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Water Scarcity and its Effect on Daily Activities of Residents in Chikun LGA

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Abstract

Water scarcity is a major challenge in Chikun Local Government Area (LGA), Kaduna State, affecting daily household activities, sanitation, and public health. This study examines water availability, the impact of shortages on residents, and coping strategies used to manage limited supply. A descriptive research design was employed, with data collected through structured questionnaires administered across selected wards. The sample size was determined using Taro Yamane's formula, ensuring a representative study population. Findings reveal that groundwater sources (well and borehole) are the primary water sources, but frequent shortages force residents to rely on wells, rivers, and water vendors, leading to increased costs and unreliable supply. Water scarcity disrupts sanitation and hygiene, contributing to a higher prevalence of waterborne diseases such as diarrhea and typhoid fever. To cope, residents adopt measures like purchasing water, rationing use, and harvesting rainwater, though these strategies are not sustainable. The study recommends government investment in boreholes and piped water networks, improved water management policies, and community-led initiatives to enhance long-term water accessibility. Addressing these challenges will improve sanitation, health, and economic stability in Chikun LGA.

Keywords: ***water scarcity, sanitation, water management, household coping strategies, Chikun LGA***

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Introduction

Water is a fundamental resource essential for survival, public health, and economic development worldwide. However, water scarcity has become a global challenge, affecting billions of people, particularly in arid and semi-arid regions. According to the United Nations (2022), nearly 2.2 billion people worldwide lack access to safe drinking water, with climate change, population growth, and poor water management exacerbating the crisis. Many countries continue to struggle with the availability and equitable distribution of freshwater resources, making access to clean water a key factor in achieving sustainable development.

In Africa, water scarcity remains a critical issue, particularly in sub-Saharan regions where access to clean water is often limited. Reports by the African Development Bank (2021) indicate that over 300 million people in Africa lack access to safe drinking water, with rural communities being the most affected. Rapid urbanization, poor infrastructure, and increasing droughts have further strained water resources. Countries such as Ethiopia, Kenya, and Nigeria face periodic water shortages, leading to food insecurity, poor sanitation, and increased health risks. Additionally, many African nations depend on seasonal rainfall, making their water supply highly unpredictable and unreliable.

In Nigeria, water scarcity is a growing concern, particularly in northern and central regions where irregular rainfall and inadequate water infrastructure impact millions of residents. According to Nigerian Water Resources Management Agency (2022), about 60 million Nigerians lack access to clean water, with rural communities depending on unreliable sources such as wells, streams, and boreholes. Urban areas also face challenges due to aging water supply systems and rapid population growth, which have increased the demand for water beyond available capacity. Poor sanitation,

pollution, and over-reliance on groundwater have further worsened the country's water crisis.

In Chikun LGA, Kaduna State, water scarcity has become a pressing issue, affecting household activities, sanitation, and livelihoods. Many residents rely on groundwater sources, and rivers as their primary water sources, but these are often unreliable, especially during the dry season. The lack of sufficient water infrastructure and frequent shortages has forced residents to travel long distances to fetch water or purchase it from vendors at high costs (Okonkwo *et al*., 2022). This study seeks to assess the extent of water scarcity in Chikun LGA, its impact on daily life, and the coping mechanisms adopted by residents. Additionally, the research will explore sustainable water management solutions to improve access and ensure long-term water security in the area.

Statement of the Problem

Despite the essential role of water in human survival, many communities in Chikun LGA lack reliable access to clean water. The growing population, climate change, and poor infrastructure have exacerbated the water crisis in the area (Bello and Adepoju, 2021). Residents face difficulties in performing daily tasks such as cooking, washing, and maintaining hygiene due to water shortages. Furthermore, reliance on untreated water sources increases the risk of waterborne diseases, posing significant public health concerns (WHO, 2019). The specific objectives of this study are to assess the availability and sources of water in Chikun LGA, examine the effects of water scarcity on household activities and sanitation, identify coping strategies adopted by residents in response to water shortages, and recommend sustainable measures to improve water access in the area.

Location

Chikun Local Government Area (LGA) is in Kaduna State, Nigeria, with a

mix of urban and rural settlements. It lies between latitudes 10°30'N and 10°58'N and longitudes 7°20'E and 7°50'E. The area has varied elevation, which influences its drainage and topography.

Fig. 1: Chikun LGA showng sampling locations. Source: Adapted from GoogleEarth and modified by author, 2025.

