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The Nature of Safe Water Supply in Abakaliki, Southeast Nigeria

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Abstract: *The supply of safe water in sufficient quantities in developing countries remains a daunting challenge. Using a cross-sectional survey, this study explores the nature of supply of safe water in Abakaliki Local Government Area (LGA) of Ebonyi State, Nigeria. The study used both primary and secondary data. Data analysis was done with the Statistical Package for Social Sciences software. Findings from the study show that there was no significant difference in water fetching role by gender, and majority of households used improved sources of water, mostly, from boreholes. The Per Capita Water use for the area is below the minimum benchmark, and the result of the chi-square test of hypotheses showed a significant relationship between occupation and perceived sufficiency of water, as well as income and being able to benefit from utilizing a safe water facility. The Pearson Product-Moment Correlations revealed that the level of education of a head of household was a major determinant of gender and water fetching role, while a One-way Analysis of Variance (ANOVA) showed that the higher the educational level of the head of a household, the higher the ability of such a household to be able to benefit from utilizing safe water. Suggestions for improvement were also made.*

Keywords: *Daily Per Capita Water Use, Gender, Household, Safe Water, Educational level.*

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I. Introduction

The crucial role of water and sanitation in national development cannot be over-emphasized. It has been observed that "global water demand is predicted to increase significantly over the coming decades".[1] This may not be unconnected with the fact that the world population continues to increase. Yet, the quantity of water limits its usage.[2] Key factors affecting the use of safe water to include income, education level, gender, household size, and distance/time to water source (including waiting time), among others.[3, 4] A strong relationship has been suggested, between wealth as measured by household assets, and use of improved water and sanitation sources.[5] In 2002, Nigeria occupied the 129th position among 147 countries in the Water Poverty Index (WPI), with an average score of 44 (total being 100), which implies that the country was poor in terms of access by her citizens to safe water and sanitation.[6] Approximately 80% of households in Nigeria had less than 30 liters of water per person per day.[7] In 2012 the percentage of deaths attributable to inadequate water, sanitation and hygiene in Nigeria was above 15% of all deaths.[8] Nigeria currently has a record of about 559 deaths (per 100,000) for children under age 5 as result of poor water and sanitation or hygiene, which is one of the worst in the world.[9] Ironically, the country also has 50.9% multidimensional poor.[9] Measures to tackle income poverty, which fail to take cognizance of "water poverty", are most likely to be ineffective.[10] Even where water supply is adequate and reliable, people may not afford to pay for clean water as a result of low income and this drives them to use inadequate and unreliable sources of water supply.[6] In fact, "at a national level, it can be seen that countries which have higher levels of income tend to have a higher level of water use".[10] Furthermore, In Nigeria, the poor among the populace are relatively worse off in terms of access to safe water and sanitation services.[11, 12] From a gender angle, women and young girls mostly, spend so much time and effort in search of safe water and convenient toilet facility, leading to tremendous economic waste in terms of time and effort that should have been put into productive activity. [11, 13, 14]Residents of Abakaliki Local Government Area rely extensively on untreated ground and surface water sources for drinking and domestic uses and open defecation is prevalent in the area.[15] This paper, therefore, seeks to ascertain the factors that affect availability of safe water in Abakaliki LGA, and also assess the sufficiency of water consumption in Abakaliki LGA.

Study Hypotheses

The following hypotheses shall be tested in this study.

1. Heads of households who are civil servants are more likely to consider the quantity of water available to their household as sufficient as heads of households in other occupations.
2. High income earners are more likely to benefit from utilizing a safe water facility than middle and low income earners.
3. There is no significant relationship between educational qualification and fetching of water for household use.
4. People who are more educated are likely to have the ability to utilize safe water

