

COST OF DOMESTIC WATER IN BAYELSA STATE, SOUTH-SOUTH NIGERIA.

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ABSTRACT

The practice of buying water for domestic consumption remains the only means of access to water supply in Bayelsa State and this poses serious threats to the health and wellbeing of the people. A study was carried out to determine the cost of water in three randomly selected communities in Bayelsa State, South-South Nigeria from January 2013 to April 2014. The study adopted the descriptive cross-sectional design, using a structured questionnaire and oral interview as the main instruments for data collection. From the findings, 81% of the respondents sampled lacked access to improved water supply, compared to just 18.9% having access to potable water. The study further indicated that the proportion of respondents who bought 20 litre Jeri-can of water equivalent to the basic minimum requirement per person per day at 20 naira, 62(45.2%) was significantly higher than those who bought 50 litre Jeri-can of water at 40 naira per person per day, 26 (19%). It was also discovered that low income families (households) spent 5.8% of their monthly income on water purchase which was twice the 3% of the monthly income recommended by the United Nations Development Programme. Conversely, high income families spent as low as <0.4% and <1.4% to buy water for domestic consumption. The scenario implied that many households in the low income group were left with little or nothing to take care of the family needs after spending a large chunk of their earnings on water, giving the high poverty profile and cost of living in the State. The cost of water charged by water vendors and borehole owners also reduced the quantity of water used by poor families for hygiene purposes, thus enhancing the spread of waterborne diseases, such as diarrhoea, cholera, typhoid fever, trachoma, ring worm infections etc. It was therefore recommended that the Bayelsa State government should improve its MDGs community water supply and sanitation coverage, with massive enlightenment campaign on hygiene promotion.

Key words: Cost of water, safe drinking water, public health implications.

INTROIDUCTON

Water is essential to life and for the maintenance of general wellbeing of man. It is also a basic human right which serves as a prerequisite to leading a healthy life and the realization of other human rights, such as food, shelter, health etc. According to the United Nations, *the human right to water entitles everyone to sufficient, safe, acceptable, physically assessable and affordable water for personal and domestic uses* (United Nations Economic and Social Council, 2002). It also stated that an individual should have access to at least 20 litres of water per day within 1 km/30mins round trip from source, in the absence of piped water on the premises to meet the basic human needs (Howard & Bartram, 2003; WHO, 1997). There is ample evidence that insufficient quantity of water leads to poor hygiene and sanitation, resulting in increased spread of diarrhoea, typhoid fever, cholera, dysentery, including eye and skin infections e.g. trachoma, conjunctivitis, dermatitis etc. Improved water quantity combined with water quality can reduce the incidence of diarrhoea by 17%, including eye and skin infections (Fewtrell & Bartram, 2001).

Despite the various efforts aimed at providing safe drinking water supply, the world today is faced with serious challenges of water scarcity, with increasing threats from disease or deaths, poverty and human suffering more than ever before. The problem of water scarcity is felt by the less privileged majority who cannot afford three square meals a day, more than other segments of the human population. It is estimated that 1.1 billion people worldwide have no safe water to drink, especially the developing countries, including Sub- Saharan Africa.

In Nigeria, over 2.1 million of the 170 million people lack safe drinking water, in spite of the fact that the country has abundant natural water resources in the coastal areas and parts of the northern region. These include the various river systems, such as River Niger and Benue, the Atlantic Ocean, Lake Chad etc., in addition to the numerous water supply schemes scattered across the country. According to the WHO/UNICEF Joint Monitoring Programme (JMP) (2010) update of the Millennium Development Goals (MDGs) progress report on water supply, Nigeria is at the bottom among the 25 countries with the lowest water supply coverage below the global 75% target to be achieved by 2015 (UNICEF, 2010).

