Assessment of water accessibility and quantity in Ilorin south local government area

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Abstract

Insufficient supply of treated pipe borne water results in the population seeking alternative sources in order to offset the huge short fall in water supply. This study aimed at assessing water accessibility and quantity supply in Ilorin South Local Government Area of Kwara State, Nigeria. Data used in this study were mainly primary which were obtained from field survey through questionnaire administration and personal field observations. A total of 400 questionnaires were administered to respondents in 40 households using systematic random sampling technique. The minimum Basic Water Requirement (BWR) per person per day, and Water Accessibility Indicator (WAI) were adopted. Descriptive statistical techniques were used for the analyses. The findings from the study revealed that the minimum Basic Water Requirement for the study area is 51.5 liters respectively, while Water Accessibility Indicator revealed that respondents do not have access to water in terms of distance and time. The results obtained indicate that residents suffer from some degree of water scarcity and stress and if there is no prompt intervention from government and well-meaning Nigerians, water crisis would shoot up astronomically in the study area. There is need to improve water supply to residents, especially for those in Akanbi ward V, and water collection points should be located proximate to residents' houses in this study area.

Keywords: accessibility, Nigeria, water indicator, water sources, water supply, water use

Introduction

Water is one of the basic necessities of life. Without it, life on earth is impossible. It sustains human health, food production and economic development. Out of all the available water on earth, only one percent is useful to us, about 97% are salty sea water and 2% is frozen in glaciers and ice caps. Demand for water in developing countries is ever increasing. As population growth rate rises, the demand for water consumption becomes high due to direct relationships that exist between population and water withdrawal (Gardener & Engelmann, 1997). Water scarcity is

expected to rise as a result of a rapid increase in the demand for water due to population growth, urbanization, agriculture and drought especially in arid regions. These activities of man are constantly depleting and polluting lakes, rivers and aquifers irreversibly. The evidence of water scarcity is seen in both rich and poor countries of the world. According to Oriola *et al.* (2017), the supply of adequate water with a reasonable quality is a major constraint at both local and regional levels and also in rural and urban areas.

In Ilorin, Kwara State, Nigeria, the evidences of water scarcity are paramount during the dry season which is the peak of water scarcity. This is due to the dryng up of wells, streams, and rivers. As a result of these challenges, people which include men, women, and children are seen on streets searching for water which usually result to a significant loss of time and energy. As such various communities particularly, the rural indigenes have adopted strategies to cope with water stress which includes water rationing, searching, queuing, and storage to mention but a few. If water scarcity trends worsen, water will be a major contributive factor to conflicts and wars in future (Lonergan, 2003). This means that the wars of the 21st century are going to be fought over water (Rahaman, 2012). The dwindling supply of renewable resources can induce powerful group to shift resource distribution in their favour leaving less and less for poorer and weaker groups (Adedayo, 2012).

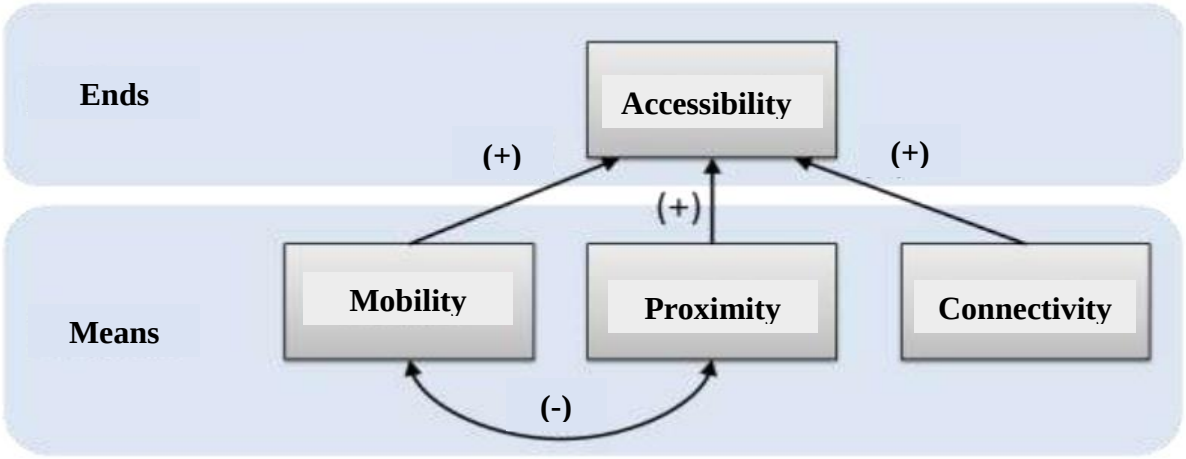
In Ilorin South Local Government Area of Kwara State, Nigeria, women and girls spend hours every day walking many kilometers to collect water from different sources. On a whole the average time lost by women and children in a day has been put at 200 million hours in search of water, meanwhile the time spent to search for water could be diverted to economic activities that could be of financial gain to poor rural families (United Nations Population Fund - UNPF, 2001). These and other challenges make it mandatory to embark on this study. Specifically, the study assessed the demographic characteristics of the respondents, the quantity of water needs and supply, and determined access to water in terms of distance and time in the study area.

Literature review

Conceptual clarification

a. Accessibility

Accessibility is defined as the quality of being at hand when needed, or as the degree of which a product, device, or service and commodity is available to as many as possible. Accessibility can also be viewed as the ability to access and benefit from some system or entity. However, this concept is applicable to the study because access to water is essential to the health and wealth of a nation. From the foregoing, a conceptual framework for this study is therefore given below in a pictorial model in Figure 1.



