

# A Survey of Household Water Accessibility and Usage in Bayelsa State Nigeria

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***Abstract-*** Water is very essential for life functions and clean water is an absolute necessity for sanitation and hygiene. However so many lack the access to clean water for drinking and other domestic purposes thereby predisposing them to preventable water related diseases, infant mortality, absence from work owing to illness, economic loss, and general under development. The issue of climate change has also exacerbated water crises as this leads to flooding in some parts of the world and drought in others. This study was done to evaluate the accessibility to improved water sources for drinking in Bayelsa State. The study utilized the UNICEF/WHO approved survey questions for drinking water to elicit responses from 135 household heads drawn from both urban and rural areas of the state using cluster and random sampling. Data was analyzed using simple percentages. Results showed that 8.9% of the respondents drink from the nearby river, 24.4% of the people use river water for other domestic purposes. More Girls under the age of 15years (25%) have the responsibility of going to fetch water than the boys (2.2%). Results also showed that among the 88 households who treat their water, only 19 boil it, 25 add alum (Potassium aluminium sulphate), 19 use water filter while 25 allow the water stand and settle. It was also noticed that people who live in the rural areas use unimproved water source more. The study therefore recommends that government should endeavour to provide clean water for people and also there is need for health promotion and education for the people so that they can be cautious of their drinking water and only collect water from an improved source.

***Indexed Terms-*** Clean Water, Survey, Household, Accessibility.

## I. INTRODUCTION

With all of its uses, water is recognized as a vital component of both life and the environment. It occurs naturally in all three states of matter viz: solid, liquid and gaseous [16][26] and is so vital that without it, a human being can only survive for a few days because the human body is approximately 75% water[20]. The human body uses water for a variety of purposes, such as lubrication, body temperature regulation, removal of toxins, and transporting nutrients throughout the body [31]. Liver and kidney function are compromised without water. Hydration is critical for eyes, mouth, and nose; simple matters that many over look are strictly regulated by the presence of water. [6]. For daily activities like drinking, cooking, washing dishes, bathing, flushing the toilet, air conditioning, gardening, etc., a man needs roughly 150 to 300 liters of water [22][15][21][23]. Water is very important; however, even more importantly is the concept of clean water [8].

Clean water is an absolute necessity for sanitation and hygiene. These are vital tools that propel global social, economic, and health progress [19]. Similar to people who live in poverty, those who lack the financial resources to offer access to clean water are forced to drink unclean water, which is bad for their health and hinders their ability to succeed economically. According to the Water Project [33], Sub-Saharan Africa loses 40 billion hours per year in the effort of gathering water. These hours are equivalent to the entire annual labor force of France and this has to be done over extraordinarily long distances. In essence without clean water, people cannot cultivate food, homes cannot be built, health is compromised, children cannot attend school, and total employment in the area is at risk. On the other hand, if clean water becomes more accessible for populations it can be safe to assume that health will also increase; this in turn will decrease the time lost to sickness. If you have less sick individuals then they are more likely to be more productive which can increase economic development and food security will be established. Lastly, education

which is negatively affected because children are often the ones that gather water for families will be improved as children will not miss school or arrive late at school [33].

The world is running out of clean, fresh water to feed and nourish a growing global population, ensure sustainable human development, and maintain the health of our planet mostly because of climate change and other anthropogenic activities. Approximately 2 billion people, more than one-third of the global population currently live in water scarce regions, and predictions show that by 2050, more than half of the world's population may be at risk of water stress [25]. There will be more competition for water among its numerous users, including the production of food and agriculture, the environment, energy, industry, and individual consumers. [32]. The competition for water resources is increasing between people and the natural environment as well as between cities and rural areas. By 2050 the global population is expected to increase to 9.8 billion, with 86 percent living in less developed countries and 70 percent living in rapidly growing urban areas [25]. Hence, global demand for water is generally projected to increase by 30 to 50 percent by 2050 [32].

"Clean water and sanitation for all" is the subject of Sustainable Development Goal 6 (SDG 6). It is one of 17 Sustainable Development Goals established by the United Nations General Assembly in 2015 and has eight targets to be achieved by 2030 [27][29]. The six outcome targets include: Safe and affordable drinking water; end open defecation and provide access to sanitation, and hygiene, improve water quality, wastewater treatment and safe reuse, increase water-use efficiency and ensure freshwater supplies, implement integrated water resources management (IWRM), protect and restore water-related ecosystems. The two means of implementation targets [4] are to expand water and sanitation support to developing countries, and to support local engagement in water and sanitation management. In order to alleviate water shortage and significantly reduce the number of people affected by it, it is imperative that water use efficiency across all sectors be significantly improved by 2030 [30].