II. Review of Relevant Literature

2.1 Income and Water Consumption

In a recent study by Deyà-Tortella, Garcia, Nilsson and Tirado, on the effect of water tariff reform on water consumption in different housing typologies in Calvià (Mallorca), Spain, the authors stated that the main policy implication of their research was that the effects on water consumption due to the water pricing reform depended on the household typology.[16] The study found that in households with the highest incomes and with larger water consumptions, the effect [of the tariff] was lower than on the households with a low-medium family income, where they already consumed less water. As a result, the effect on the total water consumption was not significant, and the increase in water prices particularly affected families with lower incomes. On the basis of the discovery, they requested policymakers to pay attention to income effects of price reforms. Similar findings have also been made to the effect that differences observed in level of access to water by different villages in their study area, was traced to differences in economic status.[17]

2.2 Gender and Water Consumption

Findings made in a study conducted in South Africa, using a sample of 30,000 dwelling units, revealed that a slightly higher percentage of female-headed households obtained water from unimproved sources. Female-headed households were also (on average) found to be larger than male headed households.[18] Increase in household size was found to be related to use of water from unimproved sources for rural areas only but not for urban areas. Female-headed households were marginally more likely to be poor than their male counterparts, hence, suggests a link between female headship and poverty, and poverty limits access to safe water and sanitation. This is in line with the observation to the effect that women were more likely to be poor and malnourished, hence, less likely to receive medical services, clean water and sanitation and other resources that can aid their functioning.[19] In sub-Saharan Africa, 71% of the burden of fetching water for households falls on women and girls.[20]

2.3 The Nexus between Water Consumption and other Variables

The study on the effect of socio-economic factors on access to improved water sources and basic sanitation in Bomet Municipality, used multi-stage sampling technique to obtain a sample of 151 households that were administered with semi-structured questionnaires. The results showed there was a significant association between the level of education of household head and type of water source used by households.[21] Again, there was a significant association between occupation of head of household and type of water source used by households. According to the researchers, water poverty is a product of income poverty.[21] The researchers recommended financial empowerment for women, inclusive and sustainable human development with focus on the poor and basic education as a way of improving the situation. In another study, 200 respondents selected purposively were administered with questionnaires, and Chi Square was used to test some hypothesis, the result of which revealed a significant relationship between source of water and incidence of water-borne diseases. Respondents reported high cost of water as a factor in water source, especially as family size becomes larger. Other problems include frustration and excessive time and energy put into going to get water from far distance.[22]

III. Theoretical Framework

3.1 The Basic Needs Approach

The approach was developed in the 1970's by Johan Galtung.[23] The approach evaluates the basic needs of a people, foremost of which are safe water and sanitation, and assesses the extent to which they have access to provisions for such needs. In this regard, if people have access to safe water and sanitation as basic human needs, they are said to be developed. However, where they lack access to these resources, then they are not developed. Major weaknesses with this approach include the fact that it says nothing about how misery is produced. It focuses on tension relief and is essentially a consumption-based view. It also captures human beings and their needs as being homogenous.[23]

3.2 The Human Rights Based Approach (HRBA)

It has been argued that "Under a human rights-based approach, plans, policies and programmes are anchored in a system of rights and corresponding obligations established by international law. This helps to promote sustainability, empowering people themselves (rights holders)—especially the most marginalized—to participate in policy formulation and hold accountable those who have a duty to act (duty bearers)".[24] Milestones in the human rights to water and sanitation range from the Action Plan from the March 1977 Mar del Plata United Nations Water Conference, which recognized water as a right for the first time declaring that "All peoples, whatever their stage of development and social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs".[25] Others include the 1979 Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), and the 1989 Convention on the Rights of the Child[26], the UN General Assembly Resolution A/RES/64/292 on 'The human rights to water and sanitation'[27], and the UN General Assembly Resolution A/RES/70/169 on 'The human rights to safe drinking water and sanitation.[28] When viewed as human rights, governments are put to task to guarantee access to safe water to their people, since anything to the contrary will amount to human rights violations.