Successive governments have made tremendous efforts over the years towards increasing access to safe water for Nigerians, yet the country still lags behind, primarily due to lack of commitment, political will and low investment in the water supply/sanitation sub sector. For instance, it was reported that between 2000-2012, the Nigerian Government made 26 commitments at 4 high level meetings aimed at increasing access to water supply from 58% to 75% and 31% to 65% for sanitation coverage. These were the World Summit in Johannesburg, South Africa (2000), UN General Assembly, New York (2010), African Sanitation and Hygiene in Thekwini, Durban, South Africa (2011) and Sanitation and Water for All Meeting in Washington D.C, U.S.A. (2012). An additional commitment was made at the meeting of ministers of Sanitation and Water for All (SWA) from 39 developing countries in 2012 to implement a 7-Point Agenda. Unfortunately, none of these commitments was implemented. There were also speculations that Nigeria may not achieve the global water coverage, based on the prediction by the WHO/UNICEF Joint Monitoring Programme that it will take the country up to 27 years to meet the national target of 82%, as well as the global 75% target for water supply by 2015 (Amadi, 2014; NEWSAN, 2013).

A more critical issue militating against the achievement of water supply in Nigeria is the fact that the human right to water and sanitation has not been recognized as a legal entitlement and implemented by the government. Although, drinking water is recognized by the National Water and Sanitation Policy 2000 as a human need, it does not recognize water as a right. Also, Government has not officially declared drinking water as a fundamental human right, due to lack of political will and commitment which account for the 58% low water supply coverage below 82% national target (NEWSAN, 2013).

The scenario in Bayelsa State is more worrisome even as the state is criss-crossed by numerous rivers and creeks, yet the inhabitants have no water to drink, because of pollution from indiscriminate waste dump, sewage, oil spill and industrial effluent discharge. Actions taken by past administrations to address the problems of water supply in the state through various intervention programmes, such as WATSAN, MDGs, WASH etc., with support by UNICEF, WHO, UNDP, Shell, Agip, among others failed to make any meaningful impact (Nwankwo, Amadi & Zachaeus, 2010; Alagoa, 1999).

Many of the water facilities in Bayelsa State are not functioning till date, mainly due to political interference, poor construction, corruption, lack of maintenance etc. A more critical issue is the absence of water testing prior to commissioning and quality monitoring of government owned water facilities, including the MDGs water supply intervention programmes at regular intervals to ascertain chemical/bacteriological fitness for human consumption. This contributes to poor water quality and incidence of waterborne diseases. These are the main reasons that encourage the practice of buying water from water truck vendors, private boreholes or packaged water/bottled water for domestic consumption in Bayelsa State. These alternative water sources are not better, because they are also unsafe and not recommended for domestic use, based on the Nigerian standards for drinking water quality (SON, 2007) and WHO guidelines (WHO, 1997, 2004, & 2011), more so, given the high level of pollution activities and poor sanitation in the area. With the increasing population in the State there is a corresponding high demand for water from boreholes, truck vendors etc., and inflation of water prices beyond the reach of the ordinary citizens. Consequently, water factories and boreholes are fast becoming the most lucrative businesses in Bayelsa State.

The socio economic implications of buying water for domestic uses cannot be overemphasized. Apart from the impacts on health of the people, the practice also adversely affects economic activities, as the cost of water often translates to general increase in the prices of essential commodities beyond the income of the ordinary citizens. The impact is usually felt more during fuel scarcity. This causes untold hardship among the low income earners who often find it difficult to provide the basic needs for their families, such as food, clothing, shelter, health care, education of children etc. For example, a study carried out in the Port Harcourt City by the African Development Bank Group (2013) had shown that 60% of the residents who did not have access to clean water normally spent more than 1,300 – 3,000 Naira every month to buy water for household use, representing 70% of their monthly income. Investigations by NAFDAC further showed that most families spent 10-20 times their income on water purchase from vendors, which not only reduced the quantity of water for drinking and other domestic uses, but also exacerbated poverty (Akuyili, 2003). This was found to be inconsistent with the recommendations of the United

Nations Development Programme (UNDP, 2006) that the cost of water (i.e. amount of money spent on water purchase) should not exceed 3% of the household income.

