

# Household Characteristics and Water Consumption among Residents of Calabar, Cross River State, Nigeria.

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## Abstract

The study assessed household characteristics and water consumption among the residents of Calabar Metropolis, Cross River State-Nigeria. The thrust of the study was to establish the nexus that household sizes across the neighbourhoods of the study area have in influencing water consumption quantity. Therefore, data for the study were collected through questionnaire administration. A total of 400 copies of questionnaire were designed and distributed randomly within the study area. The study selected 10 residential neighbourhoods at random for data collection. One hypothesis was formulated and tested. The hypothesis was tested using Pearson Product Moment Correlation Coefficient based on SPSS. The result established that there is a significant relationship between household size and the quantity of water that is consumed across households in the study area. This implies that household size significantly determines the quantity of water that is consumed. The study also noted that most residents draw water from unsafe and unhealthy sources due to limited supply of water from healthy sources. It was therefore suggested that water from safe and healthy sources be made available by relevant government agencies in order to prevent residents from accessing water from unhealthy sources. Also, the quantity of water that is produced by water supply agencies should be increased in order to meet up with water needs of households.

**Keywords:** Access to water, household size, water consumption, water demand, water quantity.

## 1. Introduction

Water is a very essential commodity. It plays a vital role in the sustenance of life of living things. Therefore, it is among the five necessities of life. Other necessities are food, air, light and heat (Utsev and Aho, 2012). With this in mind, it is obvious that without water, it will be practically impossible for crops, animals and human beings to be sustained. Notably, humans require water for daily activities including washing of clothes, agricultural activities, preparation of food, recreation, tourism, etc. The necessity of water has resulted in the focusing of attention of the 32nd Hague International Model Limited Nations (THIMUN) that was held in the Netherlands on 28th January 2000. The essence was to devise strategies for solving crises that are plaguing nations. One major consideration was to increase access to water.

Basically, access to potable water is measured by the human population that have means of obtaining the required water on daily basis with regards to quality and quantity. Therefore, the required amount of water should be safe for drinking, laundry and among other household activities (Atser and Udoh 2015). Other variables that define access to potable water include traveling within a considerable distance before getting water and having access to good quality water.

Access to water has remained a problem in both rural and urban areas, the latter is facing serious water crisis. Eja, Otu, Atu and Edet, (2011) observed that water access to urban residents is a serious problem especially in Africa where there is serious rural-urban drift resulting in massive population growth in the cities. Urbanization has further become the main reason behind increasing water demand in Africa due to the centralization of activities, facilities and infrastructure in the urban centres further exerting pressure on the residents of the rural areas to shift to the urban centres in order to have access to means of earning livelihoods (Wapwera, Jiriko and Mallo, 2015). In Nigeria, the number of households and rate of urbanization is increasing sporadically without corresponding measures to stem the tide of rural-urban migration. Wapwera *et al.*, (2015) noted that pressure on existing facilities/infrastructure including water supply systems is another negative effect of urbanization. Therefore, the increasing rate of urbanization and number of households in Nigeria has triggered water scarcity and constrained urban water coverage in Nigeria cities.

Calabar Metropolis in Nigeria is the capital of Cross River State. This means that it is the administrative headquarters of Cross River State. By virtue of its status, there is serious influx of humans on daily basis into the city thereby increasing household numbers and demand for water. Despite the increasing number in households, population and demand for water among households, literature focused on bringing this to light are inadequate. Available studies are rather concerned with water availability from varied sources, perception of people about water supply agencies and water coverage (Ukata, Ohon, Ndik Eze and Ibor 2011; Eni and Ojong, 2014; Ubugha, Okpiliya, Njoku, Itu, Ojoko and Erhabor, 2017) leaving household characteristics and water consumption partly of wholly. Therefore, there is limited knowledge on household

characteristics and water consumption in terms of quantity among the residents of Calabar. Based on this premise, this study seek to assess the relationship that exist between household characteristics and quantity of water consumed among the residents of Calabar.

## 2. Literature Review

Socioeconomic characteristics such as income, gender, household size and religion play a vital role in the quantity of water consumed among residents in both urban and rural areas. For instance, Mohammed (2014) observed that women in Kano State, Nigeria consume more in terms of water quantity than men. Mohammed highlighted that the reasons behind the increase in the quantity of water consumed by women include cooking, cleaning, washing and other household chores. In African societies, women are expected to be engaged in the above activities more than men hence; they tend to consume more water than men.

