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Comparative Evaluation of Public and Private Water Supply Systems and Institutional Framework in Uyo Capital City, Akwa Ibom State, Nigeria

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Abstract

Comparative evaluation of public and private water supply systems and institutional framework in Uyo Capital City Akwa Ibom State, Nigeria was conducted with a focus on the institutional frameworks that govern their operations. Using primary data from field surveys and ten (10) key informants drawn from relevant water management institutions within Uyo Capital City, alongside secondary data from official reports and policy documents, the research assessed the efficiency, accessibility, regulatory compliance, and sustainability of the public utility of Akwa Ibom Water Company Limited (AKWCL) and various private providers, including borehole operators and sachet water producers. Results gathered indicated that private suppliers often fill critical service gaps left by the underperforming public system but frequently operate outside formal regulatory structures, raising concerns about water quality and equity. The study concludes by recommending integrated institutional reforms and stronger public-private collaboration to improve water governance in the City and ensure equitable access to safe water.

Keywords: *Public-private Water Supply, Institutional Framework, Uyo Capital City.*

Introduction

Water is one of the most abundant and essential resources of man, and occupies about 70% of earth's surface. Water in its pure state is acclaimed key to health and the general contention is that water is more basic than all other essential things to life (Abubakar & Ali 2021). Man requires a regular and accessible supply of water which provides an essential requirement for vital physiological and biochemical processes. Apart from the essential role played by water in supporting human life, it also has, if polluted, a great potential for transmitting a wide variety of diseases. Water is not only a basic necessity for human survival but also a critical determinant of public health, environmental sustainability, and socio-economic development. In a rapidly urbanising city like Uyo, the Capital of Akwa Ibom State in Nigeria, the demand for safe and reliable water has increased significantly. However, the public water supply system has struggled to meet this growing demand, leading to the proliferation of private sector participation in various forms. While the Akwa Ibom State Water Company Limited (AKWC) is statutorily responsible for public water delivery, its capacity has been increasingly undermined by outdated infrastructure, inadequate funding, policy inconsistencies, and weak regulatory enforcement (Okon and Essien, 2020, Usen, 2024). As a result of these institutional inefficiencies, the public water supply system has failed to meet the growing demand in Uyo. This scarcity has led to the emergence and dominance of private water suppliers, who now play a critical role in filling the service gap.

However, this takeover has also brought unintended consequences; the rising cost of accessing water from private sources has contributed significantly to the cost of living in Uyo, particularly among low income households. Due to absence of coordinated oversight frameworks, private water provision ranging from borehole drilling to sachet water distribution operates largely outside regulatory standards. The vacuum left by authorities has created an unstructured market that is both costly and inequitable (Akpan and Udo, 2017). This study therefore, seeks to undertake a comparative evaluation of the public and private water supply systems in Uyo, with a specific focus on the institutional frameworks governing them. The study

also offers recommendations for policy reform and sustainable water governance in Uyo Capital City, Akwa Ibom State

Despite water being a fundamental human right and a basic necessity, access to safe, reliable and affordable water remains a major challenge in Uyo capital City. The public water supply system, managed by the Akwa Ibom state Water Company Limited (AKWC), operates under service constraints which includes outdated infrastructure, insufficient funding, inconsistent power supply, and weak institutional capacity. These challenges have rendered the public system largely ineffective, with coverage reportedly below 30% (Okon and Essien, 2020). Over the years, the question of whether inadequate public water supply has been one of the greatest challenges faced in Akwa Ibom State has been often asked. Despite the efforts of both the government and non-government bodies in solving the challenge, the problem still persists as access to public water supply decreased extensively, from 14% in 1990 to 6% in 2008 (World Health, Organization, 2010). In the face of these deficiencies, private water providers ranging from borehole operators to sachet water vendors and tanker suppliers have rapidly expanded to fill the supply gap. However, these private services often come at high financial costs and lack proper regulation and quality control. The unregulated nature of private water vending has led to questionable hygiene standards and arbitrary pricing, significantly burdening low-income households. The cost of daily water need has quietly evolved into crisis, especially in a context where minimum wages is not equivalent to cost of living (Nwachukwu, 2018). In addition to this situation is the fragmented institutional framework governing water supply in Uyo. Multiple agencies with overlapping responsibilities including the Ministry of Water Resources, Akwa Water Company (AKWC), the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA), and local governments operate without clear coordination. This has resulted in policy gap, governance inefficiencies, limited community participation and proper water screening, all of which undermine efforts toward equitable and sustainable water service delivery. The cumulative effect of these challenges is a growing problem in water access, rising cost of living and potential public health risks. Without urgent institutional reform and a more coordinated governance framework, the water crisis in Uyo will continue to deepen, especially for the most low income earners.

