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Dimensions of Water Accessibility in the Southern Part of Niger State, Nigeria.

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Abstract
The study examined the determinants of household water accessibility in Southern part of Niger State, Nigeria. Data for the study was obtained from primary and secondary sources using questionnaire, interview, Personal observation and documents. 1,192 questionnaires were administered; sampling techniques adopted are combination of purposive, stratified and simple random. Purposive sampling technique was used to determine sample frame; sample unit was determined using stratified sampling method and simple random technique was used in administering questionnaires. The result was analyzed within the scope of "WHO" water accessibility indicators using descriptive statistics. Major sources of water in the area are well; hand and electric pump borehole and streams. These sources account for over 90% of household's water. Average per capita water consumption in the area is 22 liters per day, while location efficiency of facilities revealed an average of 80 people per borehole. Household water accessibility is affected mainly by the factors of distances, time spent to obtain water, low income status of the majority of respondents to access modern water infrastructure, and to a lesser extent household size. Recommendations includes, all tiers of government to intensify efforts in providing water infrastructures and existing ones through budgetary provisions , and communities should organize fund raising bazaar, so as to raise fund to improve water infrastructures in the area.

Introduction

Water is an essential aspect of man's life because of its universal utility for domestic, agricultural and industrial purposes. Particularly at the domestic level, portable water is important to individuals and the households in order to ensure healthy living, as well as freedom from attacks and untimely deaths from water- related diseases. It is essential for human survival, well being and for general economic development. However, this resource is irregularly distributed in space and time (Victor, 2007).

97% of the water on the Earth is salt water, only three percent is fresh water, slightly over two thirds of this is frozen in glaciers and polar ice caps. The remaining unfrozen freshwater is found mainly as groundwater, with only a small fraction present above ground or in the air (World Bank, 2010). Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world and as the world population continues to rise, so does the water demand, (World Bank, 2009).

Pressures on water resources are increasing mainly as a result of human activities, namely urbanization, population growth, increased living standard, growing competition for water and pollution. These are aggravated by climate change and variation in natural conditions (World Bank, 2009). Water accessibility "means" availability of water for use by individual or by a family or household for household purposes; for farm and domestic animals up to normal grazing capacity of the land whether or not the animals are actually owned by such , individual or family, and for the irrigation of land(William, 2006).

Today, the world is facing severe and growing challenges of maintaining water quality and quantity meeting the rapidly growing demand for water resources. In many areas, water is available to users at no cost or at a heavily subsidized price. Thus, neither water managers nor water users have incentives to conserve water, so water is overused and wasted instead of being treated as a scarce resource. Water scarcity is the lack of sufficient available water resources to meet the demands of water usage within a region. It already affects every continent and around 2.8 billion people around the world at least one month out of every year. More than 1.2 billion people

lack access to clean drinking water. (Wikipedia, the free encyclopedia, 2014)

The Statement of Research Problem

The world population has been dynamic and this dynamism has impacted on environmental resources to the extent that water shortages may in the future increase dramatically. For example the percentage of households in Niger State relying on vendor services for water supply is about 3.8%, a figure higher than the national average of 1.8%. Furthermore, household access to piped water in Nigeria is only about 6.5 % . This is evident in the urban centers where piped water existed; until recent when the taps ran dry (SIWI, 2005). In fact 74.1% of household rely on non- potable sources including unprotected hand dug well, ponds and streams (GEMS, 2004). The problem is worsened in the dry season when most hand dug wells, ponds and streams run dry. (SIWI, 2005)