Globally, more than 2 billion people (26% of the population) do not have safe drinking water and 3.6 billion (46%) lack access to safely managed sanitation, according to the report, published by UNESCO on behalf of UN-Water and released at the UN 2023 Water Conference in New York. The Ecosystem is under stress due to climate change, which is increasing the frequency of intense and extended droughts and flooding, with disastrous effects on both plant and animal species. The 2020–2023 Horn of Africa drought is an ongoing drought that hit the countries of Somalia, Ethiopia, and Kenya with an estimated 43,000 in Somalia dying in 2022 [2][3][10].

## II. WATER AND HEALTH

Poor sanitation and contaminated water are associated to the spread of diseases like cholera, diarrhea, dysentery, hepatitis, and others. According to estimates, 829 000 people die annually from diarrheal disease as a result of poor hand hygiene, sanitation, and drinking water. However, diarrhea is largely preventable, and if these risk factors were addressed, 297 000 infant deaths under the age of five per year may be averted. When water is scarce, people could decide that washing their hands is not important, increasing the risk of diarrhoea and other illnesses [34]. Cholera, dysentery, hepatitis, skin and eye infections, typhoid, and other water-related disorders are widespread in Nigeria [1]. Cases of water borne diseases linked to contaminations of drinking water with pathogens have been reported and this occurs either when public drinking water supplies were not adequately treated after contamination with surface water or when surface water contaminated with enteric pathogens has been used for recreational and or domestic purpose [7]. Some studies have reported drinking water samples have *Escherichia coli*, *Salmonella*, *Shigella* and *Vibrio* species far above the World Health Organization (WHO) allowable limit [24]. Diarrhoea is considered to be one of the most important public health problems because of its association to unclean water. About 1.8 million deaths linked to diarrhoea occur annually; and of these deaths, approximately 90 percent are under the age of five [28]. In rural communities, it is estimated that three out of every five persons urinate or defaecate in the river, contaminating the water [36]. This poor sanitation can be responsible for outbreak of faeco-

oral disease transmission and possible deaths especially of the under fives. Consequences of unclean water has been linked to high mortality, lost work days, missed education, health care costs, and the draining of family resources [9].

### III. STUDY AREA

Bayelsa State is the second largest oil producer, after Delta State. It is a wetland so heavily endowed with water resources, and other natural resources. Located within latitude 5.16° and 5.00°N; and longitude 5.51° and 6.37°E, the topography of Bayelsa State is generally low-lying, with fresh water and salt water, and a typical mangrove forest. It has an average rainfall of 350 cm with its peak spread across June, July, and possible flooding in September, October and November. The State has numerous rivers, most of which are tributaries of the River Niger, and notable among them, are Ekole Dodo, Pennington, Middletown, Sam Bartholomew, Freshtown, Sangana, Nun, Brass, St. Nicholas, Santa Babara and Rams. The main creeks are Kolo, Ikebiri and Digatoro. Bayelsa State is bordered in the south by the Atlantic Ocean, northwest by Delta State, and northeast by Rivers state. [17].

It is absurd that this paper is dealing with water challenges in Bayelsa when it is claimed that the state is surrounded by water. It is comparable to the famous phrase from Samuel Taylor Coleridge's 1978 poem "The Rime of the Ancient Mariner," which reads, "Water, water everywhere and not a drop to drink." Although there is water nearby, all around them, and all over Bayelsa, the question of whether it is clean and safe to drink still lingers.

Some possible causes of salt and fresh water contamination in Bayelsa State

Community activities: through open defecation in the river and other activities like bathing, washing as well as indiscriminate solid waste disposal into the rivers also contaminate the water and make it unfit for domestic use. Making use of such water can result to diarrhoea and other water-related diseases.

b) Flooding and Erosion: Flooding has been described as the excess water flowing onto land which is usually dry [5], e.g. when rainfall exceeds absorption capacity

of the soil, which in turn causes significant environmental consequences [14]. The Nigeria Hydrological Services Agency in its annual flood outlook [13] had pointed out the major causes of flooding in Nigeria as follows: soil moisture, extreme weather conditions owing to climate change, mal functioning of dams especially those close to the country's borders, and topography. In 2012, Nigeria experienced its worst flooding in over 40 years, because of heavy rainfall across the country, for many days, and the Lagdo Dam in northern Cameroon east of Nigeria, used for electricity generation, and irrigation, releasing its excess water [11]. Manure and wastes from domestic herd animals can wash into flood waters and may carry a variety of pathogens, like carcasses of drowned animals and humans. During flooding, there may not be access to safe water for drinking, food preparation, and personal hygiene making people to use available flood water or contaminated water for household purposes leading to water-related diseases.