IV. Methodology

4.1 Area and Population of Study

The study adopted a cross-sectional survey design. The use of the design is justified, in line with the Water and Sanitation Indicators Measurement Guide.[29] The study area is Abakaliki Local Government Area in Ebonyi State, Nigeria. It lies between latitudes $6^{o}08'$N and $6^{o}24'$N, and longitudes $8^{o}00'$E and $8^{o}16'$N, respectively.[30] The area is made up of seven communities, namely: Amachi, Amagu, Edda, Enyigba, Izzi Unuhu, Okpuitumo Ndiebor and Okpuitumo Ndegu. The headquarters of the L.G.A is at Nkaliki, about 3km from the state capital. Abakaliki metropolis is the state capital. Most of the land in the area is fertile, hence, suitable for agriculture. Farming was dominant but has ceased to be with increase in urbanization in Abakaliki metropolis, which is extending to rural areas of the LGA. Mining activities by the Royal Salt Company at Enyigba community in the LGA is a source of revenue for indigenes, State and Federal government. Reports of difficulties in getting safe water in the LGA was the basis of selecting the area for the study. The general population for the study included all children and adults in the study area. The total population of the area as at the last census was 149,683.[31] The current (2017) population of the area is 206,562. The figure was derived, using the formula: $P_n=P_o\ (1+r)^n$ Where $P_{n=}$ Current (2017) Population, $P_{o=}$ Previous (2006) Population, 1= Constant r=Population Growth Rate, which is 3% or 0.03 for Nigeria, n=Number of years between P_n and P_o (i.e. 11years)However, the target population was adult male and female heads of households in the study area. The area has a total of 39,500 heads of households.

4.2 Sample Size and Procedure

The sample size for the study is 615, and was derived, using the Yaro Yamani formula,[32] from a target population of 39, 500, with an error margin of 4% or 0.04. Thus, 615 respondents constituted the sample for the study. A multi-stage sampling procedure was used for the study. First, from the seven communities in the study area, four communities were selected (Amachi, Amagu, Enyigba, and Izzi Unuhu) using simple random sampling by balloting. Next, as to give all the villages an equal chance of being selected, twenty percent of villages from each of the four sampled communities were selected using simple random sampling through balloting. Finally, to select the respondents for the questionnaire, based on the proportion systematically allocated to the different communities and villages, the sampling frame-village welfare union registers was used as aid, but where this was not feasible, convenience sampling was resorted to.

4.3 Data Collection and Analysis

The principal instrument for data collection was a structured questionnaire. Structured observation was employed to get quantitative data on water volume to enable the computation of per-capita water consumption. Data collected from respondents are presented in frequency distribution tables and explained using descriptive statistics like percentages. Chi square statistic was used to the study hypotheses, but was complemented with Analysis of Variance (ANOVA) and measures of correlation coefficients. The Statistical Package for the Social Sciences (SPSS) was used in analysis of data from the questionnaire.

V. Results and Discussion

Of the total of 615 copies of questionnaires that were distributed to respondents, 540 of the questionnaires were correctly filled and returned, hence, gave rise to a response rate of 87%.

TABLE 1. Socio-demographic Characteristics of the Respondents

Item		Frequency	Percent
Sex	Male	382	70.7
	Female	158	29.3
	Total	540	100
Age interval	18-28 years	73	13.5
	29-39 years	130	24.1
	40-50 years	166	30.7
	51-60 years	118	21.9
	61 years & above	53	9.8
	Total	540	100
Educational Level	Tertiary	196	36.3
	Secondary	206	38.1
	Primary	84	15.6
	None	54	10.0
	Total	540	100
Marital Status	Single (never married)	105	19.4
	Married (at least once)	435	80.6
	Total	540	100
Occupation	Civil/Public Servant	152	28.1
	Business/Trade	137	25.4
	Farming	73	13.5
	Artisan	18	3.3
	Unemployed	33	6.1
	Self employed	127	23.5
	Total	540	100.0
Household Size	One	48	8.9
	Two	21	3.9
	Three	42	7.8
	Four	92	17.0
	Five	91	16.9
	Six	76	14.1
	Seven	74	13.7
	Eight	38	7.0
	Nine and above	58	10.7
	Total	540	100.0
Monthly Income Range (₦)	Below ₦11,400.00 (low income)	151	28.0
	₦ 11,400.00- ₦ 34,199.00 (middle income)	201	37.2
	₦34,200.00- ₦45,599.00^{+} (high income)	188	34.8
	Total	540	100.0