Chikun LGA experiences a tropical savanna climate (Aw) with annual rainfall between 1,000 mm and 1,500 mm. The rainy season lasts from April to October, while the dry season extends from November to March. Temperatures fluctuate, with cooler months during harmattan and peak heat between March and April. Seasonal water shortages occur as most rivers and streams are ephemeral, creating challenges for residents. The area is situated

within a sedimentary basin characterized by layers of sand, gravel, and other unconsolidated materials. The ferruginous tropical soil supports agriculture, while the Guinea Savannah vegetation consists of scattered trees such as Isoberlinia doka, Daniellia oliveri, and African locust bean trees. However, deforestation and farming have led to land degradation.

Literature Review

Economic Importance of Water Resources

Water plays a vital role in agriculture, domestic use, and small-scale businesses in Chikun LGA. The main crops include maize, yam, millet, and groundnuts, but inconsistent water supply limits productivity. Households depend on rivers and groundwater sources, while water vendors provide supply in areas with shortages, though affordability remains an issue. Effective water management can enhance food security and economic stability (Ogunyemi, 2022).

Challenges and Benefits of Sustainable Water Management

Sustainable water management improves agriculture, sanitation, and economic growth. It helps reduce water scarcity, land degradation, and seasonal shortages while creating new economic opportunities such as small-scale irrigation and fisheries. However, poor infrastructure, over-reliance on groundwater, and lack of government intervention pose risks like water shortages, contamination, and long-term sustainability challenges (Richards, 2020; Hughes, 2022).

Theoretical Framework: Integrated Water Resource Management (IWRM)

The Integrated Water Resource Management (IWRM) framework focuses on managing water, land, and related resources for social and economic benefits while protecting the environment. It helps assess how water scarcity affects

households, agriculture, and public health. Understanding these issues is essential for developing policies that improve water conservation, infrastructure, and sustainable usage in Chikun LGA (GWP, 2000).

Methodology

This study employs a descriptive research design to assess water scarcity and its impact on residents in Chikun Local Government Area (LGA). Primary data were collected through structured questionnaires administered across three selected wards: Gwagwada, Kakau, and Rido, ensuring diverse representation of the population.

The sample size was determined using Taro Yamane's formula for sample size calculation:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where: n = Sample size; N = Population size (550,000 projected for 2022); 1 = Constant; $(e)^2$ = Margin error (0.05)

Substituting the values:

$$n = \frac{550{,}000}{1 + 550{,}000(0.05)^2}$$

$$n = \frac{550{,}000}{1 + 1375}$$

$$n = \frac{550{,}000}{1376}$$

$$n = 399.709$$

$$\approx 400$$

Thus, a sample size of approximately 400 respondents was determined to be statistically appropriate to ensure a 5% margin of error and better representativeness of the population. Data analysis was conducted using descriptive statistics, including frequencies and percentages, with results presented in tables and charts. This approach provides a structured

understanding of water availability, household coping mechanisms, and potential sustainable solutions for improving water access in the study area.

Results and Discussion

Demographic Characteristics of Respondents

This section presents key demographic details, including gender, age, education level, and occupation, to understand the background of the study population.

Table 1: Demographic characteristics of respondents

Variable	Frequency	Percentage (%)
Gender		
Male	181	46
Female	213	54
Total	394	100
Age Group		
18 – 30 years	110	28
31 – 45 years	193	49
46 – 60 years	75	19
Above 60 years	16	4
Total	394	100
Educational Level		
No formal education	59	15
Primary education	91	23
Secondary education	142	36
Tertiary education	102	26
Total	394	100
Occupation		
Farming	162	41
Trading/Business	102	26
Civil Service	83	21
Others (Specify)	47	12
Total	394	100

Source: Author's Analysis, 2025

Table 1 show that females (54%) slightly outnumber males (46%) among respondents. This distribution was due to availability of respondents during data collection. It shows that women took part in the study, but it doesn't clearly prove that they are more involved in managing household water. Most respondents (49%) are aged 31–45 years, followed by 28% in the 18–30 years group, suggesting that water-related activities are mainly handled by people in their productive years. Most of the respondents are aged 31–45 years (49%), followed by those aged 18–30 years (28%). This means that many of them are in their working and family-raising years, making them more likely to feel the impact of water shortages on their jobs, health, and home life. Education levels vary, with 36% completing secondary education, 26% reaching tertiary education, 23% having only primary education, and 15% with no formal education. Lower education levels may limit awareness of water conservation and alternative livelihoods, while higher education can improve access to formal jobs and better water management practices.