Source: Extracted from Levine, Grengs and Shen, 2009

Figure 1. Conceptual model

b. Mobility

Mobility refers to the ability to move between any two points in space, it involve the movement of people, information, materials and goods. A growing number of people move as a result of competition for scarce resources and economic hardship. When there is drought and scarcity human and animals are forced to move from area of deficit to abundance. For instance, Women in developing countries walk an average of 6 kilometers per day to collect drinking water, in Cameroun they spend an average of 6 hours per day while in Kenya, and about four hours is spent in dry season and two hours in wet season (National Institute of Statistics, Cameroun (NISC), 2004).

c. Proximity

Accessibility means aggregate nearness where as the Advanced English Dictionary defines proximity as nearness and it is often quantifying with the world close. Put another way, accessibility is the synonym of proximity. Living in household with access to proximate water source has several benefits; private well or in - house tap water may be of higher quality than water from community sources, close water source reduces the need for lengthy storage, and also limit bacteria growth, this can also free mothers from water fetching so that they can devote more time for child care. According to United Nation Programme Fund (2001) water points should be sufficiently close to household with a maximum distance of 500metres.

d. Connectivity

In-house connection is ultimately the goal of every individuals and population at large, this is because water will always be available with good quality and quantity. Improved drinking water source includes household water connection located inside the house and other improved water sources such as public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rain water collection, (WHO/UNICEF JMP, 2004). To ensure safety of drinking

water supplies within the building system, plumbing practices must prevent the introduction of hazards to health and this can be achieved by ensuring that; pipes carrying either water or waste are water tight, cross connection between drinking water supply and waste water removal system do not occur, water is discharged without contaminating drinking water and plumbing system function efficiently.

Water Accessibility and scarcity

Access to water is defined as a condition of uninterrupted contact and use of water for different purposes, and it can be in terms of quality and cost of getting water for various uses (Ifabiyi & Ogunbode, 2014). Water scarcity can be defined as the lack of access to potable water (Ifabiyi, 2011). On the other hand, it is attributed to a changing climate and population growth (Seckler *et al.,* 1998). In addition, the water available to meet human demand and to each person can serve as a measure of scarcity (Rijsberman, 2006). Access to safe drinking water has improved over the last decades in almost every part of the world, but approximately one billion people still lack access to safe water and over 2.5 billion lack accesses to adequate sanitation, Millennium Development Goal (MDG, 2008). Oriola *et al*. (2017) stated that the Sahel and Sahara are severely affected. This is because they are areas of the globe where adequate water supply in quantity and quality is a major problem.

There are two main types of water scarcity namely; physical and economical scarcity (Seckler *et al.,* 1998). Physical scarcity means that physical access to water is limited, it occurs when the demand for water outstrip supply; its implications include severe environmental degradation, declining aquifer, and unequal water distribution (Food and Agricultural Organization, 2012). Economic water scarcity on the other hand is when a population does not have the necessary monetary means to utilize an adequate source of water. It is also known as the lack of investment and proper management to meet the demand of people who are not financially buoyant to use existing water sources (FAO, 2012). According to WHO (2002), most of the people in sub-Saharan Africa are suffering from economic water scarcity. Nigeria Institute for Social Economic Research (NISER, 1995) reported that the volume of available water in the country as of 1993 was 515,985 trillion cubic meters. Out of this volume, 13.2% or 1.3 trillion is for industrial purposes, 35.0% or 1.8 trillion for irrigation while domestic use and wastage account for 26.85% or 1.4 trillion cubic meters.

Previous studies of water scarcity in some parts of Kwara State, Nigeria revealed that the insufficient supply of treated pipe borne water results in the population seeking alternative sources in order to offset the huge short fall in water supply (Tomilayo & Sanni, 2013). The rural communities majorly depend on surface water for domestic water supply, while urban communities have resorted to the drilling of wells and boreholes. Meanwhile, some of these wells are proximate to pit latrines, soak away, garbage and gutters which is detrimental to human health and longevity. It is also appalling to note that, human and animal wastes are littered in the surroundings of these wells and most often they are left open (Tomilayo & Sanni, 2013). These unsanitary conditions can be implicated in the spread of water borne diseases like malaria, cholera, typhoid, schistosomiasis, etc. In Kwara State, Nigeria, cholera epidemic claimed at least 40 lives in five days in Moro Local Government Area and schools were indefinitely closed to avoid further spread (Trevo, 2001). Also, in the developing countries like Nigeria.

Basic water requirement for human

Gleick (1996) introduced a water scarcity index as a measurement of the ability to meet all water requirements for basic human needs; drinking water for survival, water for human hygiene, water for sanitation services, and modest household needs for preparing food. The proposed minimum amount needed to sustain each is as follows: Data from the National Research Council of the National Academy of sciences was used to estimate the minimum drinking water requirement for human survival under typical temperate climates with normal activity to be about 5 liters per person per day. The basic requirements for sanitation, considering various technologies for sanitation worldwide, and the effective disposal of human wastes can be accomplished with little to no water if necessary. However, to account for the maximum benefits of combining waste disposal and related hygiene as well as to allow for cultural and societal preferences, a minimum of 20 liters per person per day is recommended (Gleick, 1996). The minimum amount of water needed for adequate bathing is 15 liters per person per day, taking into consideration both developed and developing countries while the water uses for food preparation to satisfy most regional standards and to meet basic needs is 10 litres per person per day.