Source: *Field Survey 2017.*

From the data in Table 1, 70.7% of the respondents are male, while 29.3% are female. Most of the heads of households were in the age 29-60 bracket. So, majority of the respondents are in the economically active group. Again, 90% of the respondents have acquired formal education, while 10% have not. Majority of the respondents (80.6%) have been married for at least once, while the rest have not. Apart from the 6.1% that were unemployed, the rest of the respondents were engaged in a form of economic activity. Civil/Public servants top the list, being 28.1% of the sample. Household size ranged from 1-9 persons per household. The average

household size is 5 persons per household. Finally, the monthly income of the respondents shows that 28% earned below ₦11, 400.00 (equivalent of $1.9 United States Dollar[1]), while 72% received above that, monthly.

5.1 Factors Influencing Availability and Use of Safe Water

TABLE 2. Responses Based on Dimensions of Access to Water

	Water Fetching Role	Frequency	Percentage
Who fetches water?	Only male members of the household	60	11
	Only female members of the household	157	29.1
	Both male and female members of the household	304	56.3
	Water vendor /supplier	19	3.5
	Total	540	100
What determines who fetches water?	Chance	213	39.4
	Seniority	67	12.4
	Gender	166	30.7
	Distance to water source	65	12.0
	Nature of the water source i.e. safety concerns	29	5.4
	Total	540	100
Why do you prefer to use your household's major source of water?	It is reliable	177	32.8
	It is affordable	146	27.0
	It is safe	70	13.0
	It is convenient	57	10.6
	It is dignifying	3	.6
	I can't say	87	16.1
	Total	540	100

Source: *Field Survey 2017.*

Data in Table 2 shows that for 11% of the respondents, water fetching was an exclusively male affair, while for 29.1% the responsibility was an exclusively female affair. However, for 56.3% of the respondents, the role was undertaken by both male and female members of the household, while 3.5% of the respondents relied on vendors/suppliers for their supply of water. To an extent, this tends to reflect gender balance unlike previous periods. The rationale for choice of person that fetches water for household use include chance for 39.4% respondents, seniority for 12.4% respondents, and gender for 30.7% respondents. Distance to water source was the rationale for 12% respondents, while safety was the concern for 5.4% respondents. Furthermore, the rationale for use of particular water sources by households include reliability for 32.8% of the respondents, affordability for 27% of the respondents, safety for 13% of the respondents, and dignity for 0.6% of the respondents. A total of 87 (16.1%) of the respondents were uncertain. Hence, reliability was mostly considered, followed by cost.

TABLE 3. Responses on Household's Predominant Sources of Water for Different Purposes

	Water Source/Facility	Drinking		Food Preparation		Bathing		Cleaning & Toilet	
		F	%	F	%	F	%	F	%
Improved	Piped water into dwelling/yard [2]	18	3.3	28	5.2	12	2.2	10	1.9
	Public tap (pipe-borne)	5	.9	8	1.5	21	3.9	15	2.8
	Borehole connected to dwelling	23	4.3	62	11.5	63	11.7	67	12.4
	Borehole through public stand pumps	99	18.3	192	35.6	157	29.1	169	31.3
	Well with cover	54	10.0	72	13.3	82	15.2	82	15.2
	Rainwater collection	103	19.1	49	9.1	22	4.1	22	4.1
Unimproved[3]	Bottled/sachet ("pure") water	201	37.2	28	5.2	15	2.8	15	2.8
	Vendor-tanker/truck/wheel-barrow (in gallons)	31	5.7	53	9.8	45	8.3	36	6.7
	Well without cover/open well	-	-	7	1.3	14	2.6	14	2.6
	Stream/ pond/lake	-	-	41	7.6	105	19.4	106	19.6
	Spring water (open)	6	1.1	-	-	4	.7	4	.7
Total		540	100	540	100	540	100	540	100

Source: *Field Survey 2017*

[1] The exchange rate as at the time of the study was ₦200.00 for $1United States Dollar (USD). ₦ 11,400 is the equivalent of $1.9 USD used as ***poverty line***.
[2] This means government provided pipe-borne water. The same is applicable to public tap (pipe-borne).
[3] Unimproved either because of high risk of contamination or as a result of being costly for the poor to afford.