The case for the study area is alarming because the entire area is made up of rural settlements, small and medium sized urban centers where majority of the population live below poverty line and could not afford water infrastructure such as modern hand or electric pump boreholes. In Nigeria, rural water coverage is far behind both urban and national coverage. Given this scenario, water and water related problems are likely to abound in the area. The complexity of the crisis is underlain by the fact that the poor suffer most from lack of access to these services, and for water they may even pay more, since cost transient cash payment to include time and energy used. Unfortunately access to safe drinking water is far less than 30% on the aggregate and the unavailability of portable water is a major source of water borne diseases, in particular among the rural and urban poor, which may lead to reduction in life expectancy (FGN, 2004). Successive governments in Niger have abdicated their responsibilities to the citizens by not investing enough resources to the provision of safe and good quality water (pipe borne water) to the population for domestic and industrial uses. An assessment of rural water supply and poverty in rural areas of Nigeria conducted in Federal Capital Territory by Chup (2004) revealed that apart from ill-health suffered by people as a result access to safe drinking water; a lot of resources are expended on drugs and medicine in pursuit of good health. In another vein Alaci (2010) look at household water accessibility in Sothern part of Kogi State, and identitfy some challenges to household water accessibility. Adeleye (2014) also assessed problems of water supply and sanitation in Kpakungu Area of Minna Niger State, but to the best of my knowledge nobody had studied household water accessibility in the study area. This is the gap in knowledge which is intended to be bridged by this research on analysis of household water accessibility in the southern part of Niger state of Nigeria. The study therefore attempts to examine the major challenges of household water accessibility in the area. An attempt is also made to recommend possible solutions to the identified problems.

AIM AND OBJECTIVES The aim of the study is to examine the determinants of water accessibility in the Southern part of Niger State. In an attempt to achieve the above stated aim, the following specific objectives shall be pursued

(i). To determine locational efficiency of water facilities in the area.

(ii). Determine per capital water consumption in the area.

(iii). To examine the spatial variation in water consumption in the area

(v). To examine factors for water demand and supply in the area.

Study Area

Location and Size'

The Study area is located between latitude 8.10^0 and 11.8^0North and between longitude' 4.30^{0}' and 7.00^0 East. The area is bordered in the north by Paikoro, Maikunkele,and Wushishi Local Government Areas, to the west by Mashegu and Borgu Local Government Areas, to the East by Suleja Local Government and the Federal Capital Territory. While to the south is bordered by River Niger, the border between Niger state and kogi and Kwara. It covers a land Area of about 24, 741 Sq Km (Abubakar, 2003

3.2.1 Literature Review

3.2.2 Studies on Water Resources.

In view of the prior discussion, this section shall review related literatures within the ambiet of water planning, problems of water supply and demand, accessibility to water, factors and indicators of accessibility, the role of water in socio-economic development among others.

Kashir, (2011) looked at water as one of the most essential elements necessary for good health -- it is necessary for the digestion and absorption of food; helps maintain proper muscle tone; supplies oxygen and nutrients to the cells; rids the body of wastes; and serves as a natural air conditioning system. He emphasize the importance of drinking at least eight glasses of clean water every day to maintain good health, since water contains no calories and can serve as an appetite suppressant and helps the body metabolize stored fat, it may possibly be one of the most significant factor in losing weight. In his book, titled "The Snowbird Diet" Dr. Donald Robertson says the body will not function properly without enough water and discusses the importance of drinking plenty of water for permanent weight loss: "Drinking enough water is the best treatment for fluid retention" the overweight person needs more water than the thin one; water helps to maintain proper muscle tone; water can help relieve constipation; drinking water is essential to weight loss.

Ibrahim (2012) examined the conceptual classification of water resources in Niger State and its accessibility to the common citizen. He said that most rural and urban settlements lack effective public water system that could ensure regular supplies to residents. The outputs of few million litres of water only meet a small percentage of people's water need. The influx of people to the cities has increased the problem of water scarcity. He identified strategies for improving water supplies level for good governance to includes; enactment of water legislation, completion of ongoing water projects and fabrication of water-based technical parts, increasing fund allocation to water boards. He said there is need for the government and the entire communities, philanthropies along-side with the politicians to collaborate in achieving the saga „water for all by 2000" which is still a dream till today. The study recommends the need to create public awareness in respect of the dangers associated with the consumption of sub-standard water; strengthen the existing water policy by ensuring adequate maintenance and funding of water treatment plants; and establish a workable policy of having

maximum threshold of twenty-five households per borehole or ten households to a well.

Water Accessibility in Nigeria

There is close relationship between water availability and economic development in Nigeria. Availability of potable water is one of the major factors controlling the distribution of population in Nigeria. Areas where water is difficult to obtain, or the water supply is unreliable, are invariably sparsely peopled. Availability of abundant supply of water, whether from surface or underground sources, is also one of the major factors influencing the pattern of industrial location in the country. Water is required in industry for various processes such as raising steam, cooling of boilers, washing of products, general sanitation and as a raw material. Consequently, industries in Nigeria are mainly concentrated in large urban centers which have the necessary infrastructural facilities such as water supplies and electricity (Ayoade and Oyebande 1983).