1.3 Aim and Objectives

The primary aim of this study was to compare public and private water supply systems and evaluate the institutional frameworks that govern them in Uyo Capital City. This was achieved with the following objectives,

1. Examine the institutional framework and mechanisms guiding water supply in the city
2. Identify the challenges and limitations associated with both public and private water provision.
3. Evaluate the impact of water supply issues on the cost of living and equity among residents.

1.4 Research Questions

To achieve the aim and objectives stated in this work, the following were the research questions.

1. What are the main challenges faced by public and private water providers in delivering sustainable water services in Uyo?
2. What are the major differences between public and private water supply systems in terms of accessibility, affordability, and quality in Uyo?
3. How has the dominance of private water supply affected the cost of living and equity in water access among residents?

Study Area

Uyo Capital City, located in the South-South geopolitical zone of Nigeria, serves as the administrative headquarters of Akwa Ibom State. Geographically, it is positioned between latitudes 4°58'N and 5°04'N and longitudes 7°51'E and 8°01'E as seen in figure 1.0. The city experiences a humid tropical climate with high annual rainfall, making it conducive for both surface and groundwater development. Major surface water bodies, including the Ikpa River and Iba Oku stream, contribute to the city's hydrological potential. However, the underutilization of these resources, due to infrastructural and management constraints, has limited their contribution to domestic water supply (Ansa and Ukpong, 2015).