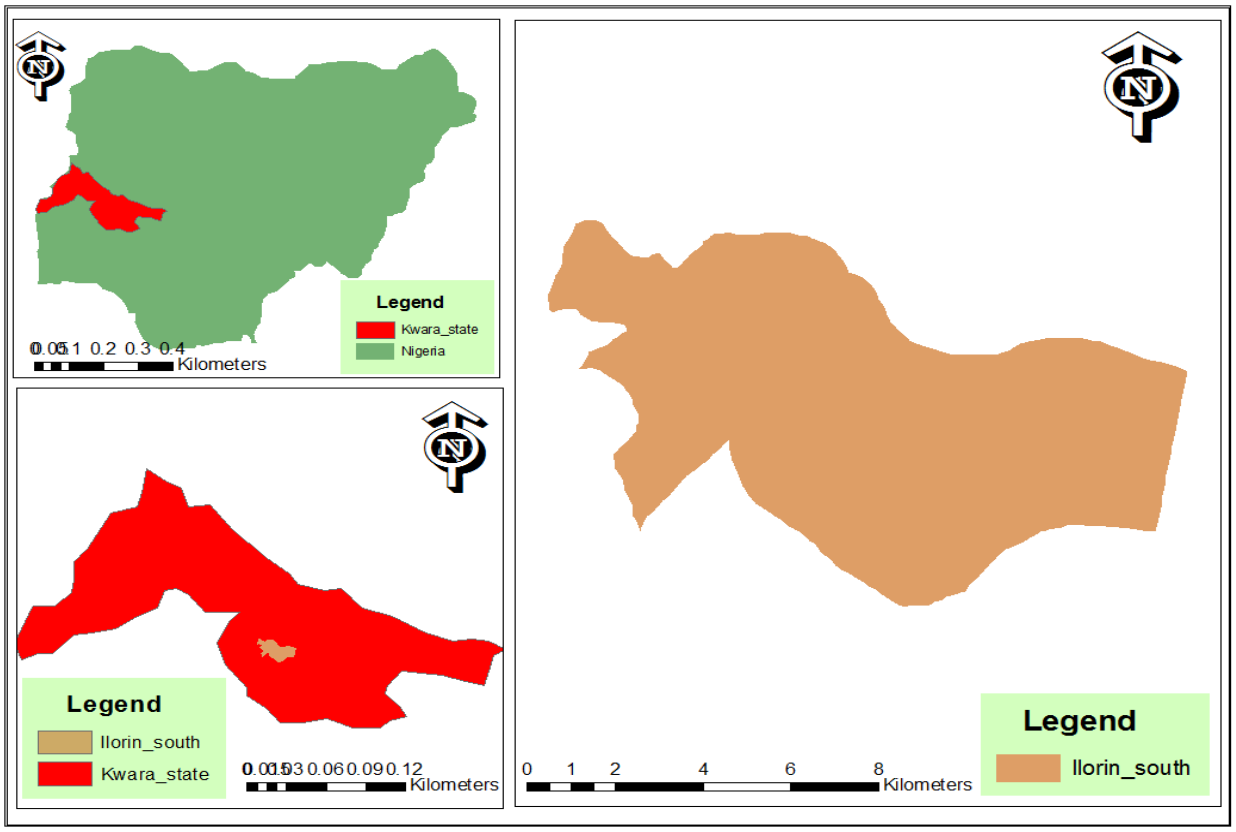
In addition, the proposed requirement for meeting basic human needs give a total demand of 50 liters per person per day. This overall basic requirement is a new threshold for meeting the basic needs of the global population, independent of climate, technology, and culture (Gleick, 1996). This indicator is only calculated on country-level so that regional water scarcity is not depicted. The limitation is that water quality is not included in the concept. Furthermore, country data about the domestic water use are insufficient and unreliable, and the needs of other water users, such as the industry, agriculture, or nature itself are not included in the approach. However, there are disparities in consumption rate, for instance, in United State of American (USA), 600 liters are used per person per day while in Europe, 200 liters and in Africa 30 liters are used per person per day (UN, 2011).

Methods and study area

The study area is located between latitude 8˚19’ and 8˚32’ North of the Equator, and longitude 4˚32’ and 4˚40’ East of the Greenwich Meridian (Figure 2). It occupies a land mass of about 174 km^2 and a population of 208,691 with the number of males given as 104,504 and female as 104,187 (National Population Commission, 2006). It comprises eleven (11) political wards. The relief feature of the study area is characterized by an undulating landscape with an elevation of 273m to 333m above the sea level. The pattern of the drainage system is dendritic due to its characteristics. The important rivers are Asa and Agba from which water is supplied to the residential area (Oyegun, 1988).

The climate of the study area is characterized by a tropical wet dry climate. Wet season is experienced from April through November and dry season from November to March. Days are hot during the dry season from November through January when temperatures range from 33.0 to 34.6 ˚C to 37.0 ˚C. The mean monthly temperature is high in dry season; it is 14 ˚C in dry season and 8 ˚C in wet season. The annual mean rainfall is about 1150 mm exhibiting the double maximal pattern between April and October of every year. Relative humidity varies seasonally with an average of 79.7%. According to Oyegun (1988), Ilorin South is situated in the transition zone between the deciduous forest (rainforest) of the south-west and the savanna grassland of the

north. The vegetation is composed of species of plants like such as shrubs and herbaceous plants, locust bean trees, elephant grasses among others. The vegetation falls within the derived savanna.



