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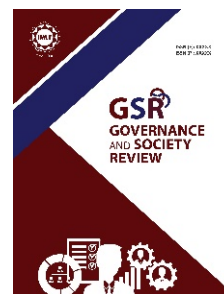
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Accessibility to Potable Water Supply and Satisfaction of Urban Residents in Lokoja, Nigeria

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Abstract

The current study aims to assess household accessibility to domestic water supply in Lokoja, Nigeria. For this purpose, two hundred and ten households were systematically sampled and information was gathered on their sources of water supply, frequency of trips to water collection points, and their perception of the quality of domestic water available for them. Relevant information was obtained from archival materials. Tables were employed to analyse the socio-economic composition of the respondents and the sources of water supply in the neighbourhoods. The Likert scale model was employed to evaluate the understanding and thinking about the satisfaction on quality and adequacy of domestic water supply in the city. ANOVA was also used to evaluate the level of satisfaction with the quantity and quality of domestic water supply across various residential areas in Lokoja, Nigeria. Pearson Product Moment Coefficient (PPMC) was used to determine the strength and direction of association that exist between domestic water supply, on one hand, and income level, education profile and residential characteristics of households on the other hand. Findings revealed that more than 70% of households residing at Zango Daji and Army Barracks areas rely on boreholes for their regular water supply. Well water and water from vendors are the principal sources of water for residents of Felele area and these constituted of 48.1% and 25.9%, respectively. Approximately, 100%, 57.7%, and 34.6% of urban households that reside at Old Poly Quarters, Lokongoma Phase 1 and 11 and Kabawa areas respectively, indicated that they rely on irregular and unpredictable public tap water supply provided by the Kogi State Water Management Board. Urban households perceived and rated the availability and quality of domestic water supply as dissatisfied. There is a linear relationship between sources of domestic water supply and urban household income level as well as education profile, which was statistically significant ($r = .196$, $n = 189$, p

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= .01) and ($r = .282, n = 189, p = .01$). Furthermore, the study recommended certain provisions related to potable water supply in the urban households, in order to reduce the vulnerability of urban residents towards water-borne diseases in Lokoja and environs.

Keywords: accessibility, government, households, potable water, urban areas

Introduction

Access of drinkable water is one of the necessities of life after shelter and food. Water is very important to every human; many societal problems could easily be solved, as human survival and ecosystem conservation depends mainly on reliable and appropriate quality water supply (Biswas & Seetharam, [2008](#)). The production of food for the fast-growing population in the world requires an adequate water supply. Despite the importance of water for human survival, approximately 2.1 billion of the population have less accessibility of drinkable water (WHO/UNICEF [2017](#); Ritchie & Roser, [2019](#)). According to WHO and United Nations International Children's Emergency Fund (UNICEF, [2014](#)), access can be described as the obtainability of a minimum of 20 litres of water per person per day within a walking distance of 1km to their residents (Hajarat, [2018](#)).

Many studies have shown that different sources of water are available to households both in urban as well as in rural areas of Nigeria. These include pipe-borne water connection (or tap water), protected dug well or borehole, rain water harvesting, bottle water, sachet water, river/ stream water, and water vendors, such as, water purchased from tankers and trucks (Akoteyon, [2019](#); Hajarat, [2018](#); Egbinola, [2017](#); Carrard et al., [2019](#)). Of all these water sources, WHO/UNICEF ([2012](#)) confirmed that pipe-borne water is still mainly regarded as more hygienic for domestic consumption as compared to untreated water that is vulnerable to water-borne diseases. However, in an assessment of sources of drinking water in Southeast Asia and the Pacific. Carrard et al. ([2019](#)) reported more than three-quarters of households in urban and rural communities, which rely on groundwater as the main source of water for drinking. Ritchie and Roser ([2019](#)) also reported that contaminated water is liable to more than 1 million deaths annually. According to them, unsafe drinking water is the main cause of diarrheal and other related water-borne diseases. A study was carried out to evaluate the obstacle to portable water supply in the low-density areas in