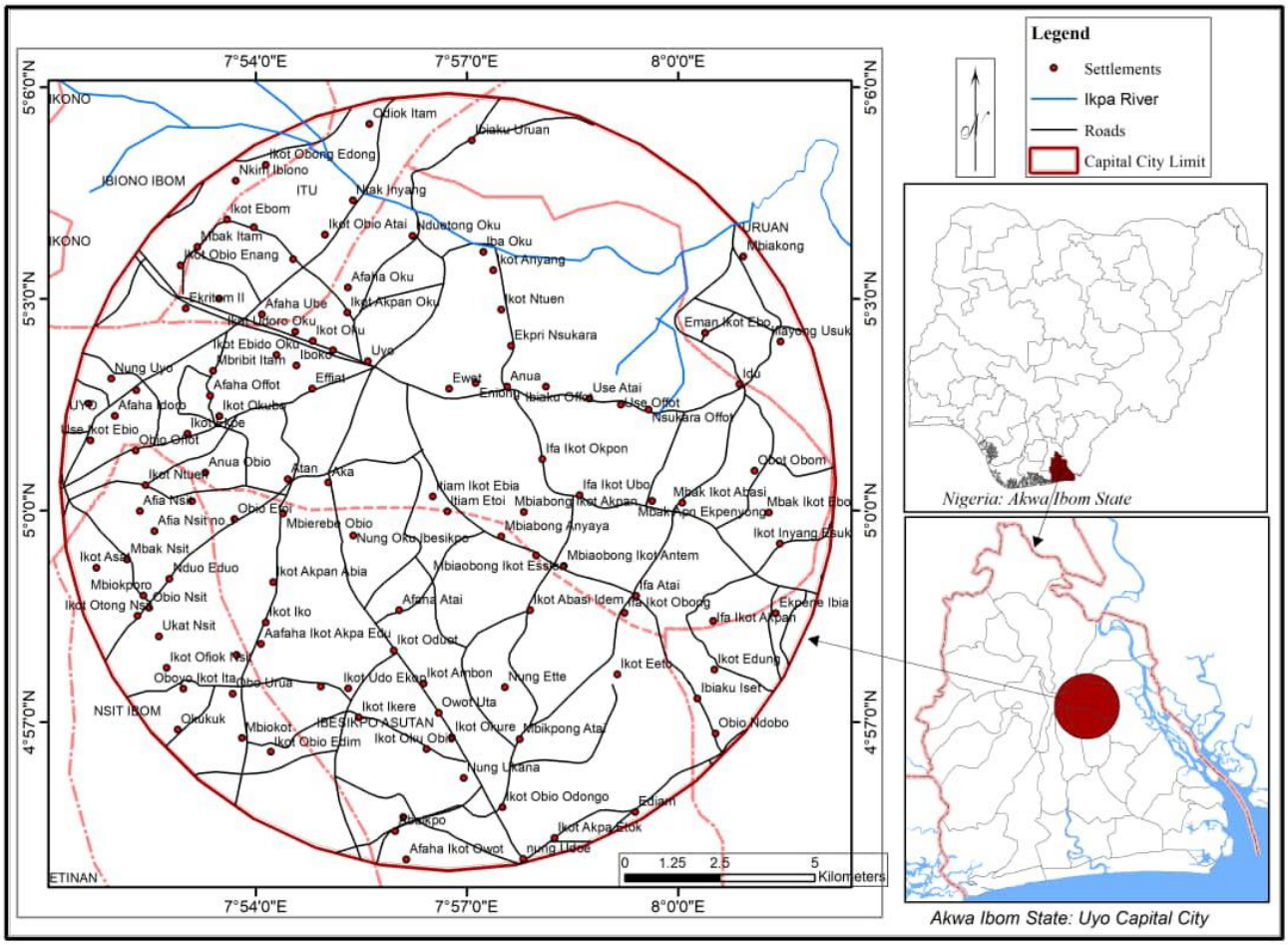

Figure 1:0 Uyo Capital City

Source: Akwa Ibom State Ministry of Lands and Town Planning, 2025

Conceptual Framework

Sustainable water resource is defined as a flux of water that is managed with the objective of maintaining the availability and quality of water for as long as the current climate prevails. The term was first coined several hundreds of years ago by Hans Carl von Carlowitz in his 1712 text titled *Sylvicultura Oeconomica*. Sustainable water resources management is a concept that emphasizes the need to consider the long-term future as well as the present. The 2030 Agenda sets forward 17 SDGs and 169 global targets, relating to development and outcomes for 15 years (2015-2030). Specifically, Goal 6 – Ensure availability and sustainable management of water and sanitation for all – reflects the concern and strategy to make water accessible to populations of the world. The goal is to make freshwater, in sufficient quantity and quality, available for all aspects of life and sustainable development. This aligns with the human right to water (Kalu, Etim, Jonathan and Eja, 2019). The target for achieving SDG 6 can be summed up as follows: achieve access to safe and affordable drinking water; achieve access to sanitation and hygiene and end open defecation; improve water quality, wastewater treatment and safe reuse; increase water-use efficiency and ensure freshwater supplies; implement integrated water resources management; protect and restore water-related ecosystems; expand international cooperation and capacity-building, and support stakeholder participation. While water sustainability is used here to mean working towards effectively making water available for the present generation and for the next generation, water resource management refers to the strategy to be put in place to ensure water sustainability. "Sustainability" in general terms, means the "ability to be maintained at a certain level" (Kalu, Etim, Jonathan and Eja, 2019). By comparing how each system operates and is managed, the study aims to identify strengths, weaknesses, and areas for improvement in service delivery. Overall, the concept of sustainable water resources management helps guide the evaluation of how different supply systems contribute to or limit access to safe and reliable water in the city.

Materials and Methods

This study used a descriptive survey design to collect quantitative and qualitative data without manipulating variables. This approached enabled a comprehensive assessment of household water usage and institutional

governance practices. In carrying out this study, a multistage sampling technique was applied. Data were derived from both primary source of data and secondary sources of data. The primary data involved the first-hand information collected in the field by the researcher with the use of questionnaire, personal interviews and field observation. A validated structured questionnaire was administered which contains questions related to the study problems, direct interviews were conducted with residents in household and some personnel from relevant institutions such as the Akwa Ibom Water Company Limited, the Ministry of Water Resources, private Water Vendors, and Environmental health officers. For this success of this sampling, the Uyo Capital City was first stratified into three major zones based on population density and urban development patterns:

i. Urban core (this comprises of Ewet Housing, Oron Road axis),
ii. Peri-Urban Areas (this comprises of Use Offot, Ikot Ntuen),
iii. Developing/suburban Zone (e.g., Nung Udoe, Nung Ukim).