Petroleum Pollution: most times, petroleum companies in Bayelsa do not follow safety practices and this leads to environmental pollution which will in turn contaminate water bodies. Such practices like transportation of petroleum products, oil spillage, gas flaring, rupture and damage to oil pipelines can contaminate water bodies hence increasing ambient heat, loss of fishes and impairment of human health.

### IV. METHODS AND MATERIALS

Study design was survey method adapted from The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) on core questions on drinking-water and sanitation for household surveys [35] and contextualized according to setting. Cluster sampling method was used out of convenience and a sample size of 135 households drawn from urban (Yenagoa metropolis) and rural (Toru-Orua) parts of the state was utilized for the study.

Interviewer-administered survey questionnaire was used for data collection. The survey questionnaire was also interpreted into the local dialect (Ijaw) for some household heads who do not understand the English language.

Data was analyzed using simple percentages

Results

Table 1: Total number of households 135

Urban	Rural	N
63 , 46.7%	72 , 53.3%	135, 100%

Table 2: Gender of household heads

	Female	Male
Urban n=63	0	63
Rural n=72	49	23
N=135 , 100%	49, 36.3%	86 , 63.7%

Table 3: Age of household heads

	<18	18-40	41-60	>60
Urban n=63	0	56	7	0
Rural n=72	6	27	34	5
N = 135	6 , 4.4%	83 , 61.5%	41, 30.4%	5, 3.7%

Table 4: Educational level of household heads

	No formal education	Primary school	Secondary school	Tertiary
Urban n=63	0	0	36	27
Rural n=72	3	54	15	0
N=135	3, 2.2%	54, 40%	51, 37.8%	27, 20%

Table 5: Marital status

	Single	Married	Divorced	Widowed
Urban n=63	15	48	0	0
Rural n=72	13	49	4	6
N=135,100 %	28, 20.7 %	97, 71.9%	4, 3%	6, 4.4%

Table 6: Main source of drinking water

What is the main source of drinking-water for members of your household?	Urban	Rural	N=135, 100%
Piped water into dwelling (taps in bathroom, kitchen etc)	8	0	8, 6%
Private tap (belonging to another household)	19	18	37, 27.4%
Borehole (in the compound with a central tap)	8	10	18, 13.3%
Rainwater collection	2	9	11, 8.1%
Bottled water	3		3, 2.2%
Sachet water	13	9	22, 16.3%
Water vendors (maruwa).	10	14	24, 17.8%
Surface water (river)	0	12	12, 8.9%

Table 7: Source of water for other house hold uses

What is the main source of water used by your household for other purposes, such as cooking and hand washing, flushing	Urban	Rural	N=135, 100%

toilets, laundry etc?			
Piped water into dwelling (taps in bathroom, kitchen etc)	8		8, 6%
Private tap (belonging to another household)	19	8	27, 20%
Borehole (in the compound with a central tap)	8	10	18, 13.3%
Rainwater collection	9	13	22, 16.3%
Water vendors (maruwa)	19	8	27, 20%
Surface water (river)		33	33, 24.4%

Table 8: Time taken to get water

How long does it take to go there, get water, and come back (single hauling trip)	Urban	Rural
Number in minutes including waiting time	15	20

Table 9: Individuals collecting water

Who usually goes to this source to fetch the water for your household?	Urban	Rural	N=135, 100%
Adult woman	4	21	25, 18.5%
Adult man	15	12	27, 20%

Female child (under 15 years)	5	18	23, 17%
Male child (under 15 years)	3	0	3, 2.2%
Not applicable	36	21	57, 42.2%

Table 10 : Water treatment

Do you treat your water in any way to make it safer to drink?	Urban	Rural	N=135, 100%
Yes	45	43	88, 65.2%
No	18	29	47, 34.8%

Table 11: Method of water treatment

What do you usually do to the water to make it safer to drink?	Urban	Rural	N=88, 100%
Boil	19		19, 21.6%
Add Alum		25	25, 28.4%
Use a water filter	19		19, 21.6%
Let it stand and settle	7	18	25, 28.4%

## V. DISCUSSION

Out of the 135 households sampled, 63(46.7%) dwell in the urban area of the state while 72(53.3%) dwell in the rural area of the state. 49 of the household heads are females and 86 are males. It was also noted that it is only in the rural area that females are household heads. Educational level of respondents show that

3(2.2%) have no form of education, 54(40%) have primary school as their highest level of education, 51(37.8%) have secondary school as their highest level of education and 27(20%) attained tertiary institution.