Abijan. Angoua et al. (2018) alluded that the socio-economic status of residents and the characteristics of the settlements are principal factors or indicators of poor access to portable water supply and sanitation in peri-urban settlements. In an assessment of the trend in the treatment of water supply in Nigeria, Egbinola (2017) noted low capital allocation and poor management supply are impediments to sustainable water provision in Nigeria. According to him, there is a need to increase subsidies for water infrastructure and management of water supply. Akoteyon (2019) found that the residential and socio-economic characteristics of urban residents determine the main source of their water supply. According to him, high-income earners residing at Ikoyi, Victoria Island and Opebi have access to private boreholes and pipe-borne water as compared to household members who reside in high-density areas with limited access.

In a study of water accessibility in Kano State, Nigeria, Hajarat (2018) reported the inability of the state water agency to supply enough water for the inhabitants of the area. This resulted in an acute shortage of water supply in the region. According to her, more than 50% of the households are not connected to pipe-borne water and approximately 64.1% of the household members rely on water vendors for their domestic use due to the irregular and unpredictable water supply from the state water supply agency. Ali (2012) admitted that inadequate water supply could be attributed to poor water supply infrastructure, low technical capacity, and absence of appropriate regulatory framework. In a similar study conducted in Nigeria, Odjegba et al. (2015), examined community awareness of drinkable water sources in Abeokuta in Nigeria. They found that 70% of sampled households indicated that water supply did not meet their daily demand, 68% of the respondents attested that the quality of the water supply was unsatisfactory and 36% claimed that they have contracted water-related diseases at one time or the other as a result of drinking water obtained from public-tap. There have been a number of researches carried out on domestic water supply in many Nigerian cities, (Angoua et al., 2018; Egbinola, 2017; Ayuba et al., 2013; Hajarat, 2018) however, none of these studies examined the perception of the household level of satisfaction with the excellence and volume of domestic water supply to different localities in a fast-growing city of Lokoja. It is this note that the current research sets out to evaluate household accessibility to domestic water supply in Lokoja with a view to determine the household level of satisfaction with the excellence/ worth and amount of potable water supply in Lokoja, North Central Nigeria. This

would avail geographers, urban planners, and other stakeholders to the opportunity to propose policy directions to the government in order to alleviate the constraints of urban residents to potable water supply in Lokoja and similar other cities in Sub-Saharan African countries.

Study Area

The study area is Lokoja township. It is located on latitude $7^{\circ}45' 27.56''$ - $7^{\circ}51' 04.34''$ N and longitude $6^{\circ}41' 55.64''$ - $6^{\circ}45' 36.58''$ E of the equator. Lokoja had a population of 195,261 in 1996 and this has increased to 265,400 by the year 2016. The study area has elevation ranging from 89 metres along the valley of River Niger and Benue, to 292 feet in the hinterland. There are seven major residential districts in Lokoja. These districts or localities are Felele, Adankolo, Kabawa, Zango Daji, Lokongoma Phase 1 & 11, Ganaja, and Aniebo Quarters Area. These localities are varying in density and patterns of development. River Niger and Benue are main sources of water in Lokoja. Smaller streams such as Meme and Akpomoba also serve as sources of water supply for residents of Lokoja (Ojoina, [2014](#)). Public water supply in Lokoja is controlled by the Kogi State Water Management Board (KSWMB). The public water supply has a capacity of fewer than 700 million litres of water for the entire population of Lokoja and its neighbouring communities (Premium Times, [2019](#)). This water supply is inadequate due to the large increase in population in the city within the last three decades. Some localities in Lokoja particularly Zango Daji, Felele, and Otokiti are not connected to the public water supply because of the financial constraints on the part of the government. Similarly, the rugged terrain in some parts of the city creates an impediment preventing the connection of public water supply to some neighbourhoods.

Methodology

Materials

With respect to primary sources of data collection, three sets of statistics were elicited for the current research. The first category of statistics/facts focussed on socio-economic characteristics of households, which include sex, education and income level, and the number of members in households. The second category of data/statistics was based on sources of water available to a household, frequency of trips to water collection points, and quality of water available to urban households. The last category of data required was based on the household perception of the challenges

encountered by households in accessing potable water in the Lokoja metropolis.