Farming is the dominant occupation, accounting for 41% of respondents, highlighting the community's reliance on agriculture. Trading/business (26%) and civil service (21%) provide alternative income sources, while 12% are in other occupations. Since most people depend on farming, water scarcity directly affects their livelihoods. Limited job diversity may force residents to rely more on natural resources, making access to water crucial for economic stability. These findings align with Eze and Okonkwo (2023), who found that rural communities in Northern Nigeria depend heavily on farming and informal trade, with education levels influencing how they adapt to environmental challenges. To improve water access and livelihoods in Chikun LGA, better water infrastructure, conservation awareness, and more job opportunities are needed.

Availability and Sources of Water in the Area

This section examines the primary sources of household water, frequency of

shortages, and the distances residents travel to access water.

Table 2: Primary water sources for household use

Variable	Frequency	Percentage (%)
Groundwater (borehole/well)	264	67
River/stream	75	19
Water vendor	55	14
Total	394	100

Source: Author's Analysis, 2025

Table 2 shows that most households (67%) get their water from groundwater sources like boreholes and wells. Rivers and streams are used by 19% of households, especially where boreholes are not available. About 14% of people buy water from vendors. This supports Okoye and Yusuf (2021), who found that rural areas in Northern Nigeria mostly depend on boreholes and wells, with rivers and vendors serving as backup sources.

Fig. 2: ***Frequency of water shortages experienced by households during dry season.*** *Source: Author's Analysis, 2025*

Figure 2 shows that during the dry season, 36% of respondents face daily water shortages, 31% experience shortages weekly, 21% monthly, and only 12% have rare shortages. This indicates that water scarcity is a common problem in the dry season for households in the areas. These results are similar to those of Ayoade *et al.* (2020), who found that frequent water

shortages in Kaduna State, especially in the dry season, disrupt daily life and force many households to use alternative, sometimes unsafe, water sources.

Table 3: Distance traveled to fetch water when primary source is unavailable

Variable	Frequency	Percentage (%)
Less than 500 meters	102	26
500 meters – 1 km	122	31
1 – 3 km	91	23
More than 3 km	79	20
Total	394	100

Source: Author's Analysis, 2025

Table 3 further shows that 31% of respondents travel between 500 meters and 1 km to fetch water when their primary source is unavailable, while 26% travel less than 500 meters. However, 23% must walk between 1–3 km, and 20% travel more than 3 km, reflecting a significant burden on households, particularly women and children, who often bear the responsibility of water collection. Similar trends were reported by Adamu and Mohammed (2019), who found that in many rural Nigerian communities, long-distance water collection leads to time loss, increased physical strain, and reduced productivity.

Effects of Water Scarcity on Household Activities and Sanitation

This section explores how water shortages impact daily household tasks, sanitation practices, and the health risks associated with inadequate water supply.

Table 4: Household activities most affected by water shortages

Variable	Frequency	Percentage (%)
Cooking	91	23
Washing clothes	99	25
Bathing and personal hygiene	75	19
All of the above	129	33
Total	394	100

Source: Author's Analysis, 2025

Table 4 indicates that water shortages significantly affect multiple household activities, with 33% of respondents reporting that cooking, washing, and bathing are all impacted. Among individual activities, washing clothes (25%) is the most affected, followed by cooking (23%) and bathing/personal hygiene (19%). This finding supports Olawale and Ajayi (2022), who noted that water scarcity disrupts essential domestic tasks, particularly washing and cooking, increasing the burden on women and affecting hygiene standards in the home.

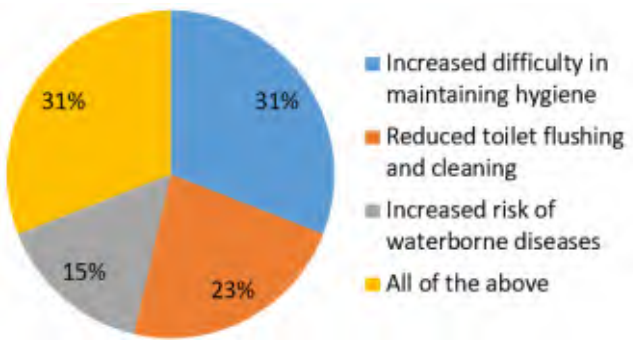

Fig. 3: ***Sanitation challenges caused by water shortages.*** *Source: Author's Analysis, 2025*

Figure 3 highlights the sanitation impact of water shortages, with 31% of respondents experiencing multiple sanitation-related challenges, including difficulty maintaining hygiene, reduced toilet flushing, and an increased risk

of waterborne diseases. Additionally, 31% reported hygiene challenges, 23% experienced difficulties flushing toilets, and 15% faced increased risks of waterborne diseases due to poor water quality and inadequate supply. This aligns with Ibrahim and Musa (2020), who found that poor water access in rural Kaduna communities leads to poor sanitation, increasing exposure to diseases such as cholera and typhoid fever.

