pump installations, solar-powered water schemes, and sanitation interventions (Wuyep, Ziyok, Wapwera, Peter, Musa, Azi & Musa, 2025).

Despite these policy efforts, rural water supply outcomes remain uneven across communities (). Studies and reports indicate that many rural water facilities become non-functional shortly after installation due to poor maintenance, lack of spare parts, vandalism, and weak community ownership. These challenges raise questions about whether existing water sector policies are effectively designed and implemented to meet the realities of rural communities in Kaduna State.

2.2 Empirical Review

Several empirical studies have examined water supply policies and rural water accessibility in Nigeria and other developing contexts. Research has shown that policy effectiveness in the water sector is closely linked to institutional capacity, funding consistency, and community participation (Chuenchum, Meneesrikum, Teerapanuchaikul & Sriariyawat, 2024)

Raja Ariffin, Sawon, Abd Rahman, Hanafi & Zahari, 2024), Adom, & Simatele, 2024). Studies on rural water projects indicate that infrastructure provision alone does not guarantee sustainable access unless supported by effective management and monitoring systems (Nyamulo & Pastory, 2024), Odhiambo, Rambo & Catherine, 2025).

Empirical evidence from Nigerian states suggests that rural water policies often suffer from implementation gaps, where well-articulated policies fail to produce expected outcomes due

to weak coordination among agencies, limited technical capacity, and inadequate monitoring (Shimawua, 2025, Amoah, 2025). Other studies highlight that donor-driven projects may improve access in the short term but often face sustainability challenges once external funding ends.

In Kaduna State, existing empirical literature suggests mixed outcomes. While some rural communities have benefited from improved water facilities, others continue to experience water scarcity and service breakdowns. This inconsistency underscores the need for a focused evaluation of Kaduna State's water sector policies to understand their actual impact on rural water supply and identify areas for policy improvement.

2.3 Theoretical Framework

2.3.1 Policy Implementation Theory

The primary theory underpinning this study is Policy Implementation Theory, particularly the Top-Down and Bottom-Up approaches.

The top-down approach views policy implementation as a process driven by policymakers and senior government officials, where success depends on clear policy objectives, strong leadership, adequate resources, and effective control mechanisms (Buzogány, & Pülzl, 2024, Cairney, 2025). In the context of Kaduna State water sector policies, this approach emphasizes the role of state government laws, institutional mandates, and funding allocations in determining rural water supply outcomes.

Conversely, the bottom-up approach focuses on the role of local actors such as implementing agencies, local governments, community leaders, and water user associations (Mulder, 2023). This perspective argues that policies are reshaped during implementation and that local participation, discretion, and community ownership are critical to success.

This study adopts a hybrid implementation perspective, recognizing that while Kaduna State water sector policies are formulated at the state level, their effectiveness largely depends on how they are implemented at the rural and community levels.

2.3.2 Relevance of Policy Implementation Theory to the Study

Policy Implementation Theory is suitable for this study because it provides a framework for analyzing the gap between policy intentions and actual outcomes in rural water supply (Ménard, Jimenez, & Tropp, 2020). The theory helps to explain why well-designed water sector policies may fail to achieve desired results due to factors such as weak institutional coordination, inadequate funding, poor monitoring, and limited community engagement.

2.3.3 Supporting Theory: Public Goods Theory

The study is also supported by Public Goods Theory, which views water supply as a public good that government has a responsibility to provide due to its non-excludable and essential nature (Qadri & Dar, 2026). This theory justifies government intervention in rural water supply, particularly where market mechanisms fail to ensure equitable access.

Public Goods Theory strengthens the study's argument that the state must not only formulate water policies but also ensure their effective implementation to guarantee universal access to safe water for rural populations.

3.1 RESEARCH METHODOLOGY

3.2 Research Design

This study adopts a descriptive survey research design with a mixed-methods approach. The design is appropriate because it allows for systematic collection of quantitative and qualitative data to evaluate the effectiveness of Kaduna State water sector policies on rural water supply. The survey design enables the study to capture perceptions, experiences, and outcomes of policy implementation across different rural communities, while qualitative data provide deeper insights into institutional and contextual factors influencing policy effectiveness.

3.3 Area of the Study

The study is conducted in Kaduna State, located in north-western Nigeria. Kaduna State comprises diverse rural communities across its local government areas, with varying levels of water infrastructure and policy intervention. The state was selected due to the persistent challenges of rural water accessibility despite existing water sector policies and institutional reforms. Rural areas across selected local government areas form the primary focus of the study.

3.4 Population of the Study

The population of the study consists of:

1. Rural household heads in selected communities of Kaduna State;
2. Officials of the Kaduna State Rural Water Supply and Sanitation Agency (RUWASSA);
3. Relevant local government officials involved in water service delivery; and
4. Community leaders or water user committee members.