Method

Lokoja metropolis is divided into seven major localities (National Population Commission, [2006](#)). In each of the localities identified, an average of thirty head of households was sampled and required information is elicited from them. A total of two hundred and ten households were selected for interview, out of which one hundred and eighty-nine households answered the questionnaire satisfactorily. A systematic random sampling technique was adopted to gather relevant information from the head of households about their socio-economic characteristics as well as their main sources of water supply and the quality of water available to urban households. Systematic sampling technique was adopted in the administration of the questionnaire to the head of household sampled. This was based on the principle that once the initial head of the household was selected others follow in a sequential pattern.

Statistical Analysis

Tables of percentage were used to describe and explain the socio-demographic characteristics of urban families, their bases of water stock, frequency of accessed potable water supply and the connectivity of their house units to the public water supply in the city. In order to determine the perception of household level of satisfaction with the quality and adequacy of domestic water supply, a 5-fact/ opinion Likert measure Model was used. The variables used to assess the perception of the household level of satisfaction with domestic water quality and availability were personal or biased and on a 5-fact Likert gauge where the emotion of the household was appraised. The assessments/rankings are as tracks: 5= Highly Dissatisfied; 4= *Dissatisfied*; 3 = *undecided*; 2 = *Satisfied* and 1= *Highly Satisfied*.

To get the total household awareness of the quality and availability of domestic water supply in the study area, the Household Perception Index as used by Yoade and Fatusin ([2017](#)) was adopted and renamed. and described as Household Awareness Index (HAI) in this paper. Here, a mass worth of 5, 4, 3, 2 and 1 is allocated to every score giving to its worth. The summary mass worth (SMW) for each variable (satisfaction of water quality and availability) was obtained by totalling the product of mass worth of every assessment /ranking and the number of responses to each score (Yoade &

Fatusin, [2017](#)). In this study, this methodology has been modified and adopted as Household Awareness Index. The index value was, therefore, derived by dividing Mean Mass Worth (MMW) times the overall amount of household that valued each of water quality and availability in the city.

Household Awareness Index (HAI) = MMW/ N

Where

HAI = Household Awareness Index

MMW = Mean Mass Worth of the awareness of households on water quality and availability

SMW = Summation of mass worth of the awareness of household on water

N = Household rating each problem of the water quality and availability

The closer the Summation of Awareness Index to 5, the better the level of dissatisfaction with the quality and availability of domestic water supply in the Lokoja metropolis.

The average HAI denotes:

$EAI = \sum HAI / N$ (Summation of Household response of Highly Dissatisfied, Dissatisfied, Undecided, Satisfied, Highly Satisfied / Summation of Frequency of Household Responses)

Where n= the number of the household response to domestic water quality and availability in the city.

ANOVA was employed to evaluate the household level of satisfaction on the adequacy and quality of domestic water supply across seven localities that constitute Lokoja metropolis. A Pearson Product-Moment correlation was run to determine the relationship between sources of domestic water supply to urban households and their income level, educational profile, residential location and adequacy of domestic water supply for urban households in Lokoja metropolis.

Results and Discussion

Generally, socio-economic characteristics of urban households play a significant role on the quantity and quality of water required (Akoteyon, [2019](#); Egbinola, [2017](#)). High income earners tend to have more and better

access to potable water supply in their residences compared to poor urban households. This is because high income earners can afford to drill boreholes and connect their houses to the public water supply. However, low income households rely on any available water supply in as much as it reduces the cost of procurement with little consideration for quality. The result from the research shows that 43.4% of respondents in the study area earned less than 50,000 per month, and 36% of the households earned between 50,000 and 100,000 per month. The last category of an urban household is considered as high-income earners who earn more than 100,000 per month. The education profile of urban households is another important factor that determines the worth and adequacy of domestic water available in Lokoja. Table 1 indicates that 11.6% of urban residents in Lokoja do not have formal education. 22.2% and 33.9% had primary and secondary education respectively. Approximately 32.3% of the urban households in the city had post- secondary (tertiary) education. The last category is likely to be more conscious about the quality of water used for domestic purposes. More than 50% of women responded to the questionnaire on domestic water supply than men because women use more water than men and they are responsible for fetching water for domestic uses (See Table 1). Further analysis revealed that 37.6% of businessmen answer the questionnaire on domestic water supply, while only 10.1% of artisans participated in questionnaire administration.