Source: Kwara State Ministry of Lands, 2016

Figure 2. The study area, showing Ilorin South Local Government Area

This study used primary data which were obtained directly from field observation and measurements. The field measurements involved questionnaire administration and personal field observations. The number of questionnaires administered for the study was based on the sample size using Yamane (2009) formula which is denoted in equation (1). After getting a sample size, 400 copies of questionnaires were administered to respondents in 40 households which were randomly selected. Systematic random sampling method was used in selecting households, by sampling every, 10th building in each of the eleven wards in the study area. The Basic Water Requirements – BWR (Table 1) per person per day according to Gleick (1996) was used to ascertain average minimum basic domestic water needs of the people in the study area. Specifically, 50 liters per person per day of clean water is the bench mark slated for the index. Water Accessibility Indicator (WAI) was also adopted to measure distance and time taken by residents to collect water daily in the study area. WAI is an indicator used to measure water access, and it revolves around distance and time indices. Using WHO standard (2004), four service levels (optimum, basic, intermediate and no access) were used to measure the levels of water access (Table 2).

$$n = \frac{N}{1 + N(e)^2} \ldots\ldots\ldots\ldots\ldots eq.(1)$$

Where:

$$n = sample\ size, N = population, e = level\ of\ significance$$

$$Thus,\ \ n = \frac{208{,}691}{1 + 208{,}691(0.05)^2}$$

$$n = \frac{208{,}691}{1 + 208{,}691(0.0025)}$$

$$n = \frac{208{,}691}{1 + 208{,}691(0.0025)}$$

$$n = \frac{208{,}691}{1 + 521.7275}$$

$$n = \frac{208{,}691}{522.7275}$$

$$n = 399.23$$

Table 1. Basic water requirements for human needs

Purpose	Recommended Minimum (Liters per person per day)	Range (liters per person per day)
Drinking water	5	2 - 5
Sanitation services	20	Over 75
Bathing	15	5 - 70
Cooking and Kitchen use	10	10 - 50
Total recommended basic water requirement	50	

Source: Gleick (1996)

Table 2. World Health Organizations (WHO) Water Accessibility Indicator

Travel distance to collect water	(WHO) Standard	Average Time Spent to Collect Water	(WHO) Standard
Water supply through multiple taps continuously	(optimal access)	Water supplied through multiple taps continuously	Optimum access
<100m	One tap on plot or within 100m (intermediate access)	Within 5 minutes	Intermediate access
101 - 200m	Between 100 and 1000m	5 - 30mins	Basic access)
201 - 500m	(Basic access)	30mins - 2hrs	
500m – 1000	More than 1000m	2 - 4hrs	No access
1.1-2km (1.5km)	(No access)	>4hrs	
> 2km(3km)			

Source: WHO (2004)

Results and discussion

Demographic and socio-economic characteristics of respondents in the study area

a. Gender

The results revealed that 32% and 68% were male and female respectively, in Oke – Ogun ward, while 31% and 68% were also male and female in Balogun ward II, respectively (Figure 3). Thus, female has higher percentage in almost all the wards than male and this is because of two reasons; (i) women are saddled with the responsibility of providing water for the household (ii) at the time of administering the questionnaires which was done mostly in the morning and afternoon, most households' heads were in their work place.

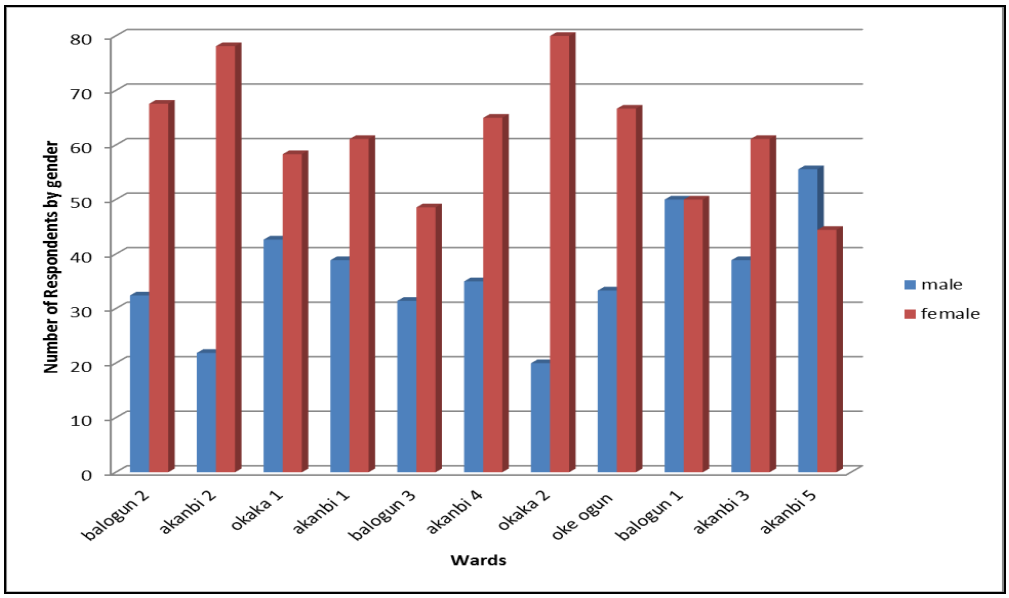


Figure 3. Gender of respondents in the study area

b. Age of respondents

Different age intervals representing each household were interviewed for this study. The result shows that 38% of respondents in Akanbi ward IV, were between 15-24 years old while 80% and 86% of respondents in Akanbi wards (III & V), ranged between 25 and 54 years old. From the analysis, it can be inferred that, most of the household heads were young to middle age, and it is because the collection of water is usually done by women and children which is in line with previous work that women and children play dominant role in water collection globally (Briscoe & de Ferranti, 1998). In the study area, it is a common sight to see students fetching water in the morning before going to school. The respondents' age distribution is presented in Figure 4.