These groups are considered relevant as they are directly involved in or affected by the formulation, implementation, and outcomes of water sector policies.

3.5 Sample Size

A multi-stage sampling technique is employed to systematically narrow the population from state level to individual respondents.

3.5.1 Local Government Areas (LGAs)

Using purposive sampling, two LGAs are selected from each senatorial zone based on:

- Rural population concentration
- Presence of RUWASSA interventions
- Accessibility and security considerations

Total LGAs selected: six (6).

3.5.2 Communities

Within each selected LGA, 3–4 rural communities benefiting from rural water schemes are randomly selected using community lists provided by local authorities.

3.5.3 Households

Systematic random sampling is applied:

- Household lists serve as sampling units.
- A sampling interval (k) is calculated.
- Every k th household is selected.
- The household head becomes the respondent.

3.5.4 Institutional Respondents

- RUWASSA officials are selected purposively based on role relevance.
- Local government officials are selected using stratified purposive sampling across departments.
- Community leaders and WUC members are selected purposively due to their functional responsibilities.

3.6 Validity and Reliability of Instruments

To ensure validity, the research instruments are subjected to expert review by scholars in public administration and water resource management. Content validity is ensured by aligning questionnaire items with the study objectives and conceptual framework.

Reliability of the questionnaire is established through a pilot study conducted in a rural community outside the selected sample. Reliability coefficients are computed using appropriate statistical methods to confirm internal consistency.

4.1 DATA PRESENTATION AND ANALYSIS

4.2 Response Rate

A total of 200 questionnaires were administered to respondents across selected rural communities in Kaduna State. Out of these, 182 questionnaires were correctly completed and returned, representing a 91% response rate, which is considered adequate for the study.

4.1 Socio-Demographic Characteristics of Respondents

Table 4.1: Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	118	64.8
Female	64	35.2
Total	182	100

Interpretation:

The table shows that a majority of respondents were male. This reflects the cultural reality in many rural communities where household heads are predominantly male, though women are primary users of water.

4.3 Analysis Based on Research Objectives

Objective 1: To examine key water sector policies guiding rural water supply in Kaduna State

Table 4.2: Awareness of Kaduna State Water Sector Policies

Response	Frequency	Percentage (%)
Aware	62	34.1
Not Aware	120	65.9
Total	182	100

Interpretation:

The table reveals low awareness of water sector policies among rural residents. This suggests weak policy communication and limited grassroots engagement, which can undermine policy effectiveness.

Objective 2: To assess the level of implementation of water sector policies

Table 4.3: Availability of Government-Provided Water Facilities

Response	Frequency	Percentage (%)
Yes	104	57.1
No	78	42.9
Total	182	100

Interpretation:

Although more than half of the respondents reported the presence of government-provided water facilities, a significant proportion of communities still lack such infrastructure.

Table 4.4: Functionality of Water Facilities

Status	Frequency	Percentage (%)
Functional	63	34.6
Non-functional	78	42.9
Occasionally functional	41	22.5
Total	182	100

Interpretation:

Only about one-third of water facilities were fully functional, indicating serious implementation and maintenance challenges.

Objective 3: To evaluate the impact of water sector policies on rural water access

Table 4.5: Distance to Nearest Water Source

Distance	Frequency	Percentage (%)
Less than 500m	58	31.9
500m – 1km	72	39.6
Above 1km	52	28.5
Total	182	100

Interpretation:

A large proportion of respondents still travel long distances to access water, suggesting limited improvement in accessibility despite policy interventions.

Objective 4: Challenges affecting policy implementation

Table 4.6: Major Challenges to Rural Water Supply

Challenge	Frequency	Percentage (%)
Inadequate funding	49	26.9
Poor maintenance	56	30.8
Weak community participation	39	21.4
Institutional inefficiency	38	20.9
Total	182	100

Interpretation:

Poor maintenance and inadequate funding emerged as the most significant challenges affecting policy implementation, aligning with Policy Implementation Theory.

Objective 5: Role of community participation

Table 4.7: Community Involvement in Water Project Management

Response	Frequency	Percentage (%)
Involved	69	37.9
Not involved	113	62.1
Total	182	100

Interpretation:

Low community involvement suggests weak bottom-up implementation, contributing to poor sustainability of water facilities.

4.4 Qualitative Data Analysis (Interview Findings)

Analysis of interviews with RUWASSA officials, local government staff, and community leaders revealed the following themes:

1. Policy–Implementation Gap:

Respondents noted that while policies exist, budget releases and field-level execution are inconsistent.

2. Sustainability Challenges:

Many water projects fail due to lack of maintenance culture and absence of functional water user committees.

3. Institutional Constraints:

Shortage of technical personnel and overlapping responsibilities among agencies affect service delivery.