A similar study carried out by Abdulwahid (2011) on the impact of water, sanitation and hygiene further corroborates the implications of water purchase in Bayelsa State. The findings showed that poor people who lived in rural/peri-urban areas were often deprived of basic amenities, such as safe drinking water and sanitation. Therefore, they usually make their own arrangements for water supply through self-help effort or pay higher prices to water vendors for insufficient quantity of water. The situation exposed the people to illnesses which put extra burden on available health services, led to the reduction in productivity and increased poverty amongst the people as well.

The effect of cost on water quantity cannot be overstressed as it determines the amount of water consumed in the household per person per day. At higher cost, the amount (volume) of water used reduces, which in turn discourages the level of personal hygiene or sanitation practiced, resulting in poverty and the spread of disease. These further give rise to most of the prevailing problems of human suffering in the state, such as malnutrition, unemployment, prostitution, low status of women, dependency, crime etc., as reported by the Bayelsa State Economic Empowerment and Development Strategy (BY-SEEDS, 2004).

The United Nations Development Programme (Main report, 2008/2009) further revealed that Bayelsa State topped the states in the South-South zone with the lowest poverty rate (US\$5.333). This was inconsistent with the prevailing scenario till date, characterized by the high degree of hunger and human suffering expressed by the inhabitants due to poverty per capita income below national average (US\$280), which are indices of severe socioeconomic deprivation in the State. The main issues bothering the people included poor quality housing, high unemployment rate, lack of safe water supply and sanitation facilities, to mention just a few. For instance, deprivation or lost traditional occupation of fishing/farming and total dependence of the people on government monthly allocation, employment/civil service jobs and lack of industries are the major causes of poverty. These had been reported by the Bayelsa State SEEDS (2004). Studies carried out by Cooney et al (2008) also revealed that the level of poverty in Bayelsa State was very high.

Based on the foregoing, the cost of water often ranged as high as 20-30 Naira per 20litre container (Jerrican) in most cases. Thus, the money spent on water per month exceeded the 3% as stipulated and this puts extra strain on the income of many families living on less than 1 US dollar per day and those on monthly salary of 18,000Naira National Minimum Wage. The situation is worse in large families comprising 5-9 individuals, coupled with the high cost of living in the state, compared to other parts of the country. Studies also indicate that in places where lack of access to safe water supply prevails, the rate of poverty increases by 70% in low income households and large family sizes between 7- 9 members, as a result of the rising cost of living. The number of persons in the household, type of occupation, as well as money spent to buy water for domestic purpose, influence poverty, resulting in the reduction of water quantity, the attendant health consequences notwithstanding.

MATERIALS AND METHODS

The descriptive cross sectional design was used for this study with the aid of a well structured questionnaire and oral interview. These made the collection of data from the subjects less cumbersome and successful. The questionnaire was modified from the WHO/UNICEF model for assessment of community water supply, sanitation and hygiene status (WHO/UNICEF, 2007).

Data was analyzed using frequency tables, bar charts, mean, percentages (%), chi square and computer aided designs (SPSS and Microsoft Excel version 2.0). These had been successfully used in similar studies to achieve remarkable results and found suitable for this study (Akpala, 1994; Abdulwahid, 2011).

The sample for the study was drawn from randomly selected households from 3 senatorial zones of Bayelsa State, which comprised Imiringi Community in Ogbia Local Government Area, Sampou Community in Kolokuma,/Opukuma Local Government Area and Tungbo Community in Samgba Local Area, representing Bayelsa West, Central and East Senatorial districts, respectively. Lack of Census figures in the communities studied made it difficult to determine the sample size to be used for the study, thus the selection of households was based on the traditional structure of the community settlement pattern using compounds and families. Purposive and simple random sampling techniques were adopted in the selection of compounds and households, respectively. In all, 260 households were randomly selected by balloting. The researcher assisted by Environmental Health Officers working in the area and principal members of the chief's council in each of the communities studied administered the questionnaire to the household heads to solicit information on the cost of water, vis-à-vis the quantity consumed and how these affected their lives. Pidgin English or the local dialect (for heads of household who could not speak or understand English language) was used as the means of communication to obtain necessary information from the respondents. Those who were not covered in the questionnaire survey participated in the oral interview on issues relevant to the study that were not captured by the questionnaire. Sanitary inspection of premises (households) was

also carried out by the researcher to determine the hygiene behavior and practices of the respondents, concerning household water handling to supplement information from the questionnaire survey and oral interview.