Table 5: Health issues experienced due to lack of clean water

Variable	Frequency	Percentage (%)
Typhoid fever	162	41
Diarrhea	114	29
Dysentery/Cholera	91	23
None	27	7
Total	**394**	**100**

Source: Author's Analysis, 2025

Table 5 shows the health problems caused by a lack of clean water. The most common health issue was typhoid fever, affecting 41% of respondents, followed by diarrhea (29%) and dysentery/cholera (23%). Only 7% of respondents reported no health issues. These results align with the findings of Ayoade *et al.* (2020), who reported that waterborne diseases like typhoid fever and diarrhea are common in areas with poor water quality in Kaduna State.

Coping Strategies Adopted by Residents in Response to Water Shortages

This section highlights the alternative water sources and conservation methods used by residents to manage water shortages.

Table 6: Alternative water sources used during periods of shortage

Variable	Frequency	Percentage (%)
Rainwater harvesting	102	26
Buying from vendors	142	36
Fetching from distant wells/streams	91	23
Borrowing from neighbors	59	15
Total	394	100

Source: Author's Analysis, 2025

Table 6 shows that buying from vendors (36%) is the most common alternative source of water when the main supply is unavailable. Rainwater harvesting (26%) is also widely used, while 23% rely on fetching water from distant wells or streams, and 15% borrow from neighbors. These findings align with Ayoade *et al*. (2021), who found that in rural Nigerian communities, commercial water vendors play a crucial role in meeting household water demands, especially during shortages.

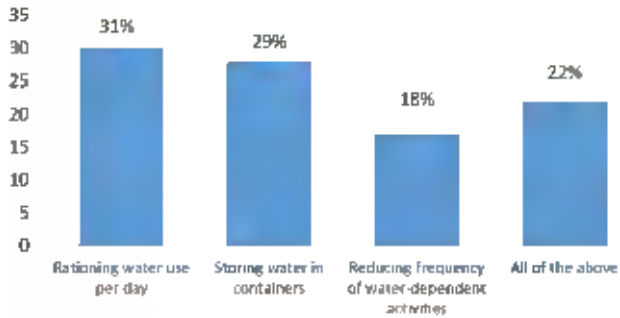

Fig. 4: ***Water conservation strategies adopted by household.*** *Source: Author's Analysis, 2025*

Figure 4 highlights how residents manage water consumption during shortages. 31% ration water daily, while 29% store water in containers to ensure supply. 18% reduce the frequency of water-dependent activities, and 22% adopt all of these strategies. This supports the findings of Olawale and Ajayi (2022), who noted that water conservation strategies, such as rationing and storage, are widely practiced in water-scarce areas.

Table 7: Participation in community-led water initiatives

Variable	Frequency	Percentage (%)
Yes, a local water cooperative	91	23
Yes, a self-funded borehole project	75	19
No, but I am interested	142	36
No, I am not aware of any	86	22
Total	394	100

Source: Author's Analysis, 2025

Table 7 further reveals that while 23% of respondents have joined a local water cooperative and 19% contributed to self-funded borehole projects, 36% expressed interest but have not participated in any initiative, and 22% were unaware of such efforts. This aligns with Adamu and Mohammed (2020), who found that while community-led water projects improve access, many residents remain uninformed or hesitant to engage due to financial constraints or lack of awareness.

Sustainable Measures to Improve Water Access in the Area

This section discusses long-term solutions to water scarcity and the role of government, NGOs, and community participation in improving water accessibility.