Responding to the question of their main source of drinking water, 8(6%) agreed having water piped into their houses, 37(27.4%) get their water from tap belonging to another household, 18(13.3%) have a central tap in the compound from where they get drinking water from, 11(8.1%) drink rain water, 3(2.2%) drink bottled water, 22(16.3%) drink sachet water, 24(17.8%) have water brought to them by water vendors popularly known as maruwa while 12(8.9%) agreed to drinking from a nearby river. It was noted that river water is consumed by a few households in the rural area. Even though, it has been noted that rain water is an improved source of drinking water, however, the collection of the water matters a lot as people who reside in an oil exploration area where the rain water may be contaminated with different atmospheric particles thus making it unsuitable for drinking. Hence, rain water need to be treated before it can be consumed.

For water used for other household purposes, 8(6%) have water piped into their houses and get water easily, 27(20%) get water from a private tap belonging to another household, 18(13.3%) have a central tap in their compound, 22(16.3%) harvest rainwater, 27(20%) obtain water from vendors and 33(24.4%) use river water. Use of surface water for other household purposes renders even drinking water from an improved source void. People in the urban area use 15 minutes on the average to make a trip of water hauling including waiting time while those in the rural areas use 20 minutes on the average. The time spent in the rural area excludes time used to have a bath or go to toilet at the river. The situation is quite different from figures obtained during 2008 National Demographic and Health Survey which says that only 71.9% of Nigerians residing in the rural areas had access to water within 30 minutes [12]. For the individual who has to go to fetch water for the household, 57(42.2%) have no need of making a trip to haul water, 25(18.5%) are adult female, 27(20%) are adult male, 23(17%) are female children less than the age of fifteen and 3(2.2%) are male children less

than the age of fifteen. This indicates that there is a gender disparity with respect to water-hauling responsibilities as more girls are made to go and fetch water than boys. This will also put the girls at risk of bullying or rape as those who live in the rural areas rely more on river water for household chores. Responding to treatment of water to make it safer, 88(65.2%) of the total surveyed household agreed to one or two forms of water treatment while 47(34.8%) reported no form of water treatment. Of the 88(65.2%) who treat their water, 19(21.6%) boil the water, 25(28.4%) add alum, 19(21.6%) use water filter and 25(28.4%) let the water stand and settle. Majority of the households who add alum to their water are people who make use of the river water while those who allow their water to stand and settle constitutes mainly of people who harvest rain water. This conforms slightly to a survey of the community water supply of some rural riverine communities in Niger Delta region carried out by Ordinioha in which it was observed that the common source of drinking water was surface water (37.9%) and most (61.2%) of the water drawers spent less than 15 minutes to complete the round trip to the water sources [18].

#### CONCLUSION AND RECOMMENDATIONS

At the time of the survey, there was water crisis in the rural area surveyed because of unavailability of fuel used in pumping water by households who have boreholes. This on the other hand made borehole owners to be hoarding their water and releasing only a little for commercial purposes. This practice made water to become expensive even in the urban setting. Also as at the time of this survey, there is no state provision of water by the state for people in the urban areas especially the state capital. Households without borehole in their compound depended on vendors for water. The study thus recommends that the Bayelsa state government should look into provision of potable water for her citizens. Some of the following measures could also be taken to provide clean and safe water for people in Bayelsa state;

Addressing water pollution through safe practices: majority of water sources especially surface water in Bayelsa are being polluted through human activities that are not safe eg. bathing, defecation, oil spill, oil transport etc. There is need for proper health education

and promotion for the residents so that they are aware of activities that pollute water and refrain from it. Oil companies are also to be made to follow only practices that are safe for the environment.

The issue of cultural belief is also a problem as some of the natives believe that river water makes the body stronger and that was why their ancestors lived for a long time. This is totally wrong and there is need to correct such notion. Companies and industries that are domiciled in Bayelsa should also help in the provision of basic amenities as a social responsibility to the people. Research promotion that will allow the use of solar energy to desalinate water for increasing supplies and to purify the water should be put in place. This will help to reduce water scarcity and provide clean water for household use. The Middle East have made strides in this regard and such can be replicated elsewhere especially in Bayelsa that is surrounded by salt water. As seen in some communities, there is also need for community effort in the provision of safe water for her residents. Communities in Bayelsa should start looking for ways of bringing their sons and daughter in the Diaspora to help develop their communities and provide them with basic amenities.

At the time of the survey, the state water board had no public piped water to different areas in the capital territory and this is quite disheartening. There is need for Bayelsa State Water Board to seek for ways to pipe water into different towns and cities, in this way people will not use unimproved source of water for their household purposes. Access to clean water in Bayelsa State is possible when all stakeholders pull resources together to achieve that.

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