This helped capture the variation in water supply access, usage patterns, and infrastructure across different parts of the city. From each of the three strata, five (5) communities were randomly selected, resulting in a total of 15 communities. In each of the selected community, 20 households were sampled using a systematic random sampling technique. Every third or fifth house (depending on population density) was selected using a random starting point. This gave a total of 300 household respondents (15 communities x 20 households). In addition to primary data, secondary data were collected from ten (10) key informants selected using purposive sampling, based on their expertise, institutional roles, and relevance to the study. These included officials from the ministry of Water Resources and Environment, senior staff from Akwa Ibom Water Company Limited (AKWCL), registered private borehole operators and sachet water producers and Local government environmental health officers. This allowed the researcher to collect targeted insights on regulatory frameworks, policy implementation, and operational challenges from experienced stakeholders. The quantitative data which were obtained through structured questionnaires were processed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as frequency distributions and percentages were applied to interpret socio-demographic data and household water usage patterns. Also, qualitative data derived from key informant interviews and observations were manually transcribed and analyzed thematically. Recurring issues such as regulation, service delivery, and infrastructure challenges were identified, categorized, and interpreted to support findings from the quantitative data.

Ethical Considerations

Ethical approval was obtained prior to data collection, and all research activities were conducted in accordance with established ethical guidelines. Firstly, the respondents survey voluntarily participated in the survey. Hence, there was no use of force or threats to get information. The questionnaires were designed in such a way that a letter of introduction of the study and researcher preceded the questions. The letter showed the identity of the researchers, as well as the intendment of the research, leaving the participant with the choice to either answer the questions or decline. In order to guarantee confidentiality, the questionnaires were designed to ensure that the respondents did not indicate their names and specific addresses but community names were used. The questionnaires were designed in such a way that options or possible answers were presented to the respondents to choose from and tick as appropriate.

Result and Discussion

Socio-demographic characteristics

Socio-demographic profile of respondents revealed a relatively youthful and educated population. The data are summarized in table

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	135	45.0
	Female	165	55.0
Age group	18-30	82	27.4
	31-45	125	41.7
	46-60	66	22.0

	Above 60	27	8.9
Educational level	No Formal/Primary Education	31	10.3
	Secondary Education	89	29.6
	Tertiary Education	180	60.1
Occupation	Informal Sector	188	62.7
	Civil/Public Service	74	24.7
	Others (Unemployed/Retired)	38	12.6

Sources of Water Supply, Cost and Perception of Water Quality

The majority of respondents (70%) relied on private sources such as boreholes, sachet water, and water vendors. Only 20% used public taps or pipe borne water, while 10% used mixed sources. Accessibility and reliability were cited as major reasons for choosing private sources. In Uyo Capital City, following the response from the respondents, private users spent over #3,000 - #5,000 monthly depending on individual water usage, sachet water was rated the highest with a pack containing 20 sachets selling for #500. For the quality of water, only 10% of respondents trusted untreated public tap water.

Key Informant Themes

In-depth interviews were conducted with ten (10) key informants drawn from relevant water management institutions within Uyo Capital city.

Institution	Key Points Raised by Informant
AKWCL	Poor infrastructure, limited coverage, low funding
Ministry of Water Resources	Policy oversight hindered by inter-agency overlaps
Borehole Operators	Operate with flexibility but minimal oversight
Sachet water Producers	Registered, but quality checks are infrequent and is sometimes replaced with bribe to cover up
Environmental Health Officers	Need for regular inspections, centralized vendor database, community sensitisation.

Summary of Key Informant Themes and Perspectives

Discussion of Findings

The findings from this study present a multifaceted understanding of water access, cost, and governance in Uyo Capital City, underpinned by both household survey data and insights from key informants. These findings are consistent with broader research across Nigeria and Sub-Saharan Africa, highlighting systemic issues in water service delivery and the growing dependence on private sources. The socio-demographic profile of respondents indicates a relatively youthful and educated population, with a majority aged between 18–45 years (69.1%) and 60.1% having attained tertiary education. This suggests that the population is potentially informed about water quality issues and may have higher expectations regarding service delivery. A similar demographic structure was observed in studies conducted by Oloruntade et al. (2022) in southwest Nigeria, where younger, educated populations showed heightened awareness and preference for perceived safe water sources. The gender distribution was fairly balanced, with a slight female majority (55.0%). The occupational data reveals that most respondents (62.7%) are engaged in the informal sector, implying varying income levels and possibly limited financial capacity to consistently afford high-cost water options. This financial vulnerability has been linked to water insecurity in urban areas, as reported in Amoah et al. (2018), where informal workers in Accra and Lagos faced disproportionate water costs due to privatized access models.