RESULTS

The assessment of water supply as shown in table-1 indicated that 45% of the households obtained water from private neighbourhood borehole, while 20% depended on the river and ponds as the main sources of water supply. From the findings, 81% of the households sampled lacked access to improved water supply, compared to just 18.9% having access to improved water supply.

Table-2 revealed that 41(24.3%) out of 169 households (respondents), being the largest consumed 41-50 litres (cpd) of water per person per day, 37(22%) consumed 31-40 litres (cpd) of water, 32(18.9%) consumed 21-30 litres (cpd) of water and 29(17.1%) consumed above 50 litres (cpd) of water per person per day. Also, 17(10%) respondents consumed 10-20 litres (cpd) of water and 9(5.3%) consumed 10 litres (cpd) of water, while the lowest proportion of households (respondents) 4(2.4%) did not know the amount of water they consumed per day. These values were calculated at *p*-value of 0.301.

Table-3 showed the income level of respondents in the three randomly selected communities studied in which 28(16.6%) out of 169 households (respondents) earned 31,000-50,000 naira per month. Also, 21(12.4%) households were on monthly income of 10,000-30,000 naira, 18(10%) earned 50,000-80,000 naira as monthly income, while 17(10.1%) earned above 80,000 naira per month. The least proportion of households (respondents), 6(3.6%) earned less than 10,000 naira per month. The study further showed that 79(46.72%) respondents did not know their monthly income.

Further analysis as contained in Table-4 indicated that out of 169 households studied, 62(45.2%) respondents bought 20 litre container (Jeri-can) of water at 20 naira per person per day, 32(23.4%) bought water at 10 naira per 10 litre container (Jeri-can), compared to 26(19%) respondents who bought 40 litre container (Jeri-can) at 40 naira. Also, 16 (11.7%) respondents bought 5 litres (medium sized bucket) of water at 5 naira twice per person per day, while 1(0.7%) did not disclose the price of water.

Table-5 showed the percentage (%) of household income spent to buy water in two out of the three communities studied where water purchase was inevitable. The result indicated that households earning 10,000-30,000 naira per month spent 2.8%- 0.9% of their income to buy 10 litres of water at 5 naira per person per day. The cost of water at 20 naira per 20 litre container (Jeri-can) per person per day represented 11.2%-3.7% of 10 000-30 000 naira monthly income. At 40 naira per 50 litres container of water sold the households spent between 2.4% and 7.5% of their monthly income.

The respondents (households) who earned between 31,000-50,000 naira monthly bought 10 litres of water at 5 naira per person per day and spent up to 0.9% and 0.6% of their income. At 20 naira per 20 litres of water per person per day they spent 3.6% and 2.2% above their income, while at 40 naira per 50 litres of water per person per day the respondents spent as much as 7.2% and 4.5% of their hard earned income to buy water every month. High income families earning between 51,000 and 80,000 naira per month bought 10 litres of water at 5 naira and spent less, i.e., between 0.5% and 0.4% of their income on water purchase monthly. At 20 naira per 20 litres of water per person per day the respondents spent between 2.2%-1.4% and 4.4%-2.8% of their income to buy 50 litres of water at 40 naira per person per day monthly. The respondents (households) that earned above 80,000 naira monthly spent <0.4% of their income to buy 10 litres of water at 5 naira per person per day. At 20 naira per 20 litres of water, they spent <1.4% and <2.8% of their income to buy water at 40 naira per 50 litres of water per person per day. The statistical test of hypothesis showed that *p*-value was 0.000 which suggested the high percentage of income spent on water by low income families.

It was also revealed that majority of the households 73(43.2%) had 7-9 persons in the family, 42(24.9%) had 4-6 members (occupiers), compared to 22(13%) households made up of only 1-3 occupiers, respectively. This impacted negatively on the income of large families living below poverty line which require more water to meet household needs.

