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Residents' Assessment of DominantReliable Sources of Water Supplies for Domestic Purposes in Port Harcourt Municipality

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ABSTRACT
The importance of water cannot be underemphasized as the lack of it poses numerous challenges.Water in Port Harcourt municipality is of high demand and utmost significance to resident households but there is observed shortfall on the part of government who according to the World Health Organization standard had the responsibility to deliver potable water to the masses. It is on this note that this paper is raised with the objectives to 1. Identify the sources of water supply to residential homesin Port Harcourt municipality and 2. Ascertain the dominant reliable sources of water supply for domestic purposes in the study area.The study adopted a descriptive survey method and had its information with the aid of questionnaire and personal observation. The findings indicate that there are government facilities for water distribution in the study area but are not functional as there is no running water in the pipes. The dominant reliable sources of water supply in the study area as of presentlyare private borehole, commercial borehole and vendor supplies.

I. INTRODUCTION

Urban area functionality, economic growth, and enhancement of the residents' quality of life hinges on provision, maintenance and advancement in urban infrastructure (Asikhia&Uyoyoghene, 2011). Collier &Venables (2016) stated that though cities are prospectively high productivity areas and drivers of economic growth and development, the spatial configuration of economic activities in cities is dependent on infrastructure. Urban water supply system is an essential infrastructure that supports socio-economic growth and sustainable development (Yıldız, 2017). This is because water is extremely necessary and associated with all ecological resources, flora and fauna and for human survival and development on the earth (Eddy &Ekop, 2007). Without water, there can definitely be no survival on the earth as it is not only required for consumption by humans and animals, but is also required at home for personal hygiene needs such as washing, bathing, sewage and general cleaning (Ansa, &Uzoma, 2019). Meanwhile, it is worthy to note that urbanization and the unrestricted increase in population has not helped matters but have stirred the demand for the provision of water in residential homes of urban areas especially in developing nations (Sharma and Vairavamoorthy, 2009).

Today, we will not be able to sweep the issue of demand and supply of water under the carpet as water and its supply is a basic need of every individual in urban and peri-urban community or where there is density of population. United Nations, (2018) stated that 55% of the world's population currently lives in urban areas and this proportion is expected to increase to 68% by 2050, adding another 2.5 billion people to urban areas with close to 90% of the increase taking place in Asia and Africa. The implication of this statistics is that, without adequate provision of water by government, residents of urban areas will continue to suffer the challenge and pressure of inadequate water provision and supply and will definitely resort to other sources of water which inadvertently may not be safe water. WHO, (2017) states that at least 1.1 billion people globally lack access to sources of clean drinking water. This means that there is the reality of lack of access to safe water. Access to water supply according to Okon and Njoku (2017) is when an individual is availed a volume of safe water at least 50 litres per day at a

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convenient distance of at least 200 metres to acquire the water where it is not present within the residence. If it did not meet this condition, residents are said to have access to no safe drinking water.

II. PROBLEM STATEMENT

The importance of water cannot be underemphasized as the lack of it poses numerous challenges. Public water provision in Port Harcourt municipality dates back as far as 1913 and this was just after the founding of Port Harcourt city in 1912. In 1913 during the era of the military administration of Alfred Diete Spiff., six (6) public water stations with ancillary facilities were built namely Trans Amadi, Rumuola, Moscow Road, Diobu, Borokiriand these projects were done under the then Public Works Department at Old Port Harcourt Township.From 1968 to late 70's, the Ernest Ikoli, Boro Park and Abuloma Public water stations were constructed and residents houses in the city were supplied with safe and clean water. It is worthy to state that the city's areal expansion and increasing population will definitely place demand for more water supply and more facilities but as observed, no other public water station has been built till now.

"Access to water was one of the Millennium Development Goals (UN-MDGs) and it is also one of the main goals of the Sustainable Development Goals (SDGs). The UN-SDG goal 6 states that water sustains life, but safe clean drinking water defines civilization. Despite these facts, there are inequalities in access to safe drinking water in the world".(Dinka, 2018)

Water in Port Harcourt municipality is of high demand and utmost significance to resident households but currently, it is observed that most of both commercial and residential houses (old and new) are engaging in the process of sinking borehole which is a private provision for water. Again, it is glaringly observed that water vendors convey water in jerry cans and local trucks to the places of demand in parts of the study area. This will definitely mean shortfall in the part of government who according to WHO, (2017) had the responsibility in delivering portable water to the masses. It is on this note that this paper is raised with the objectives to 1. Identify the sources of water supply to residential homesin Port Harcourt municipality and 2. Ascertain the dominant sources of water supply for domestic purposes in the study area.