Our findings as contained in Table 3 shows that on household's predominant source of water for drinking, majority of the households (37.2%) used sachet water predominantly for drinking in comparison to other water sources. A total of 56% of the respondents used improved sources of drinking water, while 44% used non-improved sources. Public borehole was the predominant source of water for food preparation used by households (35.6%). A total of 76.1% used water from improved sources for food preparation, while 23.9% used water from unimproved sources. On the predominant source of water for bathing, 66.2% of households used improved sources of water, while 33.8% of households used unimproved sources of water for bathing. Public boreholes remained the predominant source of water for bathing used by households. Also, public boreholes remained the predominant source of water for house washing, cleaning and toilet used by households, with total of 67.6% of households that used improved water sources, while 32.4% used unimproved water sources.

TABLE 4. Trends in Use of Water Sources for Different Domestic Purposes

Purpose	Improved Sources (%)	Unimproved Sources (%)	Total (%)
Drinking	56	44	100
Food Preparation	76.1	23.9	100
Bathing	66.2	33.8	100
Cleaning, washing, toilet	67.6	32.4	100

Source: *Field Survey 2017.*

The trend in Table 4 on improved and unimproved sources for different uses is instructive. The fact that as much as 44% of households collected and drank water from unimproved sources even makes matters worse, considering the health consequences and financial cost of such practice. This could also be an indicator of peoples inability to access water from safe sources as a result of poverty.

5.2 Sufficiency of Water

Table 5. Sufficiency of Available Water Facilities/Sources

Issue	Response	Frequency	Percentage
Do you consider available water quantity as sufficient?	Yes	247	45.7
	No	235	43.5
	I can't say	58	10.7
	Total	540	100.0
Is it only your household that uses the water source/facility?	Yes	86	15.9
	No (We share a facility)	439	81.3
	I can't say	15	2.8
	Total	540	100.0
If your answer in the preceding question is No, what number of persons share/collects water from the same water point/facility?	1-50	190	43.2
	51-100	74	16.9
	101-150	50	11.4
	151-200	56	12.8
	201-250	38	8.6
	251-300	11	2.5
	Above 300	20	4.6
	Total	439	100
Number of available water sources/facilities	1-5	249	56.7
	6-10	42	9.6
	11-15	51	11.6
	16-20	8	1.8
	Above 20	3	0.7
	I can't say	86	19.6
	Total	439	100
Household enjoys any benefit from being able to utilize safe water	Yes	215	39.8
	No	279	51.7
	I can't say	46	8.5
	Total	540	100.0

Source: *Field Survey 2017.*

The perception of the respondents over the sufficiency or otherwise of available water, as presented in Table 5 revealed, interestingly that 45.7% of the respondents considered (without knowing the national benchmark) the quantity of water available to their household as sufficient, while 43.5% of the respondents considered it as insufficient, and 10.7% of the respondents were uncertain. Furthermore, 15.9% of the respondents utilize their predominant source of water as a single household, 81.3% of the respondents who form a majority share their