In Nigeria, accessibility to improved water supply is very biased in favour of urban centers. This situation was inherited from the colonial administration which attempted to use improved water supply as a means of controlling the spread of certain diseases in urban centers. The situation regarding rural water supply is, however, quite pathetic. Up until the early seventies, less than 8 per cent of all rural households had access to pipe-borne water for domestic purposes. The programmes of the River Basin Development Authorities (RBDAs) established in 1976 and the Directorate of Foods, Roads and Rural Infrastructure (DFRRI) established in 1986 improved on the situation. The latter's remarkable success at providing 5,054 communities in all States of the Federation with potable water mainly through boreholes, raised the proportion to about 13.63 per cent of rural households that had access to pipe-borne water by the end of 1999. For urban and semi-urban centers, the figures are 68.50 per cent and 42.45 per cent respectively. (Devace, 2011) Rural households that depend on streams are about 36 per cent, compared with only 3.63 per cent for urban centres and 19.53 per cent for semi-urban locations. Hand-dug wells provide water for 23.5 per cent of households in urban centres, 27.6 per cent in semi-urban and 41.9 per cent in rural locations. Some 1.68 per cent of urban households depend on boreholes. Comparable figures for semi-rural and rural areas are 3.13 per cent and 5.56 per cent respectively. In 1997 when all settlements irrespective of sizes were taken together, only about 24.74 per cent of all households in Nigeria had access to pipe-borne water. By 1999 the households that depended on boreholes, wells and stream/ponds were, respectively, 15.41 per cent, 27.62 per cent, and 32.23 per cent. Thus, the provision of potable water still demands government's prompt and sustained attention (Devace, 2011).

Accessibility Indicators

An indicator generally is a model implying elements of cause and effects, of social norms that constitute progress, and of policy, actions and outcomes. Root word of indicator is pointer; describing how an indicator is intended to point towards some desirable state or course of action and something that is used to show the presence or state of a condition or trend. Indicators are not data, rather they are models simplifying a complex subject to a few numbers to be easily grasped and understood by policymakers and the public. Indicators are user driven, and are generally highly aggregated, so that changes or differences in the value of an indicator may be more important than its absolute level. Water accessibility indicators as developed by the World Health Organization (WHO) is presented in Table 2.1

The table 2.1 below shows water accessibility indicators as developed by World Health organization (WHO). The indicators here are distances to be covered to access water and time spent to obtain water. A distance of 100 meter travelled to obtain water is regarded as intermediate access, 101-500 meters (Basic access), 1.1Km – 3Km (No access). In terms of time spent to obtain water, within 5 minute is regarded as intermediate access, 5minutes to 4 hours (Basic access) while more than 4 hours (No access).

Table 1.1 WHO Water Accessibility Indicators

Distance Travelled to Collect water	WHO Standard/ Remark	Average Time spent To collect water	WHO Standard Optimal Access
< 100 M	One tap on plot Within 100m (Intermediate accesss)	Within 5 minute	Intermediate access
101- 200M	Between 100 and 1000m (Basic access)	5-30 minutes	Basic access
201-500M		30 minute -2hours	
500M-1000		2-4 hours	
1.1-2Km(1.5Km)	More than 1000m (No access)	>4hours	No access
>2km(3km)			

Source:WHO 2004

Research Method

The data for this research was drawn from water users and water providers, this include households, water providing agencies, water vendors and government official documents..

Types and Sources of Data

The data for this study were derived from secondary and primary sources.

Primary Sources of Data:

The primary sources of data include questionnaire, observation, and personal interviews of Heads of household, Officials of Water Board Resident in the Area NGOs and water vendors.