Table 1
Socio-demographic Composition of Household Sampled in Lokoja

Variable	Categories	Frequency	Percentage
Sex	Male	92	48.7
	Female	97	51.3
Educational Profile	Non-Formal Edu.	22	11.6
	Primary School	42	22.2
	Secondary School	64	33.9
Income Per Month	Higher Institution	61	32.3
	Less than 50,000	82	43.4
	50,000- 100, 000	68	36.0
	More than 60,000	39	20.6

Variable	Categories	Frequency	Percentage
Occupation	Farming	21	11.1
	Artisan	19	10.1
	Civil Servant	49	25.9
	Businessmen / women	71	37.6
	Unemployed/ Others	29	15.3

Further analysis revealed that different sources of water are available to household members in Lokoja metropolis. This includes pipe born water supply, boreholes, streams, rivers, and water vendors. Table 2 reveals that 34.4% of urban households are able to use drinkable water (tap water) from the State Water Board in Lokoja. Approximately 100% of household members who reside at Ganaja Area or Old Poly Quarters have access to clean water supply in Lokoja, while residents living at Army Signal area have not been able to access to fresh water supply due to the incapacity of government to deliver potable water for their citizens in the city. The resultant effects of this situation have forced some of the urban residents in Lokoja to rely on underground water supply such as water from wells, boreholes, stream and river, which are generally regarded as unsafe for human use. Further analysis shows that 30.2% and 17.5% of household members rely on borehole and well water respectively, for their main source of water supply in the city. 70.4% of household members who resides at Zango Daji rely on boreholes as their main source of water supply. Approximately 48.1% and 26.9% of household members at Felele and Lokongoma Phase 1 and 11 rely on well water as their main water supply. However, unprotected well water and boreholes as well as stream water are regarded as unsafe for drinking and other domestic uses. This accounts for the main cause of diarrheal and other related water borne diseases that result in untimely death of people (Ritchie & Roser, 2019).

Table 2

Residential Location and Household Water Supply in Lokoja

Residential Location	Well water		Stream water		Borehole		Water Vendor		River Niger/Meme		Tap water			
	No	%	No	%	No	%	No	%	No	%	No	%		
	Adankolo Area	5	17.9	2	7.1	5	17.9	8	28.6	2	7.1	6	21.4	28
Kabawa/Karaworo Area	4	15.4	3	11.5	7	26.9	3	11.5	0	0.0	9	34.6	26	100.0
Felele Area	13	48.1	0	0.0	3	11.1	7	25.9	0	0.0	4	14.8	27	100.0
ZangoDaji	4	14.8	0	0.0	19	70.4	1	3.7	0	0.0	3	8.1	27	100.0
Ganaja/Old poly Quarter Area/Aneibo quarter	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	28	100.0	28	100.0

Residential Location	Well water		Stream water		Borehole		Water Vendor		River Niger/Meme		Tap water			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
	Lokongoma Phase I and II	7	26.9	0	0.0	4	15.4	0	0.0	0	0.0	15	57.7	26
Army Signal/Barrack Area	0	0.0	8	29.6	19	70.4	0	0.0	0	0.0	0	0.0	27	100.0
Total	33	17.5	13	6.9	57	30.2	19	10.1	2	1.1	65	34.4	189	100.0

Many urban residents in Nigeria are less accessible to unpolluted water especially public water. The situation in Lokoja is an extreme case. Table 3 indicated that more than 70 % of urban households interacted with within Lokoja claimed that they are not connected to the public water supply. Only 28.6% of the respondents indicated that they are connected to tap water supply provided by the Kogi State Government Water Board. This could be the reason why more than 60% of households in Lokoja depend on other sources of water for their daily use (See Table 1).