predominant source of water with others, while 2.8% were uncertain. This means that a greater number of households shared their predominant source of water. Probing further, it was found that among 43% of the respondents, 1-50 persons shared a water facility, while among 16.9% of the respondents, 51-100 persons shared a facility. Again, among 11.4% of the respondents, 101-150 persons shared a facility, while among 12.8% of the respondents, 151-200 persons shared a facility. In some other cases, 8.6% of the respondents used a facility shared by 201-250 persons, while 2.5% of the respondents used a facility shared by 251-300 persons, and 4.6% of the respondents used a facility shared by above 300 persons. For most of the respondents i.e. 439 that shared a water facility, the number of available water facilities, i.e. water points from where they fetch water in their vicinity range from 1 to 5 as indicated by 56.7% of the respondents. For others, the available water facilities were 6-10 for 9.6%, 11-15 for 11.6%, 16-20 for 1.8%, and above 20 for 0.7% of the respondents, respectively. However, 19.6% were uncertain. As indicated also, 39.8% of the respondents enjoy benefits from being able to utilize safe water, while the remaining 51.7% do not. However, 8.5% were uncertain. So, most respondents (51.7%) do not enjoy benefits related to use of safe water.

5.3 Water Use Per Capita Per Day

The Daily per capita water use[4] for the study area is derived by the formula:

$$\frac{\text{Total quantity (in litres) collected}}{\textit{Total no of persons in the sample household}}$$

Table 6. Daily Per Capita Water (DPCW) Consumption

Purpose	Volume of water collected	Number of Persons	DPCW
Drinking	11,033	2,839	4
Food Preparation	14,427	2,839	5
Bathing	28,480	2,839	10
House cleaning, washing, and toilet	14,278	2,839	5
Total	68,218	2,839	24

Source: *Field Survey 2017.*

The data in Table 6 shows that the per capita water use for the study area (in the dry season) was 4 litres for drinking water, 5 litres for water for food preparation, 10 litres for bathing water, and 5 litres for water used for house cleaning, washing, and toilet. The daily per capita water consumption in the area is, therefore, 24 litres per day.

5.4 Test of Research Hypotheses

The outcome of the test of the study hypotheses as earlier stated is presented below. The test statistic for the hypotheses is the Chi square ($\chi 2$).

Hypotheses One: Heads of households who are civil servants are more likely to consider the quantity of water available to their household as sufficient than heads of households in other occupations.

Table 7. Relationship between Occupation and Perceived Sufficiency of Water (N=540)

Occupation	Sufficiency of Water			Total
	Yes	No	Uncertain	
Civil/Public Servant	89(16.5%)	53(9.8%)	10(1.9%)	152(28.1%)
Business/Trade	56(10.4%)	71(13.1%)	10(1.9%)	137(25.4%)
Farming	20(3.7%)	38(7.0%)	15(2.8%)	73(13.5%)
Artisan	12(2.2%)	3(0.6%)	3(0.6%)	18(3.3%)
Unemployed	6(1.1%)	20(3.7%)	7(1.3%)	33(6.1%)
Self-employment	64(11.9%)	50(9.3%)	13(2.4%)	127(23.5%)
Total	247(45.7%)	235(43.5%)	58(10.7)	540(100)

Source: *Field Survey 2017.* $\chi 2 = 29.59$, N=540, df=10, $p<.001$

The data in Table 7 show that among heads of households that are Civil/Public Servants, 16.5% believed they had sufficient water, 9.8% did not, and 1.9% were uncertain. Among heads of households that were business men or traders, 10.4% believed they had sufficient water, 13.1% did not, and 1.9% were uncertain. For households with farmers as the head of household, 3.7% believed they had sufficient water, 7.8% did not, and 2.8% were uncertain. For households in which an artisan was the head of household, 2.2% believed they had sufficient water, 0.6% did not, and 0.6% were uncertain. Among heads of households that are unemployed,

[4] Data collected, using the questionnaire in the manner suggested by (Billig, Bendahmane and Swindale (1999).

1.1% believed they had sufficient water, 3.7% did not, and 1.3% were uncertain. Finally, among heads of households that are self-employed, 11.9% believed they had sufficient water, 9.3% did not, and 2.4% were uncertain. With an observed $\chi 2$ value of 45.8 against the critical value of 29.59 at 10df and $p<.001$, the chi-square test shows that there is a statistically significant relationship between occupation and sufficiency of water. It is on this basis that we accepted the substantive hypothesis.

Hypothesis two: High income earners are more likely to benefit from being able to utilize water from a safe water facility than middle and low income earners.