These findings reinforce quantitative results and validate the conceptual framework.

4.5 Discussion of Findings

The findings indicate that Kaduna State water sector policies have achieved limited success in improving rural water supply. While policies and institutions are in place, their effectiveness is constrained by weak implementation, low community participation, and sustainability challenges. This supports ****Policy Implementation Theory**, which emphasizes that policy success depends not only on formulation but also on effective execution at the grassroots level.

5.1 SUMMARY, CONCLUSION, AND POLICY RECOMMENDATIONS

5.2 Summary of the Study

This study examined the effectiveness of Kaduna State water sector policies in improving rural water supply. The motivation for the study stemmed from persistent challenges of inadequate access to safe and reliable water in rural communities despite the existence of water sector policies, legal frameworks, and implementing institutions in Kaduna State.

The study adopted a descriptive survey research design using both quantitative and qualitative methods. Data were collected from rural household heads, officials of the Kaduna State Rural Water Supply and Sanitation Agency (RUWASSA), local government officials, and community leaders. Questionnaires and interviews were used as instruments for data collection, while data analysis involved descriptive statistics and thematic analysis.

The conceptual framework guided the analysis by linking water sector policies, policy implementation mechanisms, moderating factors such as community participation and institutional capacity, and rural water supply outcomes. The study was anchored on ****Policy**

Implementation Theory**, supported by **Public Goods Theory**, to explain the observed gap between policy intentions and service delivery outcomes.

5.3 Summary of Key Findings

The major findings of the study are summarized as follows:

1. Existence of Water Sector Policies:

Kaduna State has established water sector policies, laws, and institutional arrangements aimed at improving rural water supply. However, awareness of these policies among rural residents is generally low.

2. Policy Implementation Challenges:

Although government-provided water facilities exist in some rural communities, many of these facilities are non-functional or only occasionally functional. This indicates weak implementation and maintenance systems.

3. Limited Improvement in Water Accessibility:

A significant proportion of rural residents still travel long distances to access water, suggesting that policy interventions have not sufficiently improved accessibility and reliability.

4. Institutional and Financial Constraints:

Inadequate funding, poor maintenance culture, limited technical capacity, and weak inter-agency coordination were identified as major obstacles to effective policy implementation.

5. Low Community Participation:

Community involvement in planning, operation, and maintenance of rural water projects remains low, contributing to poor sustainability of water facilities.

5.4 Conclusion

Based on the findings of the study, it is concluded that Kaduna State water sector policies have achieved only limited effectiveness in improving rural water supply. While policy frameworks and institutions exist, their impact on rural water accessibility is constrained by weak implementation mechanisms, inadequate funding, limited community participation, and institutional capacity challenges.

The study confirms that policy success in the water sector depends not only on the formulation of sound policies but also on effective implementation, continuous monitoring, and active involvement of local communities. Without addressing these implementation bottlenecks, efforts to achieve sustainable and equitable access to safe water in rural areas of Kaduna State will remain limited.

5.4 Policy Recommendations

Based on the findings and conclusions of the study, the following policy recommendations are proposed:

1. Strengthen Policy Implementation and Monitoring:

The Kaduna State Government should strengthen monitoring and evaluation frameworks within the water sector to ensure that policies are effectively implemented and regularly assessed for impact at the rural level.

2. Improve Funding and Budgetary Releases:

Adequate and timely funding should be provided for rural water supply projects, including maintenance and rehabilitation of existing facilities, to enhance sustainability.

3. Enhance Institutional Capacity:

Implementing agencies such as RUWASSA should be strengthened through training, recruitment of technical personnel, and improved coordination with local governments.

4. Promote Community Participation:

Rural communities should be actively involved in the planning, implementation, and management of water projects through functional water user committees. This will promote ownership and sustainability.

5. Increase Public Awareness of Water Policies:

Government and relevant agencies should improve communication and public enlightenment on water sector policies to enhance community understanding, cooperation, and accountability.

6. Adopt Sustainable and Appropriate Technologies:

The use of durable, climate-resilient, and locally maintainable water technologies should be prioritized to reduce frequent breakdowns and long-term costs.

7. Strengthen Transparency and Accountability:

Clear accountability mechanisms should be established to reduce mismanagement, project abandonment, and corruption within the rural water sector.

5.5 Contribution to Knowledge

This study contributes to the body of knowledge by providing empirical insights into the effectiveness of sub-national water sector policies in a Nigerian context. It highlights the critical role of implementation mechanisms and community participation in translating water policies into sustainable rural water supply outcomes.

5.6 Suggestions for Further Studies

Future studies may:

- a. conduct comparative analysis of rural water policies across different Nigerian states;
- b. assess the impact of donor-funded water projects on long-term sustainability; or
- c. examine the relationship between rural water access and public health outcomes in Kaduna State.

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