DISCUSSION

Improved water supply not only promotes human health, but also helps to boost economic status and general living standards all of which reduces human suffering. The income of households influences or dictates their access to improved water supply, as well as the quantity of water consumed. This study however focused on the cost of buying water in Bayelsa State and how the practice affected the economic status of the people in terms of poverty.

Studies have shown that people who do not get sufficient water supply suffer from diseases spread by intestinal parasites, diarrhoea, trachoma, conjunctivitis, dermatitis etc., including poverty and effects on livelihood. Conversely, increased access to improved water supply brings about a remarkable reduction in morbidity/mortality

from diarrhoeal infections, including malnutrition, especially in children below five years (Abdulwahid, 2011; Estrey, Potash, Roberts & Schiff, 1991). Therefore, the provision of water less than the basic service level of at least 20 litres per person per day on average to meet the minimum requirement of availability on plot or within 1 km/30 minutes round trip from the source is unacceptable for public health reasons (Howard & Bartram, 2003; WHO, 1997).

Given the poverty profile of majority of Bayelsans living below the poverty line (i.e. on less than US\$1 per day) it is obvious that low income families buying water at 20 naira per 20 litres per person per day would have spent 3.6% of their monthly income on water, while those who bought water at 40 naira per 50 litres of water per person per day spent as high as 7.2% of their hard earned income to buy water. In large families comprising 7-9 occupants, the percentage (%) income spent on water per person per day would be twice these figures, if not more.

According to WHO (2011), affordability of water influences the use of water. Therefore households without access to safe water supply usually spend more money on water than households with piped water connection. The high cost of water forces low income households to seek alternative sources of poor quality that constitute dangers to their health. In areas where people purchase water for use, the cost also determines the volume (quantity) of water which often results in significant reduction of water procured for domestic use. This ultimately increases the risk of disease transmission and poor health status, particularly with regard to the spread of diarrhoea and water-washed diseases (e.g. trachoma, dermatitis etc.). It also limits hygiene promoting practices, such as hand washing, cloth washing and house cleaning as stated above.

In poor countries severe water shortages often lead to increased family expenditure above 3% of their total income on water purchase. Thus, families face the risk of diarrhoea and malnutrition, particularly amongst children below five years. Also, majority of the people who buy water to drink or cook are always left with little or nothing to provide for other basic needs, including food. Nigeria's former NAFDAC Director-General, Dr. (Mrs.) Dora Akunyili (2003) in a paper she presented at the 29th WEDC International Conference on 'Action for water and sanitation', Abuja stated that the urban poor spends up to 20-30 times their income on water from vendors. These have been substantially supported by Caincross and Kinnear (1992) in Howard and Bertram (2003). But studies from some Ugandan towns and cities disagree with the findings for lack of sufficient information and conflicting evidence of cost influence on water quantity and use (Howard, 2002).

Nevertheless, the aforementioned studies help to buttress the prevailing situation of the water crises in Bayelsa State, whereby the residents have no choice than heavily depend on bottled/ sachet water, water vendors and private commercial bore holes for their daily needs, due to failure of public water supply services. These are the common features of public water utilities in Nigeria which Akunyili (2003) attributed to the inability of government to secure adequate water supply to the people. It is also the main reason that water manufacturing business is thriving as alternative source of water supply in the country, including Bayelsa State.

It will be recalled that Ordinioha (2011) in his survey of community water supply in the Niger Delta Region had found out that not less than 67.9% of households in Bayelsa bought bottled and sachet water produced from unreliable sources, mainly contaminated rivers, streams, ponds, boreholes etc. The study further revealed that water consumed by the people contained *E. coli*, and significant concentrations of iron, including other toxic metals which were the major problems of water supply in the area. A post-market surveillance of 647 registered packaged water products by NAFDAC (Akunyili, 2003), in which 57% and 22% samples contained microbial agents of cholera, typhoid fever and chemical contaminants, such as lead, nitrates etc, capable of causing liver damage was also relevant to this study. These had been highlighted and supported by study findings of; Omoweh (2005), Nwankwo, Amadi and Zacchaeus (2010), and Nwankwoala, Udom and Ugwu (2011), respectively.