Study Area

Port Harcourt City Local Government Area is one of the area councils that make up the Port Harcourt Metropolis, and one of the twenty-three local Government areas in Rivers State. It is an economic beehive (centre) in the Niger Delta area of Nigeria. Port Harcourt City Local Government Area is bounded by Obio/Akpor to the North, Okrika to the South (See Fig. 1.1). It is located within latitudes $4^{0}5'11"$ and $5^{o}15'45"$ North and longitudes $6^{o}22'25"$ and $8^{o}05'12"$ East (Ajie&Dienye, 2014). (Fig. 1).

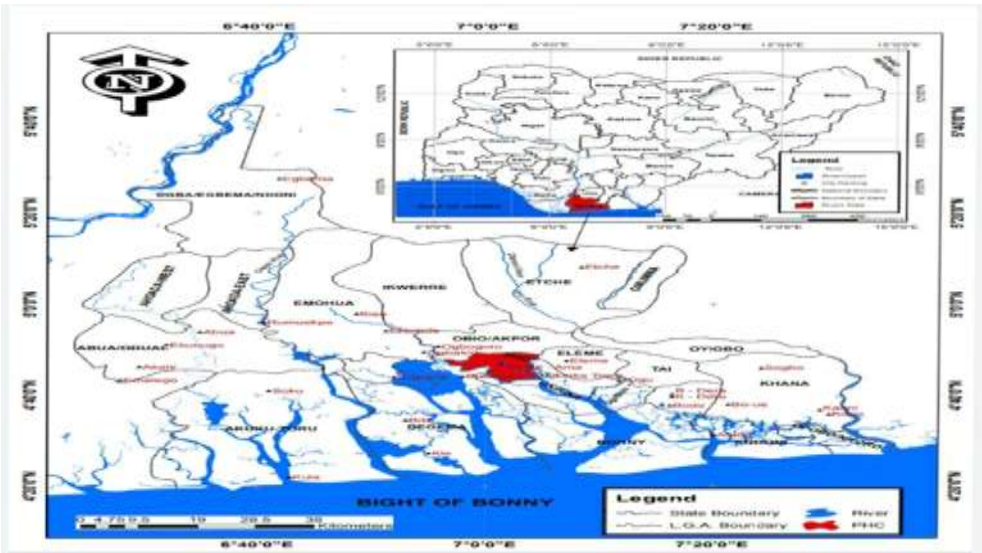

Fig. 1: Map of Nigeria showing Rivers State and the position of Port Harcourt L.G.A

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Population and Economy

The relationship between population growth and economic growth is controversial as low population growth in high-income countries is likely to create social and economic problems while high population growth in low-income countries may slow their development (Peterson, 2017).From the population estimates and projections of the World Bank (2020) projecting from UN World Urbanization Prospects (2018), the Port Harcourt City population at 2020 is put at 3,020,232 at 5.11% growth rate. This increase in population of the area is attributable to migration which is caused by several factors knowing that Port Harcourt City Local Government Area doubles as the headquarter, administrative and major economic hub of Rivers State, the centre of Nigeria's oil and gas industry. The Local Government Area houses the prime Rivers State University, the rivers State University hospital (former Braithwaite Memorial hospital) and several other institutions with all the banks and other financial houses in their numbers. There is therefore no doubt that this will put more pressure on the available public water infrastructure, water demand and supply in the area.