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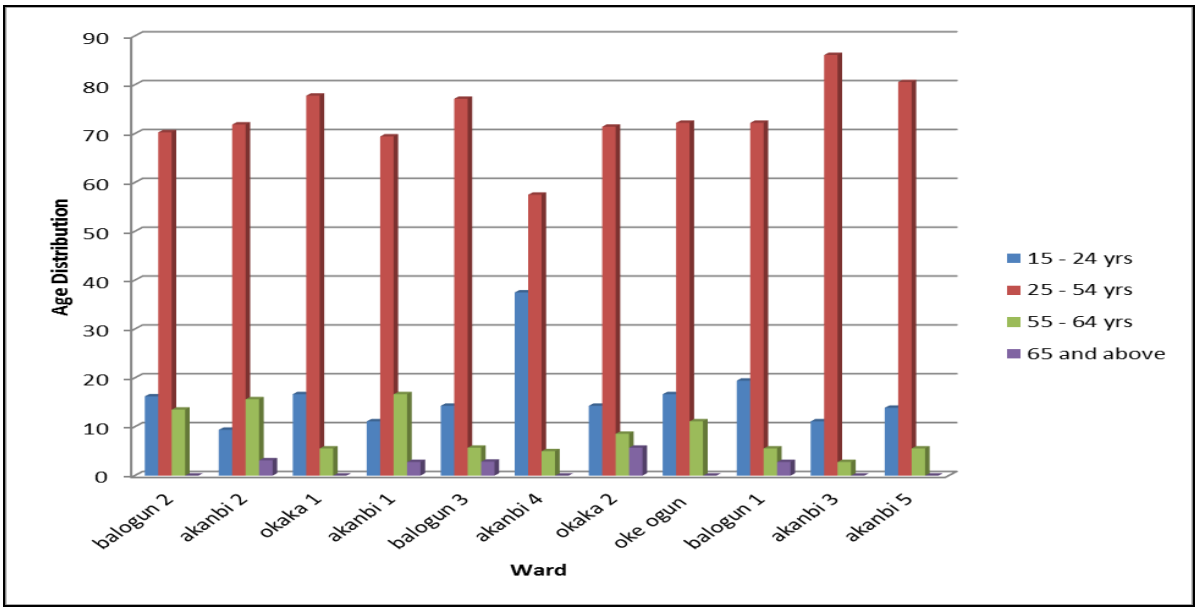


Figure 4. Age distribution of respondents in the study area

c. Marital status of respondents

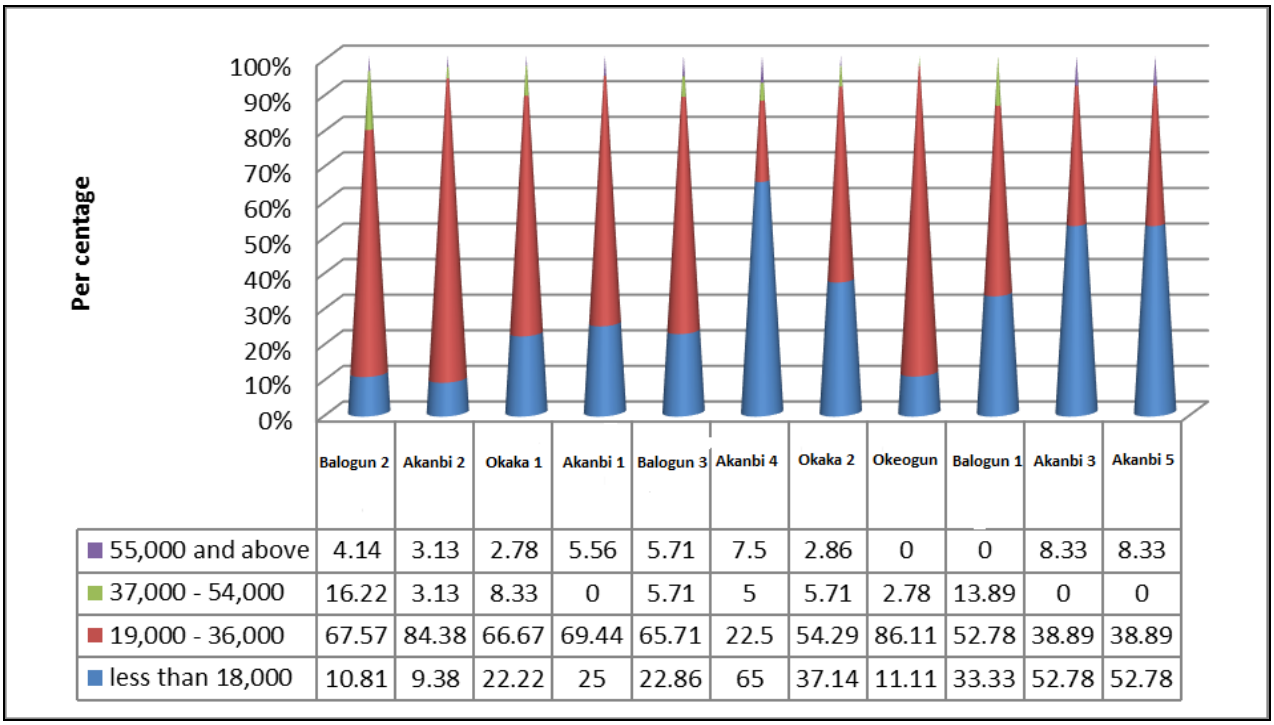
Concerning marital status of respondents in Ilorin South LGA, it revealed that over 60% of the people interviewed were married and significant proportion of 33% are single (Table 3). And this is because married people consume more liters of water than the unmarried. For instance, families that are together (not divorced) have tendencies of large household sizes compared to single and divorce respondents, for a large household more water will be required and more time will be spent in water collection.