The problems of lack of safe drinking water have not only increased the risk of human exposure to environmental agents of disease, but also undermine socio economic development and quality of life of the people in the area. An evaluation of environmental health services in selected LGAs of Bayelsa State by Nwankwo, Amadi and Zacchaeus in 2010 portrayed a grim picture of unsatisfactory status of water supply among other essential sanitation services which promote good health and make life more meaningful.

CONCLUSION

The continued practice of buying water for domestic uses, especially from sources that are suspicious and not reliable in view of their bacteriological/chemical quality puts the health of the entire population at risk. From studies carried out so far, no one indicated that the sources of drinking water in Bayelsa State mainly boreholes were satisfactory for human consumption. Laboratory analysis of samples collected from both ground and surface water in the area had shown significant concentration of chemical substances and coli-form counts above the Nigerian Standards for Drinking Water Quality and WHO guideline values.

In the circumstance, private water service providers, especially private commercial borehole owners should

be encouraged and educated on water treatment and testing. The relevant agencies/departments (MDAs) should carry out surveillance and regular monitoring of boreholes to enforce water quality standards. Government should also live up to its obligations in ensuring the provision of safe drinking water in the communities in line with the Millennium Development Goals (MDGs) and targets to safeguard public health and alleviate poverty in the State.

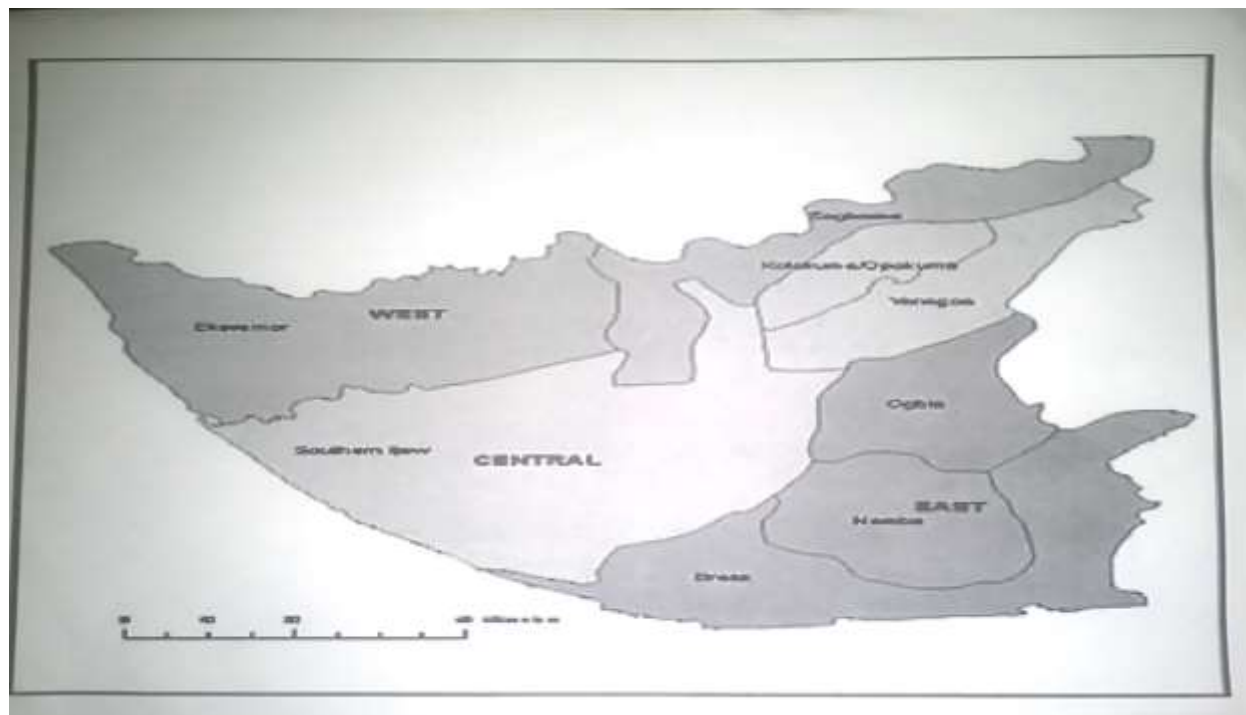


Figure 1. Map of Bayelsa State, South-South, Nigeria.