Table 3

Household Connected to Tap Water Supply in Lokoja

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	54	28.6	28.6	28.6
Valid No	135	71.4	71.4	100.0
Total	189	100.0	100.0	

It is pertinent to observe with care that the supply of tap water to urban residents in Lokoja is not regular because it covers few localities in the town. Table 4 indicates that 89.9% of population interacted with in Lokoja claimed that they have access to water occasionally in their neighborhoods. Only 7.9% of the respondents indicated that they make use of unpolluted water in the city. Approximately 2.1% of household members are indifferent to the water supply in the city (Table 4a). Irregular domestic water supply from the Kogi State Water Board has forced households living at Kabawa, Aungwar Kura, Cantonment, Old Market and other areas of the city to source water directly from River Niger. This water from River Niger is usually contaminated with waste such as excreta dumped and discharge into it. This makes it highly inimical to human health (Ngozi-Chika et al., 2016).

Table 4a

Frequency of Domestic Public Water Supply to Urban Households in Lokoja

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular	15	7.9	7.9	7.9
	Occasionally	170	89.9	89.9	97.9
	Undecided	4	2.1	2.1	100.0
	Total	189	100.0	100.0	

In order to seek the opinions of urban households on how to tackle the problem of irregular water supply by the Kogi State Water Board in Lokoja, they were asked to indicate whether they are willing to pay for water bills to supplement financial cost incurred by the state government on provision of water for urban populace. Table 4b indicates that 51.9% of urban household in Lokoja indicated that they are ready to pay for water bills if the Kogi State Water Board gives them assurance of regular water supply. Approximately 48.1% of urban households in Lokoja were still of the opinion that it is the sole responsibility of government to provide potable water for them free of charge.

Table 4b

Households' Willingness to Pay for Water Utility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	98	51.9	51.9	51.9
	No	91	48.1	48.1	100.0
	Total	189	100.0	100.0	

In terms of water availability to urban households in the study area, Table 5 shows that 36% of the urban households indicated that they are satisfied with the availability and supply of water for their domestic use. 35.4% and 11.1% of the urban households claimed that they are dissatisfied and highly dissatisfied to the rate of water supply, respectively.

Table 5
Rate of Domestic Water Availability to Urban Household in Lokoja

	Frequency	Percent	Valid Percent	Cumulative Percent
Highly dissatisfied	21	11.1	11.1	11.1
Dissatisfied	67	35.4	35.4	46.6
Valid Undecided	24	12.7	12.7	59.3
Satisfy	68	36.0	36.0	95.2
Highly satisfied	9	4.8	4.8	100.0
Total	189	100.0	100.0	

In an effort to decide the level of satisfaction of urban household to domestic water supply, their perceptions on the quality and adequacy or availability of water supply in Lokoja, these variables mentioned were considered. The Household Awareness Index (HAI) of water quality and availability in different localities identified in Lokoja is $6.57/2 = 3.29$ (Table 6). This implies that households perceived and rated the quality and availability or adequacy of domestic water supply as dissatisfied. Of the two major variables highlighted as the parameters to determine the level of satisfaction of the domestic water supply in Lokoja, Table 6 indicates that Household Level of Satisfaction with the quality of domestic water supply in the city is the main variable which has been ranked highest (3.36) by the head of households. This dissatisfaction with the quality of water available or supplied is exhibited by the colour of water from taps in many areas in the city which can be attributed to contaminations from distribution network or pipes connecting public water supply to individual residence. In a similar study carried out on access to treated water stock in Nigeria, Egbinola (2017) reported that outlay in the water segment in Nigeria remains poor and low on the scale of policy priorities. This has made it difficult to get enough funds for the treatment and supply of water to urban residents. The epileptic power supply from the power holding company has worsened the situation, as many state governments struggle to purchase diesel to power the generators used at the water works. Further analysis revealed that the availability of public water supply to urban households was ranked second (3.21) and rated unsatisfactory. Generally, the supply of domestic / public tap water to urban households in Nigeria is irregular due to the cost implications that are majorly borne by the state government and the

unwillingness on the part of the citizens to pay for the water bills. It is interesting to note that public water supply is not connected to the low density areas in Lokoja coupled with the fact that some houses are located on rugged terrains, making it difficult for some urban households to have access to potable water supply from the Kogi State Water Board, although water vendors pull their trucks to all nooks and crannies of the city to sell water to the inhabitants of these areas with less access to potable water.