Table 3. Marital status of respondents in the study area

Political wards	Single (%)	Married (%)	Divorced (%)	Separated (%)	Widow (%)
Balogun II	16.22	81.08	0.00	2.70	0.00
Akanbi II	0.00	93.75	3.13	3.13	0.00
Okaka I	25.00	69.44	2.78	2.78	0.00
Akanbi I	22.22	77.00	78.00	0.00	0.00
Balogun III	5.71	88.57	0.00	0.00	5.71
Akanbi IV	55.00	42.50	2.50	0.00	0.00
Okaka II	14.29	82.86	0.00	2.86	0.00
Oke—ogun	11.11	88.89	0.00	0.00	0.00
Balogun I	33.33	63.89	0.00	0.00	2.78
Akanbi III	36.11	63.89	0.00	0.00	0.00
Akanbi V	19.44	77.78	2.78	0.00	0.00

d. Income distribution of respondents

The income of respondents interviewed in the study area (Figure 5), revealed that most of the people are low income earners residing in Okaka wards (I &II), Oke-Ogun ward and Balogun wards (I & II), on the average the income of respondents in these wards are less than (Thirty-seven thousand naira per month). As such most of these people rely on public taps, boreholes and the patronage of water vendors as their means of water supply. Meanwhile, 8.3% and 7.5% of the respondents in Akanbi wards (III, IV and V) earned more than $155 (# 55,000) per months which results to these respondents having private ownership of wells and boreholes in their respective households.



	Balogun 2	Akanbi 2	Okaka 1	Akanbi 1	Balogun 3	Akanbi 4	Okaka 2	Okeogun	Balogun 1	Akanbi 3	Akanbi 5
55,000 and above	4.14	3.13	2.78	5.56	5.71	7.5	2.86	0	0	8.33	8.33
37,000 - 54,000	16.22	3.13	8.33	0	5.71	5	5.71	2.78	13.89	0	0
19,000 - 36,000	67.57	84.38	66.67	69.44	65.71	22.5	54.29	86.11	52.78	38.89	38.89
less than 18,000	10.81	9.38	22.22	25	22.86	65	37.14	11.11	33.33	52.78	52.78

Figure 5. Income distribution of respondents in the study area

e. Household size of respondents

The average household size of respondents in the study area is 6 each in Akanbi wards (I & II) which are the highest and this is because they are rural areas while it is 3 in Okaka ward II, which is the lowest (Table 4). This could be attributed to the extended family system of rural and semi urban households in Nigeria. The size of a household determines the quantity of water consume, large family has higher demand for water than smaller family and thus spend more time in water collection. Ifabiyi (2011) opined that large family size is common in the traditional area as much as 19 people and least in the modern area sometimes as low as 2 persons.

Table 4. Household size of respondents in the study area

Political wards	1-3	4-7	7-10	11 and above
Balogun II	10.81	40.54	40.54	8.11
Akanbi II	21.88	68.75	6.25	3.13
Okaka I	16.66	50.00	25.00	8.34
Akanbi I	25.00	58.33	13.89	2.78
Balogun III	14.29	62.86	17.14	5.71
Akanbi IV	42.50	47.50	7.50	3.50
Okaka II	2.86	60.00	28.57	8.57
Oke-ogun	11.11	55.56	30.56	2.78
Balogun I	19.55	50.00	27.78	2.78
Akanbi III	16.67	66.67	8.33	8.33
Akanbi V	25.00	47.22	27.78	0.00

f. Occupation of respondents

In Ilorin South LGA, 80% of respondents in Akanbi ward II, were farmers and this is because it a rural area while 78% in Okaka ward II, were involved in multiple incomes generating activities in addition to their normal activities (Figure 6). Buying and selling goods was common amongst respondents. In Akanbi ward III and Balogun ward III, with 38% and 36% of traders, and this is the highest proportion in the category.

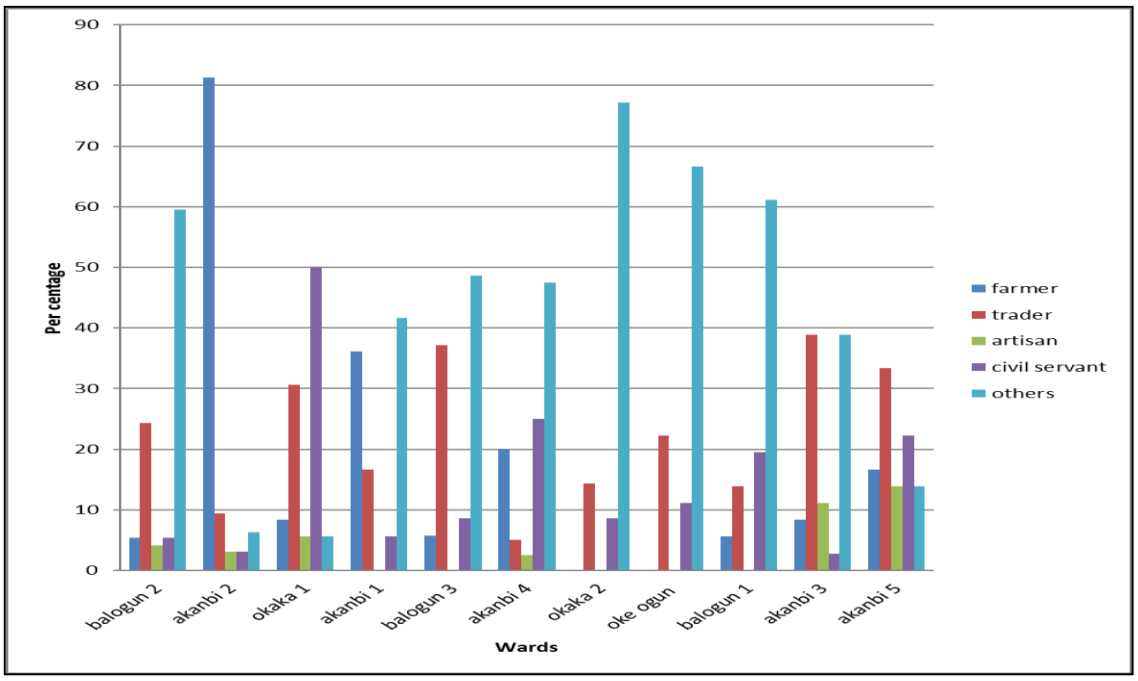


Figure 6. Occupation of respondents in the study area

g. Education qualification of respondents

In figure 7, there were high levels of literacy within the eleven wards, with only a minority of 8.33% having no formal education. Okaka ward II has the highest proportion of secondary school leavers (60%) while 72.5% of respondents in Akanbi ward IV are in tertiary institution and this is because of its proximity to University of Ilorin.