Table 8. Relationship between Income and Ability to Benefit from Utilizing Water from a Safe Water Facility

Income Level	Benefitted from utilizing water from a safe water facility			Total
	Yes	No	Uncertain	
Below ₦11,400.00 (low income)	43(8.0%)	96(17.8%)	12(2.2%)	151(28.0%)
₦ 11,400.00- ₦ 34,199.00 (middle income)	54(10.0%)	122(22.6%)	25(4.6%)	201(37.2%)
₦34,200.00- ₦45,599.00^{+} (high income)	118(21.9%)	61(11.3%)	9(1.7%)	188(34.8%)
Total	215(39.8%)	279(51.7%)	46(8.5%)	540(100%)

Source: *Field Survey 2016.* $\chi 2 = 18.46$, N=540, df=4, $p<.001$

Finally, using the data in Table 8 above, it can be seen that among low income earners (Below ₦11,400), 8.0% benefitted from utilizing water from a safe water facility, 17.8% did not benefit, while 2.2% were uncertain. For middle income earners (₦11,400-₦34,199), 10.0% benefitted from utilizing water from a safe water facility, 22.6% did not benefit, while 4.6% were uncertain. Furthermore, among the high income earners (₦34,200 and above), 21 .9% benefitted from utilizing a safe water facility, 11.3% did not benefit, while 1.7% were uncertain. With an observed $\chi 2$ value of 65.6 against the critical value of 18.46 at 4df and $p<.001$, the result of the chi-square test shows a statistically significant relationship between income, and ability to benefit from utilizing water from a safe water facility. The substantive hypothesis that says high income earners are more likely to benefit from being able to utilize water from a safe water facility than middle and low income earners is therefore accepted.

Hypothesis three: The correlation of educational qualification and being responsible for fetching water for household use.

Table 9 . Pearson Product-Moment Correlations Between Educational Qualification and Responsibility for Fetching Water for Household Use

		Who is responsible for fetching water for household use?	Educational qualification
Who is responsible for fetching water for household use?	Pearson Correlation	1	-.223**
	Sig. (2-tailed)		.000
	N	540	540
Educational qualification	Pearson Correlation	-.223**	1
	Sig. (2-tailed)	.000	
	N	540	540

Source: *Field Survey 2017.* **. Correlation is significant at the 0.01 level (2-tailed).

The relationship between being responsible for fetching water for household use and educational qualification was investigated using Pearson product-moment correlation coefficient. Preliminary analysis was performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a negative correlation between the two variables *[r=-.22, n= 540, p<.001]*, with high educational qualification associated with being less responsible for fetching water for household use. Therefore, the level of education of a head of household is a major determinant of whether only male or only female members of the household will be involved in water fetching, or whether both sexes will be involved. Again, the higher the level of education of a member of a household, the less likely such a person is to be responsible for fetching water.

Hypothesis four: Exploring the impact of educational qualification on the ability to utilize safe water

Table 10. One-Way Analysis of Variance of Ability to Benefit from Utilizing Safe Water by Educational Qualification

Source	SS	Df	MS	F	Sig
Between Groups	296.956	3	98.985	39.154	.000
Within Groups	1355.065	536	2.528		
Total	1652.020	539			

Source: *Field Survey 2017*

One-way analysis of variance was conducted to explore the impact of educational qualification on ability to benefit from utilizing safe water. The result shows a statistically significant difference at the p<.05 level in the ability to benefit from utilizing safe water for the four categories of educational qualification [F=39.2, p= .000]. Despite reaching statistical significance, the actual difference in mean scores between categories was quite small. The effect size, calculated using eta squared, was .18. Therefore, the higher the educational level of the head of a household, the higher the ability of such a household to be able to benefit from utilizing safe water.