Income equally plays a determining role in the quantity of water that can be demanded and consumed. Eja *et al.*, (2011) observed a correlation between the income of households and the quantity of water they consume in Port Harcourt, Nigeria. Their study highlighted that low income earners were unable to afford water at required standards. For instance, they had to travel several kilometres before accessing water and evenmore, from unsafe and unhealthy sources. The long travel distance coupled with the energy spent on the travel is enough to discourage water consumers from accessing sufficient water quantities. Also, their nature of having low income translate to the fact that the purchasing power to enable them get access to water is limited. They therefore have to use water in very limited quantities. Similar observations were made by Abaje, Ati and Ishaya (2009) and Kanayo, Ezeuilo and Maurice (2013) in different studies and different cities.

Household size also determine water demand/consumption quantity. In order words, large number of persons indicate corresponding quantity of water consumption and more households' means that the water demand in such cities is likely to increase. Istifanus (2017) showed that household sizes largely determine water consumption. He reported that in Bauchi Metropolis-Nigeria, the average household water consumption was 511 liters per day. He further noted that the quantity of water consumed varies within the housing densities. His finding revealed that household water consumption was 878 liters per day for the low densities while it was 439 liters per day in medium density areas and 458 liters per day in high of density areas.

Other socioeconomic variables such as religion, occupation and educational background all have roles in determining water quantities that are consumed. For instance, traders such as food vendors, dry cleaners, irrigation agriculturists among others are likely to consume water in larger quantities than those that mainly use water for domestic purposes. Also, religion/culture together with festival activities can show variations in water consumption. With literature returning the results above in different places, it is of immense importance to carry out this study.

## 3. Materials and Methods

### 3.1 Study Area

Calabar metropolis is situated in the Southern Senatorial District of Cross River State, Nigeria. It is made up of two Local Government Areas; Calabar Municipality and Calabar South Local Government Areas. Calabar Metropolis is located between Longitudes 8°18' East and 8°26' East of the Greenwich meridian and Latitudes 4°50' North and 5°06' North of the Equator. The total surface area of Calabar is 159.65square kilometres (Offiong, Offiong and Ekpe, 2014). The study area is bounded to the North by Odukpani Local Government Area, to the West by the Calabar River, to the East by the Great Kwa River and to the South by the Atlantic Ocean (Figure 1). It had of 328876 in 1991. Presently, the population is estimated at 687351. The relief of the study area is low which rises gradually towards Odukpani Local Government Area. Calabar Metropolis consist of mangrove and rainforest ecosystems. The study area has a maximum temperature of above 27°C reaching a peak of about 350°C during January to February. The daily maximum and mean annual maximum temperature increase from the coastal temperature is 30°C. (Afandigeh, Njar, Ewa and Iwara, 2011).

### 3.2 Methods

The survey design was employed in this study. A total 10 residential neighbourhoods were randomly sampled out in Calabar Metropolis for data collection. Total number of households in the study area was established using an average household size of 6 persons in neighbourhoods within the selected sampled areas. The Yaro Yammenne formular was further used in arriving at the number of households that were sampled for questionnaire administration. However, a total of 400 households were sampled out for data collection. Copies of questionnaire were randomly distributed across the sampled areas. The random approach was equally applied in the administration of questionnaire within the neighbourhoods. A total of 389 copies of questionnaire were successfully retrieved and used for the analysis. The formulated hypothesis was tested using Pearson Product Moment Correlation Coefficient. It is mathematically expressed as follows

$$r = \frac{1}{n} \frac{\sum (x - \bar{x})(y - \bar{y})}{\sigma_x \sigma_y}$$

Where: r = correlation coefficient, x = independent variable, y = dependent variable,  $\sigma$  = standard deviation, 1 = unit constant, n = number of variables.