III. METHODOLOGY

This study adopted the descriptive survey research design. Data was collected in situ, at one point in time, from a sample of respondents with the aid of a questionnaire. Analysis of data was done descriptively with tables, charts and modal scores. The population of this study comprised three (3) planned neighbourhood settlements (See Table 1) such as Diobu (1,2,3), Port Harcourt Main Town, and Oromineke Layout of Port Harcourt Municipality

Table 1:Neighborhood Settlementsin Port Harcourt Municipality

S/N	Settlements	S/N	Settlements
1	Rumukalagbor	11	Abuloma
2	Orije	12	Port Harcourt Main Town
3	Orogbum	13	Nkpolu-Oroworukwo (Mile 3 Diobu)
4	Oroabali	14	Rumuwoji (Mile 1 Diobu)
5	Oromerezimgbu	15	Eagle Island
6	Woluchem	16	Mgbundukwu (Mile 2 Diobu)
7	Elekahia	17	Nkpogu
8	Oroworukwo	18	Old GRA
9	Amadi-Ama	19	Borokiri
10	Okujagu	20	Oromineke

Source: Authors field work, (2021)

The five (5) neighborhood settlements namely: a. Port Harcourt Main Town, b. Oromineke Layout c. Nkpolu-Oroworukwo (Mile 3 Diobu)d.Mgbundukwu (Mile 2 Diobu) e. Rumuwoji (Mile 1 Diobu) as stated were selected through simple random samplingprocess and they represent 25% of the twenty (20) neighborhoods settlements within the study area.From the population of randomly selected settlements, the Taro Yamane online formula was used to ascertain the sample size (number of questionnaire (399) for administration). Based on settlements population and an average household size of 6 persons, the total number of administrable questionnaire were distributed proportionately in percentages. The Table 2 shows the population and sample size of the study.

Table 2: Population and Sample Size

S/No.	Communities	1991 Census Population	Projected Population (2020)	Total Number of Households	Number of Questionnaire administered
1	Main Town	12369	76,820	12,803	27
2	Oromineke Layout	21377	132,766	22,128	46

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3	Nkpolu Oroworukwo Mile 3 Diobu	52613	326,764	54,461	113
4	Mgbundukwu (Mile 2 Diobu)	55582	345,203	57,534	118
5	Rumuwoji (Mile 1 Diobu)	44,183	274,407	45,735	95
	Total	**186,124**	**1,155,960**	**192,661**	**399**

Source: Authors field work, (2021)

IV. RESULTS OF THE STUDY

Table 3: Questionnaire Administration and Retrieval

S/No	Selected Neighbourhoods	No. of Questionnaires Administered	No. Questionnaires Retrieved	Percentage Returned
1	Rumuwoji (Mile 1 Diobu)	95	90	94.7
2	Mgbundukwu (Mile 2 Diobu)	118	101	85.6
3	Nkpolu Oroworukwo Mile 3 Diobu	113	107	94.7
4	Oromineke Layout (D-Line)	46	41	89.1
5	PH Main Town	27	24	88.9
	Total	**399**	**363**	**91.0**

Source: Authors field work, (2021)

From Table 3, it was seen that a total of 399 questionnaires were served to heads of households in the five randomly selected neighbourhood settlements. The result shows that a total of 363 questionnaires were returned and 33 were not returned. The percentage of returned questionnaire records 91% and this shows a high degree of response and yields a number adequate for proper analysis.

Table 4: Sources/ Accessto Water Supply in Port Harcourt Municipality

Neighbourhood settlements / **Sources of Water**	Rumuwoji (Mile 1 Diobu) N=90	Mgbundukwu (Mile 2 Diobu) N=101	Nkpolu Oroworukwo Mile 3 Diobu N=107	Oromineke Layout (D-Line) N=41	PH Main Town N=24	Total
Public Water Supply	63	85	15	32	20	215
Private Borehole	60	28	62	15	5	170
Commercial Borehole	20	31	15	8	5	79
Tankers/Trucks	0	0	6	2	2	10
Vendors	6	18	18	10	15	67
Rainfall	74	88	67	40	20	289
Stream/Rivers	0	0	0	0	0	0

Source: Authors field work, (2021)

Respondents response shows that they have multiple sources of water supply.From Table 4above, out of the 363 houses/ households that were visited and questionnaire administered, 215 that is 59.2% said that they have access to public water supply (ie their property is connected to the public water main). A total of 170 houses making 46.8% access water from their private borehole, a

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total of 79 houses making 21.76% said that they have access to water through commercial boreholes, 10 houses making 21.76% said that they have access to water through commercial boreholes, 10 houses making 2.75% said that they have access to water through tankers/trucks delivery, 67 houses making 18.45% uses vendors while almost all-a total of 289 houses that is 79.6% make use of rain water. None of the respondents declared water from stream/river as their source of domestic water supply.