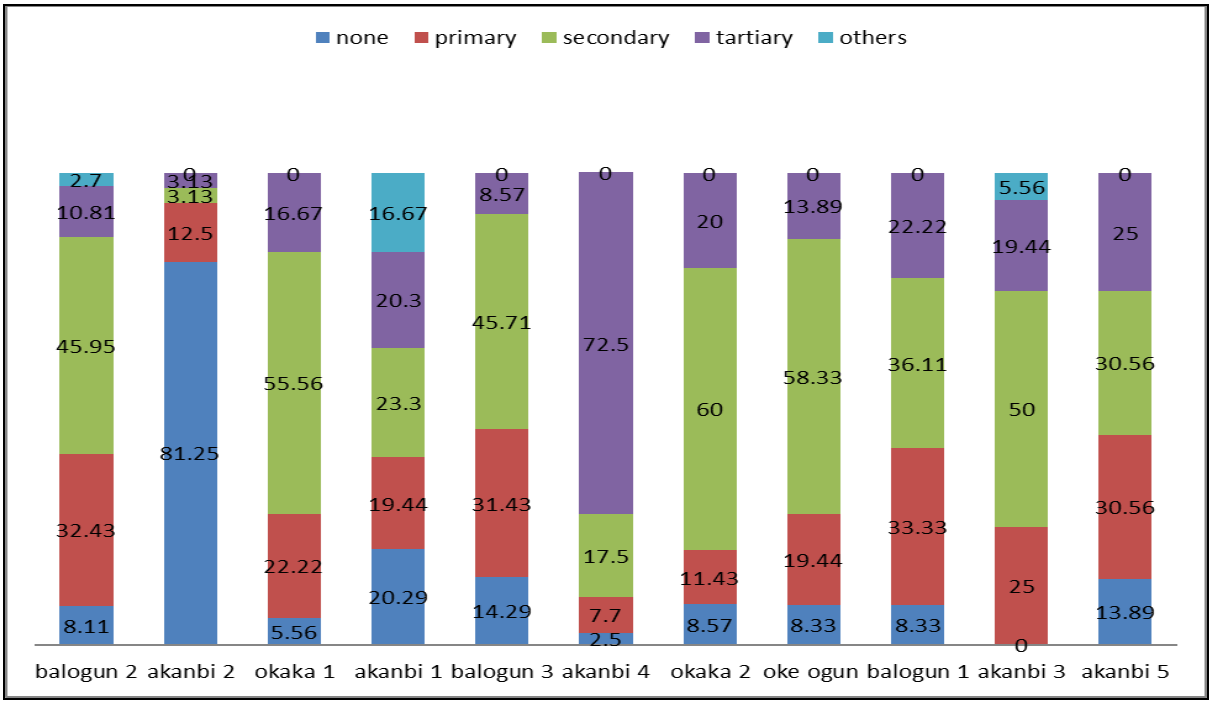


Figure 7. Education qualification of respondents in the study area

h. Sources of water supply

The sources of water supply in Ilorin South LGA, includes but not limited to; pipe borne water, well, borehole, stream, pond and rain. The findings revealed that household well accounts for the highly significant source (55%). This is because of its proximity to respondents' houses and water in the wells could be pumped into their houses by using pumping machines. However, the disadvantage is that most of the wells in the study area usually run dry during dry seasons. This collaborate with the studies which opined that almost all groundwater sources (well) which are not used during the raining season when water is adequately available are major sources of water in homes during the dry season when the resource is scarce in Ilorin (Musa & Fumen, 2013; Kolawole & Afolayan, 2017). This is followed by borehole with the score of (25%) due to the fact that most of the respondents have resorted to the drilling of wells and boreholes in order to offset the huge short fall in water supply as observed by (Tomilayo & Sanni, 2013). The result further revealed that tap water account for (12%) and this is because of its epileptic water supply which can be attributed to the poor management of Kwara State Water Corporation Board. Most often, there is epileptic water supply, non-availability and inaccessibility. Meanwhile, others (such as pond, stream, river and rain) account for (8%), this is due to the fact that most of the wards in the study area are located in town. Figure 8a-b show real samples of water sources in

the study area. According to Kessier (1997) as cited in Ifabiyi (2011), free access to resource leads to excessive use and that charging of water rates leads to sustainable water management. Many factors affect household water demand and willingness to pay for improved water services. Kolawole and Afolayan (2017) observed that water sources have a total bacterium count and total coliform counts above the recommended national and international guidelines.

Figure 8a. A covered well at Akanbi ward I

Figure 8b. A tap dispensing water at Oke-Ogun ward

The quantity of water needs and supply in the study area

Access to safe water is a fundamental human right as such a first step toward sustainable water use is to guarantee all humans the water needed to satisfy their basic domestic needs using this index as a bench mark. Basic minimum water requirement by households in the study area is mainly for domestic purposes (drinking, cooking, and bathing, washing among others). According to Gleick (1996), the minimum basic water requirement for human needs is 50 liters per capita day of safe water, which is considered adequate for a household to meet the needs of all domestic purposes in urban areas.