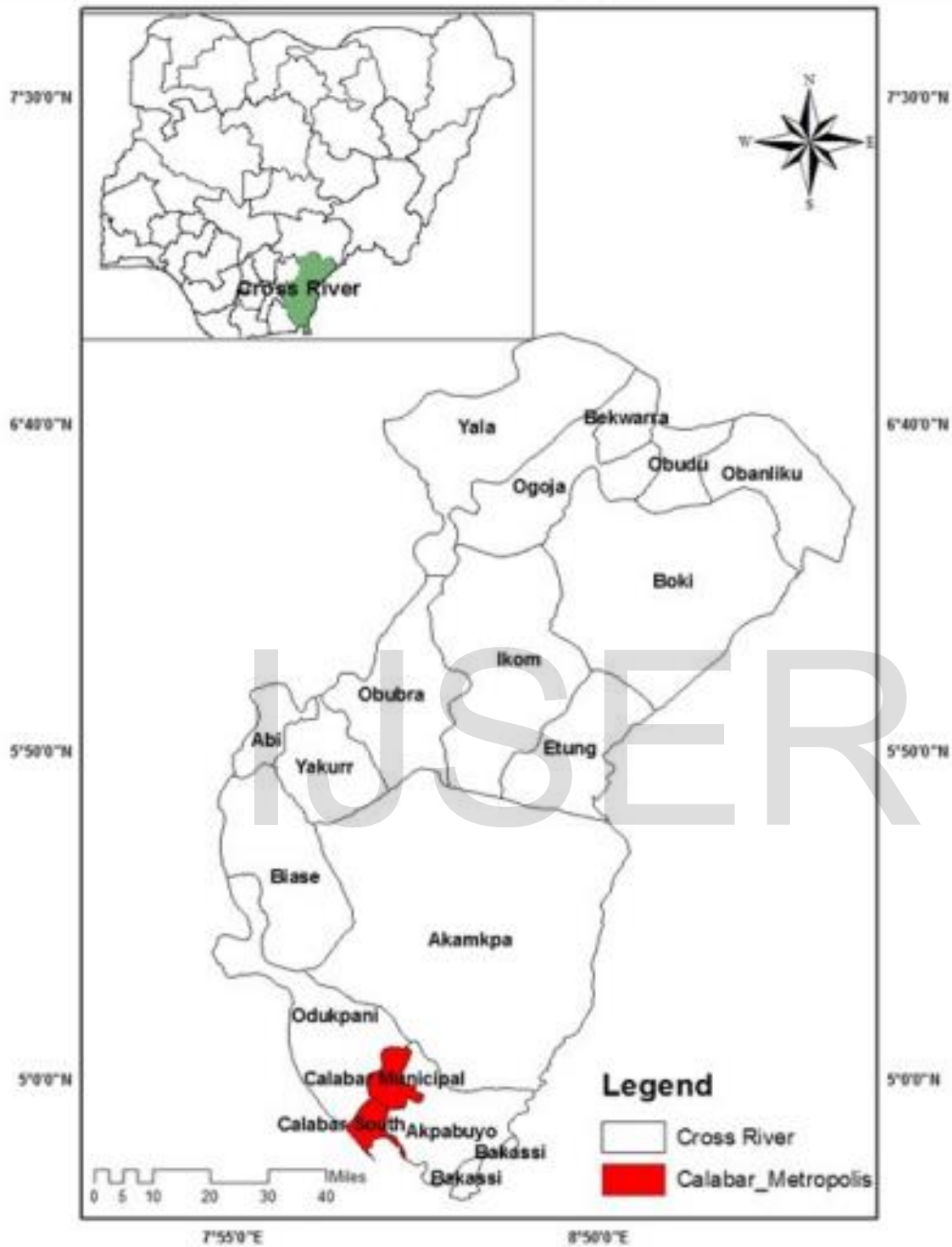


Figure 1: Map of Cross River State showing Calabar Metropolis  
Source: Cross River Geographic Information Agency, 2016

#### 4. Findings and Discussions

**Table 1: Socioeconomic Characteristics of Respondents**

Characteristics	Categories	Number	Percentage
Gender	Male	267	68.6
	Female	122	31.6
	<b>Total</b>	<b>389</b>	<b>100</b>
Age	18-27	65	16.7
	28-37	74	19
	38-47	152	39.1
	48>	98	25.2
	<b>Total</b>	<b>389</b>	<b>100</b>
Marital Status	Single	71	18.3
	Married	267	68.6
	Separated	37	9.5
	Widowed	14	3.6
	<b>Total</b>	<b>389</b>	<b>100</b>
Occupation	Farming	16	4.1
	Trading	139	35.7
	Civil service	208	53.5
	Craftsmen	26	6.8
	<b>Total</b>	<b>389</b>	<b>100</b>
Educational Level	None	-	-
	Primary	13	3.3
	Secondary	29	7.5
	Post secondary	347	89.2
	<b>Total</b>	<b>389</b>	<b>100</b>
Religion	Christianity	367	94.3
	Islamic	14	3.6
	Traditional	8	2.1
	<b>Total</b>	<b>389</b>	<b>100</b>
Income	18,000-36,0000	3.6	3.6
	36,001-54,000		
	54,001 >	52	13.4
		323	83

*Source: Field Survey, 2021*

From table 1, it is clear that household heads in the study area were predominantly males. Also, the dominant age bracket of the household heads in the study area was between 38 and 47 years of age. The table went on to show that the least percentage of household head were between 18 and 27years. It was also noted that those that are married constitute a large (68.6) percent of the households in the study area. In other words, most household heads in Calabar were married. Having married persons as household heads automatically points to the fact that population will grow sporadically especially with reference to the fact that the active age is predominant as earlier highlighted. Also, increase in household sizes due to birth rate points at increase in the demand for water by the households. Correspondingly, household heads are predominantly observed to be civil servants while their educational level was observed to be predominantly above secondary education. Therefore, the population is obviously made up of those with university degrees and above.