VI. Discussion of Findings

On gender and availability and use of safe water in the study area, the study found that a total of 56% of the respondents reported that both male and female members of their household could fetch water for household use. This indicates that the gender gap in water fetching responsibility is gradually closing, although female members of households were twice more responsible for fetching water than males as reported by 29.1%, against 11% of the respondents, respectively. It had been found that in India, time spent in fetching water by women was nearly 22% of their working days and represented a significant unproductive part of their work time.[33] The pattern of water use in the area showed that the predominant source of drinking water for majority of the respondents (37.2%) was sachet water which is an unimproved source of water because of cost. For instance, for the past two years, the cost of a bag of sachet water has been pegged at between ₦100 and ₦150 per bag which contains 20 sachets (50cl or 60cl per sachet). Thus, with most of the households falling in the low and average income categories, respectively, there is a forced reduction in water intake for the household members, hence, the 4litres per capita per day water use as our computation revealed. Attention had earlier been drawn to the fact that even where water supply is adequate and reliable, people may not afford to pay for clean water as a result of low income and this drives them to use inadequate and unreliable sources of water supply.[6] In this regard, as much as 10% of households depended on water from wells with cover which are not treated, and another 5.7% relied on water from water vendors, which has a high probability of contamination. This is indeed a worrisome situation, considering the health implications. More worrisome is the consistency in the use of unimproved water sources for food preparation, bathing, and house washing/cleaning/toilet among a minimum of 20% of households in each case. The study findings on the sufficiency of available safe water revealed first, that the per capita water per day in the area is 24 litres per day in the dry season, which is 26 litres below the suggested minimum benchmark for developing countries of 50 litres per day[6], and 6 litres below that of rural areas in Nigeria of 30 litres per day.[34] This finding is a reflection of the perception of 43.5% of the respondents that considered water available to their households as insufficient, even without knowing the national or international benchmark. The result of the chi-square test of hypotheses showed a statistically significant relationship between occupation and sufficiency of water, as well as income and being able to benefit from utilizing a safe water facility. The substantive hypothesis in each case was accepted. The Pearson Product-Moment Correlations between educational qualification and responsibility for fetching water for household use revealed that the level of education of a head of household was a major determinant of whether only male or only female members of the household will be involved in water fetching, or whether both sexes will be involved. Furthermore, the outcome of a One-way Analysis of Variance (ANOVA) of ability to benefit from utilizing safe water by educational qualification shows that the higher the educational level of the head of a household, the higher the ability of such a household to be able to benefit from utilizing safe water. This could be because with a higher degree, one can secure a better paid job, and be in a better economic position to pay for safe water. Applying these findings to the theoretical framework of the study, first, we find that water and sanitation were seen by all the respondents as a basic need which they required for survival, and desired to get access to as much as possible. However, from a human rights angle, the finding on per capita water per day which falls below the benchmark indicates a human rights violation which should be addressed, since availability of safe water is a right guaranteed by national and international agreements.

VII. Conclusion

Efforts to achieve universal access to safe water and sanitation for the teeming Nigerian populace, majority of whom live in rural areas has so far proved elusive. This study attempted to understand the nature of supply of safe water, with emphasis on the factors that affect availability and the sufficiency of available water in the study area. Findings made include that the gender gap in water fetching role in the area is seen to be closing. Also, while most households in the area used improved water sources, a sizeable proportion made use of unimproved water sources, both in terms of safety and cost. The daily per capita water usage for the study area is below the minimum benchmark. These findings reflect a failure in a core objective of the National Water Supply and Sanitation Policy of year 2000, namely "guarantee affordable access for the poor to the ***basic***

human need level of water supply and sanitation".[34] It also reflects a failure in the goal of the National Rural Water Supply and Sanitation programme which aims to "consolidate, increase and sustain universal access to ***adequate quantities,*** of affordable and safe water by the year 2015".[34]

Based on the findings made, some recommendations for improvement are necessary, which include that the State government should put in greater effort to provide the area with pipe-borne water. There is a need to form water and sanitation clubs in primary schools in the state to enable them imbibe the culture of water safety. Furthermore, the involvement of Non Governmental Organizations (NGOs) in water related activities in the LGA is imperative. Communities should learn to evolve water and sanitation projects to help her members.

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