Table 6
Domestic Perceptions of the Excellence and Availability of Water Stock in Lokoja

Family Perception of the Domestic Water Supply	Highly dissatisfied FHR(WV)	Dissatisfied FHR(WV)	Undecided FHR(WV)	Satisfied FHR(WV)	Highly Satisfied FHR(WV)	Summary or addition of frequency of Households Response	SMW	MMW
Level of Satisfaction with Quality of Water Supply	58 (290)	36 (144)	6 (18)	54 (108)	18 (18)	172	578	3.36
Rate of Availability of Water Available for Domestic Uses	21 (105)	67 (268)	24 (72)	68 (136)	9 (9)	189	608	3.21

Table 7 reveals that the quantity of domestic water supply in Lokoja varies ($F=12.344, p < .00$), from one locality or neighbourhood to another. This is statistically significant at 5%. Generally, public water supply by the Kogi State Water Management Board covers few areas such as Kabawa, Lokongoma Phase 1, and 11, Adankolo, Government Reserve Area (GRA), Old Poly Quarters and some parts of Ganaja area. Many of the households interacted with claimed that the supply of water is not regular. Similarly, in terms of water quality, it also varies significantly across different localities in Lokoja ($F= 3.154, p < .00$). Worthy of mention is the fact that many of the urban households living at Zango Daji, Felele, Crusher, Kabawa, and Army Signal rely more on water from rivers, streams, wells, and water vendors, whose sources are questionable for domestic use because all these sources of water are directly from the ground. However, in a study carried out on the quality of ground water at Lokoja. Ayuba et al. (2013) revealed

that the ground water in the area is highly polluted and not hygienic for human uses

Table 7

Level of Satisfaction on the Rate of Quantity and Quality of Domestic Water Supply across Various Residential Areas

		Sum of Squares	Degree of freedom	Mean Square	F	Sig.
Quality of Water Supply	Amongst Groups	58.765	6	9.794	3.154	.006
	Within Groups	565.235	182	3.106		
	Total	624.000	188			
Rate/ Quantity of water Availability	Amongst Groups	52.104	6	8.684	12.344	.000
	Within Groups	128.033	182	.703		
	Total	180.138	188			

Previous studies showed that large number of urban households that depend on untreated water from wells, streams, and water vendors are prone to water borne diseases in many developing countries (Ahmed & Kafayos, 2020; Osiemo e al., 2019). Lokoja is not exempted from this menace. Table 8 reveals that more than 50% of the urban households in Lokoja claim that they have experienced some kinds of water-related ailments within the last three months. Approximately 23.3% of urban households interacted with indicated that they had malaria. 11.1%, 10.1%, and 3.2% had typhoid, dysentery, and cholera respectively, within the same time frame. Incidentally, most of these ailments are associated with people drinking unsafe water (Vaziri & Tolouei, 2010). This result is parallel to the findings of the prevalence of water-borne diseases in Southern Nigeria, where Yusuff et al. (2014) reported that diarrhoea is the most prevalent of water borne diseases in communities located along the River Ase in Southern Nigeria.