Table 8: Preferred long-term solutions to water scarcity

Variable	Frequency	Percentage (%)
Government investment in boreholes/water facilities	158	40
Rainwater harvesting systems for households	87	22
Community-led water conservation initiatives	71	18
Expansion of piped water supply	79	20
Total	394	100

Source: Author's Analysis, 2025

Table 8 highlights the preferred long-term solutions to water scarcity in

Chikun LGA. 40% of respondents support government investment in boreholes and water facilities, while 22% favor rainwater harvesting for households. Community-led water conservation initiatives (18%) and expansion of piped water supply (20%) were also identified as viable options. These results align with Ibrahim and Musa (2021), who emphasized the role of government intervention in improving rural water access, as borehole installations and pipeline expansion are key to sustainable water supply.

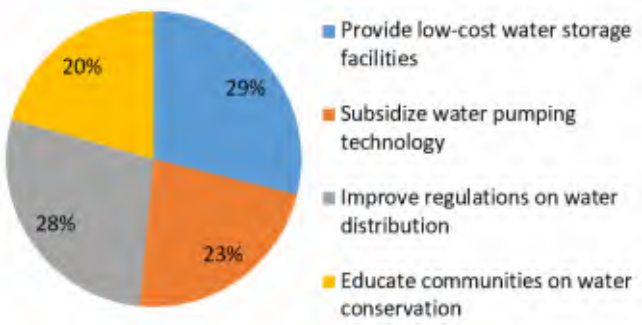

Fig. 5: Suggested government and NGO interventions for water accessibility.
Source: Author's Analysis, 2025

Figure 5 outlines the ways in which government and NGOs can support water access. 29% of respondents prefer low-cost water storage facilities, 28% advocate for improved water distribution regulations, 23% suggest subsidies for water pumping technology, and 20% support community education on water conservation. These findings are consistent with Eze and Okonkwo (2022), who found that policies promoting affordable water storage and better distribution management significantly enhance rural water availability.

Table 9: Willingness to contribute financially to community water projects

Variable	Frequency	%
Yes, through monthly contributions	134	34
Yes, through a one-time donation	118	30
No, I cannot afford it	75	19
No, I don't trust community projects	67	17
Total	394	100

Source: Author's Analysis, 2025

Table 9 assesses willingness to contribute financially to a community water project. 34% of respondents are willing to make monthly contributions, while 30% prefer a one-time donation. However, 19% cannot afford to contribute, and 17% lack trust in community projects. This aligns with Ogunleye and Yusuf (2023), who found that while rural residents recognize the importance of sustainable water projects, financial limitations and transparency concerns often deter participation.

Discussion of Findings

The study reveals that water scarcity in Chikun LGA significantly affects daily life, sanitation, and economic activities. Most households rely on boreholes as their primary water source, but frequent shortages force many residents to fetch water from distant locations, placing a burden on women and children. Among household activities, washing clothes is the most affected, while poor water access also leads to hygiene challenges, reduced toilet flushing, and a higher risk of diseases such as diarrhea. To cope, buying water from vendors is the most common alternative, though it is often costly and unreliable. Many residents believe that government investment in boreholes and water facilities is the best long-term solution, but financial constraints prevent some from contributing to community water projects. These findings highlight the need for better infrastructure, improved water management, and stronger government intervention to enhance water

supply, sanitation, and overall well-being in Chikun LGA.

Conclusion and Recommendations

The findings of this study reveal that water scarcity in Chikun LGA significantly affects daily household activities, sanitation, and economic productivity. Groundwater sources remain the primary water sources, but frequent shortages force many residents to travel long distances to fetch water, placing a burden on women and children. The scarcity of clean water disrupts essential domestic activities such as washing, cooking, and bathing, leading to poor hygiene and increased exposure to waterborne diseases like diarrhea and typhoid fever. Many residents rely on water vendors and rainwater harvesting as coping strategies, but these measures are often unreliable and unsustainable. Despite financial challenges, most respondents believe that government investment in boreholes and water infrastructure is the most effective long-term solution. These findings emphasize the urgent need for improved water access and management to enhance public health and overall well-being in Chikun LGA.

To address these challenges, the government should invest in boreholes, expand piped water supply, and improve water distribution networks to ensure reliable access. Community-led initiatives should be encouraged to promote rainwater harvesting and water conservation practices. Public awareness campaigns on sustainable water use should be implemented to help residents manage resources efficiently. Additionally, NGOs and private organizations should support water projects by providing affordable storage facilities and subsidizing water-pumping technology. To ensure the success of community-based water projects, transparent management systems should be established to build trust and encourage financial contributions from residents. By adopting these measures, Chikun LGA can achieve sustainable water management, improve sanitation, and enhance the quality of life for its residents.

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