The result for this index revealed that in Akanbi ward III, the minimum water requirement is 39 liters per capita day, while in Akanbi ward I, 44 liters is required and in wards like Balogun III and Oke-Ogun, 48 and 49 liters are required respectively. Thus, these political wards are below the benchmark for minimum water requirement set by Gleick in 1996. However, six political wards are above the basic minimum water requirement in the study area, which are Akanbi wards (II and IV), and Okaka ward I, with values of 50, 52- and 54-liters per capita day. The result further revealed that Balogun wards (I and II), Akanbi ward (V) and Okaka ward II, have values (55, 56, 59- and 61-liters per capita day), respectively, which is above the bench mark slated globally for minimum domestic water requirement (Table 5).

Table 5. Basic minimum (average) water requirement by households' per capita day

S/N	Political wards	Daily water consumption(liters)
1	Balogun II	55
2	Akanbi II	50
3	Okaka I	54
4	Akanbi I	44
5	Balogun III	48
6	Akanbi IV	52
7	Okaka II	61
8	Oke-ogun	49
9	Balogun I	56
10	Akanbi III	39
11	Akanbi V	59

The results from this indicator revealed that, water demand in Ilorin South LGA has outpaced supply and this is as a result of urbanization and population growth. In addition, since the study area is short of safe water supply there is every tendency that people will continue sourcing their domestic water needs through wells, boreholes, streams, rivers and rain. However, the standard of safe water required per person per day should be 40 liters and this should be the ideal daily requirement (WHO/UNICEF, 2003).

Furthermore, this study is in line with Aderibigbe *et al.* (2008) findings where he observed that in Ilorin metropolis the average daily access and use per person for domestic purposes was 35.79 liters. It is important to note that, Aderibigbe findings and those of the present study are below international standard of between 40 and 50 liters. According to Gleick (1999) majority of households are not aware of international recommended standards of water access required to eliminate diseases, promote culture and socioeconomic wellbeing and improve the qualities of life.

Accessibility to safe water in the study area

a. Accessibility to safe water in terms of distance

During the survey interview, most respondents in the study area, that are having access to pipe borne water, household wells, public wells and boreholes, claimed that they get water within a distance of less than 200 meters from their residence and less than twenty minutes and above.

Distance is an important parameter for measuring water access. According to the results from Table 6, 43.7% of respondents covered a distance of less than 50 meters before they could access water in the study area, while 21.7%, covers a distance of 100 meters. In addition, 14.9% covers a distance of 101-200 meters to fetch water while 19.7% had to travel above 200 meters before they could access potable water. From this analysis, it is obvious that distance is an impediment to water access in Ilorin South Local Government Area.

Table 6. Distance/Accessibility to safe water in the study area

Political wards	<50m	50m-100m	101-200m	>200m
Balogun II	25	8.0	2.0	1.0
Akanbi II	12	7.0	9.0	8.0
Okaka I	10	12	8.0	6.0
Akanbi I	26	7.0	1.0	2.0
Balogun III	10	11	11	4.0
Akanbi IV	22	10	1.0	3.0
Okaka II	16	3.0	2.0	15
Oke-ogun	19	7.0	5.0	5.0
Balogun I	19	11	4.0	2.0
Akanbi III	4.0	9.0	3.0	20
Akanbi V	10	1.0	13	12
Total	173(43.7%)	86(21.7%)	59(14.9%)	78(19.7%)

It is very obvious that most of the people in the study area have in-house wells and boreholes that could meet their water demand, yet distance remains a stumbling block to water access in Ilorin South LGA.

b. Accessibility to safe water in terms of time

The time taken to collect water depends on water quality and quantity. This is because water that is gotten from in house tap is cleaner than water obtained from a distant stream. The results obtained from table 7, revealed that, 27.2% of respondents spent less than 5 minutes to access water, while 21.2%, 5-30 minutes. Meanwhile, about 16.7% spent 30 mins-1 hour and the remaining, 34.8% spent, 1 hour and above. Which implies that time is a major constrain to water access in the study area.

Table 7. Time/Accessibility to safe water in the study area

Political wards	< 5 minutes	5-30 mins	30 mins-1hour	1 hours and above
Balogun II	12	13	5.0	6.0
Akanbi II	11	4.0	9.0	12
Okaka I	6.0	7.0	8.0	15
Akanbi I	13	10	8.0	5.0
Balogun III	5.0	6.0	7.0	18
Akanbi IV	19	13	2.0	2.0
Okaka II	3.0	3.0	9.0	21
Oke—ogun	11	4.0	9.0	12

Balogun I	12.0	13.0	3.0	8.0
Akanbi III	13.0	6.0	3.0	14
Akanbi V	3.0	1.0	4.0	28
Total	108(27.2%)	84(21.2%)	66(16.7%)	138(34.8%)

The results from tables 4 and 5, revealed that, although, water sources are proximate to residents' households' yet ample time and distance is used by respondents to collect water at all times and this can amount to a significant loss of productive hour for women and children respectively who are responsible for domestic activities at home.

Conclusion

The challenges of water scarcity in the study area is worsen by the day and the impact is mostly felt by women and children. This is because they are the water collectors and have to go through the stress in order to perform their domestic responsibilities to the detriment of using their productive time. The study has assessed water accessibility and quantity supply in Ilorin South Local Government Area of Kwara State, Nigeria with a view of providing improve access to safe water in order to overcome impediments like; distance and time spent in fetching water and water borne diseases. Water is fairly available in the study area but still inadequate in terms of quality. As a result of the shortfall in water supply, most of the residents have switched to alternative sources, some of which are unsafe for domestic purposes. The study recommends that: there is need to provide more public water points in the study area in order to improve access to water supply; water collection points should be located proximate to residents' houses and damage old pipelines should be promptly replaced in order to efficiently safe water supply; and individuals should ensure that wells are protected and desist from dumping refuse close to water sources.

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