Table 8
Type of Disease Experienced

	Frequency	Percent	Valid Percent	Cumulative Percent
Typhoid	21	11.1	11.1	11.1
Cholera	6	3.2	3.2	14.3
Dysentery	19	10.1	10.1	24.3
Valid Hepatitis	12	6.3	6.3	30.7
Malaria	44	23.3	23.3	54.0
None	86	46.0	46.0	100.0
Total	189	100.0	100.0	

Children are more vulnerable to water-borne diseases than any other members of urban households in society. Table 9 reveals that approximately 30% of the families showed that their children have contracted water borne diseases in the last three months. 26.5% of urban households who are adults claimed that they have contracted water borne diseases. Only 2.1% of elderly claimed that they had water borne diseases. In a report carried out by the World Health Organisation ([2017](#)) water borne diseases particularly diarrhoeal alone were reportedly killed more than 500,000 children in every year.

Table 9
Member of Household Affected by Water Born Disease

	Number of Occurrence	Percent	Valid Percent	Cumulative Percent
Children	56	29.6	29.6	29.6
Adult	50	26.5	26.5	56.1
Valid Aged/elderly person	4	2.1	2.1	58.2
None	79	41.8	41.7	100.0
Total	189	100.0	100.0	

In order to determine the level of association between sources of domestic water available to urban household in Lokoja and their income level, educational background, residential location, and distance travelled to water collection points, a Pearson Product-Moment correlation was run so as to determine the weight of the relationship. Table 10 revealed that there was a positive correlation between sources of domestic water supply to urban households and income level as well as education profile of urban

households, which was statistically significant ($r = .196, n = 189, p = .01$) and ($r = .282, n = 189, p = .01$). A negative correlation occurred between different sources of water supply to urban household and their commuting distance towards water collection points; this is significant at ($r = -.154, n = 189, p = .01$).

Table 10

Result of Pearson Product Moment Correlation between Different Sources of Water Supply and Education Profile and Income Level of Urban Households in Lokoja

	1	2	3	4	5	6
1. Water Supply	-	.196**	.074	-.006	-.011	.314***
2. Household Income		-	.077	.282***	-.164*	.106
3. Residential Location			-	.086	-.154*	.087
4. Education				-	-.019	-.148*
5. Distance to Water Supply					-	.138
6. Rate of water Availability						-

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Urban households in Nigerian cities are facing a lot of problems in order to access public water supply for domestic uses. Table 11 reveals that 38.6% of urban households in Lokoja claimed that they spent substantial parts of their time queuing to access the public tap water supply. This is because a large number of urban households do not have public water supply connected to their housing units. Irregular and unpredictable public water supply has ranked second (21.7%), among the problems encountered by urban households that rely more on public water supply in Lokoja. Further analysis revealed that poor quality of water purchased from water vendors is another major concern of urban households in Lokoja. Some of the water vendors fetch water from River Niger, streams, and unprotected wells that are not safe for human consumption.

Table 11

Challenges Encountered by Urban Households to Access Domestic Water Supply in Lokoja

	Number of Incidences	Percent	Valid Percent	Cumulative Percent
Valid Long queue at the water collection points	73	38.6	38.6	38.6
Poor quality of water purchase from water vendor	30	15.9	15.9	54.5
Irregular supply of public tap water	41	21.7	21.7	76.2
High charges pay to water vendor for every supply or purchase	11	5.8	5.8	82.0
More time is wasted on trip to water collection points	34	18.0	18.0	100.0
Total	189	100.0	100.0	

Conclusion and Recommendations

The current study extensively discussed the sources and challenges of domestic water supply to urban residents. At methodological segment, sources of water supply in Lokoja were examined. Relevant materials about characteristics of domestic water supply to urban households were elicited. Tables of percentages were employed to describe the socio-economic characteristics of urban households, patterns of trip to water collection points as well as satisfaction with adequacy of water stock. Variance analysis was used to examine whether there was variation on the level of satisfaction of urban households on the excellence and amount of domestic water supply across various localities studied. Findings revealed that various sources of water are accessible to urban households in Lokoja. Some urban households are not connected to the Kogi State Water Board supply chain. Irregular water supply and a long queue is the major impediment to access the public tap water in Lokoja. Thereby, the study recommends that the provision of potable water to urban populations should be the collective responsibility of both the government and individual households in order to achieve its sustainable supply. The study concludes

that individual households must be ready to pay for water bills and this would enable the government to have sufficient funds to finance the water supply to urban households.

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