The study reveals a heavy dependence on private water sources such as boreholes, sachet water, and water vendors, with 70% of respondents using these options. This is consistent with Akinbode & Ugbomeh (2018) and Ojolowo & Odugbemi (2020), who documented that residents in urban centers across Nigeria, including Port Harcourt and Ibadan, overwhelmingly depend on self-supplied or vendor water due to the unreliability of public utilities. This reliance on private sources comes with significant financial implications. Majority of households reported monthly expenditures ranging from ₦3,000 to ₦5,000, depending on usage. Among these, sachet water—often perceived as

cleaner—is the most expensive on a per-liter basis, with a 20-pack costing ₦500. Abubakar, & Ali (2021) found similar patterns in Adamawa, where sachet water consumption was high despite financial constraints, indicating a willingness to pay more for perceived quality, even when affordability was a challenge. Furthermore, Achore, Essien, & Udoh (2020) emphasized that in many Nigerian cities, private water sources are often unregulated, and pricing structures vary widely, further exacerbating inequities in water access, particularly for low-income and informal sector households. Only 10% of respondents trusted untreated public tap water, underscoring a widespread distrust of public water systems. This reflects more than a technical failure—it indicates a confidence gap in governmental service delivery. This distrust is echoed in studies by Edokpayi et al. (2018) and Adithya et al (2021) which found that even when public water is available, residents often resort to private alternatives due to perceived or actual contamination. These findings are supported by Udoetok et al. (2021), who assessed sachet water in Uyo and found that over 80% of brands failed to meet WHO microbial standards, reinforcing local concerns about water safety across all sources—public or private.

The Akwa Ibom Water Company Limited (AKWCL) reported poor infrastructure, limited coverage, and underfunding, consistent with Essien & Etim (2020), who noted that water boards across Nigeria operate under severe financial and technical constraints. The Ministry of Water Resources highlighted policy overlaps and inter-agency fragmentation. Similar governance failures have been documented by Essang, Etim & Akpan (2024) in their study on urban water governance in Akamkpa, Cross River State where unclear institutional mandates led to weak accountability. Borehole operators, while meeting urgent water needs, operate with minimal regulatory oversight, raising questions about water quality and sustainability. This mirrors findings from Nwokem (2023), who observed that boreholes in many Nigerian cities often bypass environmental standards due to enforcement lapses. Sachet water producers, though registered, are subject to infrequent inspections, and allegations of bribery affect quality assurance. Nwidu, Oveh, Okoriye and Vaikosen (2021) also noted that in Ilorin, regulatory agencies often lacked the capacity or independence to conduct routine water quality checks, leading to widespread public health risks. Environmental Health Officers in this study emphasized the need for a centralized vendor registry, routine inspections, and community sensitization—recommendations that align with UNICEF and WHO (2019) calls for enhanced local water governance and citizen engagement to improve trust and transparency.

Conclusion and Recommendations

This study finding revealed that private sources dominate water access due to their reliability and convenience, despite being costlier and lacking adequate regulatory oversight. Public water systems, though more affordable, are limited by infrastructural decay, poor funding, and institutional inefficiencies. Interviews with key informants from relevant industries in Uyo Capital City further emphasized the fragmented nature of water governance and absence of strong monitoring frameworks for private suppliers. From this analysis, it could be seen that the current water landscape in Uyo reflects a reliance on private alternatives as a coping mechanism for public sector failure, which is neither equitable nor sustainable in the long term. There is a need for achievable reforms to ensure that all residents have access to safe, affordable, and sustainable water. To address the challenges sorted out by the study, the listed recommendations are to be considered. The Akwa Ibom State Government should prioritize investments in public water infrastructure to expand access and reliability. The Government should give clear assigned duties to each approved organization involved in the water assessment in the state so as to avoid clash of responsibities. Public-private partnerships should be encouraged for sustainable water service delivery There should be thorough screening of private water quality by appropriate organizations responsible for the activity. This will bring remedy to the issue of private water quality.

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