Table 5: Residents' Dominant Sources of Water Supply in Port Harcourt Municipality

Neighbourhood settlements / Dominant Sources of Water	Rumuwoji (Mile 1 Diobu) N=90	Mgbundukwu (Mile 2 Diobu) N=101	Nkpolu Oroworukwo Mile 3 Diobu N=107	Oromineke Layout (D-Line) N=41	PH Main Town N=24	Modal Dominant Score
Public Water Supply	10	10	15	5	5	45
Private Borehole	80	85	85	90	90	430
Commercial Borehole	85	85	90	75	80	415
Tankers/Trucks	0	0	5	10	10	25
Vendors	20	15	20	15	50	120
Rainfall	5	5	5	5	5	25
Stream/Rivers	0	0	0	0	0	0

Source: Authors field work, (2021)

Table 5 shows the level of dominance of the sources of water supply in Port Harcourt municipality. Among the seven variables of water sources, the first three most dominant and reliable sources of water supply were private borehole with 430 dominant score, commercial borehole with 415 dominance score and vendors with 120 dominance score.

Public water supply with 45 dominance score, tankers/ trucks with 25 dominance score and rainfall with 25 dominance score were found to be the least dominanceand reliable sources of water suppliers as stated by respondent household heads.

V. DISCUSSION OF FINDINGS

The study found out basically six sources of water supply to residential homes for domestic purposes in Port Harcourt municipality. These sources includepublic water supply, private borehole, commercial borehole, tankers/trucks delivery, vendors, rainfall, stream/rivers. The highest source of water supply to resident's home as stated by residents is from rainfall (79.6%). This shows that most of the residents collects water during rainfall for domestic purposes in the study area. Public water supplies signify water piped and connected to homes or a central point within a minimum distance of 200m for the public consumption. Mile 1 area and mile 2 area had better public water supply than d/line, main town and mile 3 respectively. The study generally found out that access to public water supply was high in the study area with 59.2%. This shows that 59.2% of the area studies has portable water connected to their homes or premises. It shows that public water supply was a major source of water supply to residential houses in the study area. Private borehole in order of 'more' are mile 3, mile 1, mile 2,d/line and main town. Generally, 46.8% of the study area uses private borehole as their source of water. Commercial borehole was also another source of water with more in the order of mile 2, mile 1, mile 3, d/line and main town. Port Harcourt main town is the least and that is why local vendors uses local trucks and wheelbarrow in delivering water with jerry cans to the place of demand. In this location, the distance travelled is more than the WHO, (2017) stipulated 200 meters.

From residents rating of dominance as it relates to the most reliable source of water in the study, it was seen that the dominant water supply source is private borehole, commercial borehole and water from vendors with dominant scores of 430, 415 and 120 respectively.

VI. CONCLUSION

Access to water supply and availability are two different things. The study shows that there is access but when dominant reliable sources were checked, there was gross shortfall in water supply to resident houses for domestic purposes especially from public water supply. Although, there are

government facilities for water distribution in the study area, the study found out that there was no water and that there are dominant reliable sources of water supply. Private and commercial borehole top the list of dominant reliable water sources in the study area.Water availability and supply is a global concern and is very important to sustainable development and as such, most cities are gearing up to meet this development goal. Port Harcourt Water Corporation is a part of this effort. Despite its partnership with the World Bank, there has not been any significant development in urban public water supply. The government lack of provision and supply/distribution of public water has resultedto the influx of private water provision which currently can be argued in the headings of if it is safe, clean, healthy and affordable.Ukpaka&Ukpaka (2016) stated that most boreholes are dug shallow and do not meet the purification standard, so residents are prone to water-related diseases which threaten the health of the residents. Therefore, amidst the increased population and urbanization with attendant high demand for potable water for domestic usage and sanitation, it is very important for the Rivers State government to wake up, take the challenge and providepotable public water supply in Port Harcourt municipality.

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