Table 1: Summary of household access to improved water supply in the rural communities of Bayelsa State, 2013.

	IMIRINGI COMMUNITY		SAMPOU COMMUNITY		TUNGBO COMMUNITY		TOTAL	
	N	%	n	%	N	%	n	%
Households with improved water supply	27	43.5	2	6.25	3	4.0	32	18.9
Households without improved water supply	35	56.4	30	93.75	72	96	137	81.1
Total	62	100	32	100	75	100	169	100
P value							-0.990	

Table 2: Summary of the amount (quantity) of water consumed per person per day.

	IMIRINGI		SAMPOU		TUNGBO		TOTAL	
	N	%	N	%	N	%	N	%
10 litre (cpd)	3	4.84	2	6.25	4	5.33	9	5.3
11-20 (cpd)	7	11.29	3	9.38	7	9.33	17	10.0
21-30 (cpd)	10	16.13	8	25.0	14	18.67	32	18.9
31-40 (cpd)	13	20.97	6	18.75	18	24.0	37	22.0
41-50 (cpd)	12	19.35	10	31.25	19	25.33	41	24.3
>50 (cpd)	15	24.19	3	9.38	11	14.67	29	17.1
Don't know	2	3.23	-	-	2	2.67	4	2.4
Total	62	100	32	100	75	100	169	100
p-value							0.301	

Table 3: Monthly Income of the respondents heads of household (in Naira)

	IMIRINGI COMMUNITY		SAMPOU COMMUNITY		TUNGBO COMMUNITY		TOTAL	
	N	%	N	%	N	%	N	%
< 10,000	1	1.6	5	15.6	0	0.0	6	3.6
10000-30000	8	12.9	3	9.4	10	13.3	21	12.4
31000-50000	11	17.7	2	6.25	15	20.0	28	16.6
51000-80000	13	21.0	2	6.25	3	4.0	18	10.6
Above 80000	13	21.0	4	12.5	0	0.0	17	10.1
Don't know	16	25.8	16	50	47	62.7	79	46.7
Total	62	100	32	100	75	100	169	100

Table 4: Summary of the Cost of water (in naira) per person per day (lpcd) in Byelsa State, 2013.

Sample location	IMIRINGI		TUNGBO		TOTAL	
	N	%	n	%	n	%
Cost in naira (#)						
#5 per medium bucket	9	14.51	7	9.33	16	11.7
#10 per 10 litre container (Jeri-can)	16	25.81	16	21.33	32	23.4
#20 per 20 litre container (Jeri-can)	27	43.55	35	46.67	62	45.2
#40 per 50 container litre (Jeri-can)	10	16.13	16	21.33	26	19.0
Don' know	-	-	1	1.33	1	0.7
p-value						0.297

Table 5: Percentage Household Income (%) Spent on Water Supply at Imiringi and Tungbo Communities in Bayelsa State

Monthly Income Level (in naira)	Imiringi		Tungbo		Water Expenditure Per Month	
	N 5 per 10 litre container twice a day Per month	% income	N 20 per 20 litre container twice a day Per month	% income	N 40 per 50 litre container twice a day Per month	% income
<10,000	N 280	2.8	N 1,120	11.2	₦ 2240	22.4
10,000-30,000	N 280	2.8-0.9	N 1,120	11.2 -3.7	₦ 2240	22.4-7.5
31,000-50,000	N 280	0.9-0.6	N 1,120	3.6 -2.2	₦ 2240	7.2-4.5
51,000-80,000	N 280	0.5-0.4	N 1,120	2.2 - 1.4	₦ 2240	4.4-2.8
>80,000	N 280	<0.4	N 1,120	<1.4	₦ 2240	<2.8
P-value				0.000		

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