Table 1 also revealed that Christians dominate the study area. The domination of Christians against other religions show that water demand/consumption is likely to be on the increase during festive periods such as Christmas and the Easter periods. This is because Christians prepare food in large quantities and do charity during such seasons. The income which is said to be the purchasing power for water is equally represented in the table. It was noted in the table that those that earn above ₦54,001 constitute the greater percentage of the population. One may deduce from this observation that residents within the study area can afford to pay for water from different sources.

**Table 2: Source of Water**

Source	Frequency	Percentage
Pipe water	248	63.8
Bore hole	118	30.3
Rain water	14	3.6

Stream/river	9	2.3
Total	389	100

Source: Field Survey, 2021

Table 4.2 shows that majority of the households in the study area depend on pipe water that is supplied by the Cross River State Water Board. Most of the households connect water into their private residences from where they use domestically. Others equally depend on public and private boreholes (30.3 percent). The public boreholes are developed by development partners and governments while private individuals also compliment the efforts of the government in supplying water to the people through private borehole development. Very little percent (3.6 percent) depend on rain water. This people store up rain in large containers for use. However, they turn to other sources when the season for rain is long gone and their reservoirs lack water. Equally, stream/river is the source of water for 2.3 percent. Obviously, the later sources of water (rain water and stream/rivers) are unsafe and unhealthy therefore, one may deduce from it use and dependence by the people that accessibility to safe water is still a problem in the study area.

Table 3: Household Size and Quantity of Water Consumed

S/N	Neighbourhood	Mean Household Size	Daily Mean Quantity of Water consumed (Litres)
1	Ikot Ishie	6	430
2	Ikot Effanga	6	315
3	Ikot Ansa	5	398
4	Ikot Eneobong	6	405
5	Ikot Omin	5	218
6	Efut Uwanse	6	392
7	Duke Town	4	323
8	Mbukpa	6	293
9	Anantigha	6	408
10	Henshaw Town	5	303

Source: Field Survey, 2021

Table 3 shows the mean household sizes and the water consumption across neighbourhoods in the study area. These data was used in testing the hypothesis which state that 'there is no significant relationship between household size and the quantity of water consumed across households in the study area. The hypothesis was tested using Pearson product moment correlation coefficient with statistical package for social sciences (SPSS). The result of the hypothesis is shown in table 4.

**Table 4: Correlation between Household size and Quantity of Water consumed**

		Household	Quantity
Household size	Pearson	1	.966**
	Correlation		
	Sig. (2-tailed)		.000
	N	20	20
Quantity of water consumed	Pearson	.966**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	20	20

Source: Statistical Computations, 2021

The analysis show that there is a significant relationship between household size and the quantity of water that is consumed across the neighbourhoods in the study area. Obviously, the calculated significant value of .000 is less than .05 which make the null hypothesis to be rejected while the alternative hypothesis was retained. The result therefore show that household sizes influence water demand/consumption significantly.

## 5. Recommendations

The following recommendations were made due to the study findings;

- Water from safe and healthy sources should be made available by relevant government agencies in order to prevent residents from accessing water from unhealthy sources
- The quantity of water that is produced by water supply agencies should be increased in order to meet up with demand of households
- The State Government should increase the number of staff concerned with water treatment, supply and also increase the storage capacities of water tanks

## 6. Conclusion

Water being a necessity needs to be made available in required quantity and quality. At the household level, water is needed for varied reasons therefore domestic water consumption has been increasing steadily especially with regards to population and sizes of households. The study identified that household sizes influence the quantity of water that is consumed. As seen in the study, more people in the household means that the demand for water for water is likely to correspondingly increase. For water needs to be met, there is need for government agencies, public and private individuals to synergize and ensure adequate delivery of the commodity. Obviously, limited water supply in terms of quantity from healthy and safe sources means that consumers are likely to turn to unsafe and unhealthy sources which will have several negative implications on the health and wellbeing of the consumers.

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