Secondary Sources of Data:

The secondary sources of data include relevant publications, government documents, statistical maps and records including government financial budget, allocation and expenditure on capital water project and materials obtained from the internet

Sampling Frame and Sampling Technique

The sampling technique employed in this research is a combination of purposive, stratified and simple random sampling. To arrive at the choice of the sampled Local Government Areas for questionnaire administration, purposive sampling method was used. The choice of Bida is to have insight to water accessibility problem in urban centres and Lapai and Edati have both semi-urban and rural communities under them and this areas would reveal water problem in semi-urban and rural areas.

The selection of localities in each sampled LGA was based on stratified random sampling; because localities vary in size and distribution and to ensure a representative and spatial coverage. With the aid of topographical map, localities sampled were made to maintain at least five (5) kilometers or more distance apart, All localities selected have population of not less than (300) people and it based on the size of population that they were stratified.

The choice of household was based on simple random sampling. The reason is because area being a fairly homogenous society in terms of socio-cultural traits, experience and responses are not likely to vary significantly, however, in a large population it is important to give every individual equal chance of being selected. The combination of these procedures yielded three (3) Local Government Areas, fifteen (15) Localities, five (5) per Local Government Area.

The largest localities in each Local Government Area sampled

For the purpose of sampling in each of these three Local Government Areas, 2006 population was updated to 2013 using 3.4% growth rate for the state and the updated figured was used to calculate sample size using Yaro Yamane formulae.

$$n = \frac{N}{1+N(e)2}$$

Source: Practical Guide to Writing Research Project by A.E. Uzoagulu Pg 66

Where

n= the Sample size

N= the finite population

e= level of significance (or limit of tolerable error) (0.05)

1= unity (a constant)

Table .1.2 The sample sizes obtained using Yaro Yamane formulae

	Local Government Area.	Total Population (2013 estimate)	Sample Size
1	Bida	117045	399
2	Edati	88930	398
3	Lapai	66270	398
	Total		1195

Questionnaire Administration.

Questionnaire was administered randomly using the table of random sampling; this was done using 3 research assistants in each of the wards. The administration of questionnaire was done under the supervision of the researcher. Discussions was held with the water users, water vendors, NGO's and Officials of the Niger state Water Board resident in the area on their contributions in the provision of water in the community.

Method of Data Analysis.

The data was sorted out using frequency tables; the information was then summarized in tabular form. The percentages and means for various Local Government Areas were sorted out, after which cumulative percentage was calculated. This was used to generalize the information on the study area. Percentages were used for easy comparison of the water accessibility levels and also to show spatial variation of water accessibility in the area.

Result Presentation and Discussion.

Indicators of Water Accessibility (i.e Water sources, How is water sourced, Per Capita Water Consumption, Locational Efficiency of Facilities, Time, Distance, Cost, and Regularity of the supply,)

How water is been sourced is considered, domestic water sources, per capita water consumption, location efficiency of facilities, regularity of water supply by vendors, amount spent, time spent to obtain water. The source of the water used by the household can be an important indicator of the level of water accessibility.

1.1. Distribution of how Water is sourced by the Respondents

Table 1.1 below revealed how water is sourced by respondents, Accessibility deals with ease with which a resource can be obtained. How water is sourced indicate ease with which water is obtained, it is an indicator of accessibility that tends to look at whether the respondents obtain water within the compound or outside the compound or within the locality or outside the locality. It is an indicator that shows the level of access to water.

Table 1.1: How Water is sourced by Respondents

How water Is sourced	**Lapai LGA**		**Bida LGA**		**Edati LGA**		**Cumulative Frequency**	**Cumulative Percentage**
	Freq	%	Freq	%	Freq	%		
Door to Door	5	1	15	4			20	2
Within the Compoud	59	16	90	25	129	34	278	24.
At home outside the Compound	135	35	173	47	166	45	474	42
Within Locality	170	44	74	20	72	19	316	28
Outside Locality			3	1			3	0.26
Through Vendors	16	4	11	3	9	2	36	3
Total	385	100	366	100	376	100	1127	100

Source: Authors Field Survey, 2014

Table 1.1 shows how water is sourced by the respondents. In the area only 2% of the respondents have door to door service, 24% obtain water within their compound and 42% obtain water outside their compound. This revealed that majority of respondents have to travel some distance to obtain water and also time is been wasted to wait for turn to fetch water. This therefore constitutes constraints to accessibility in the area. A situation where no household has access to pipe borne water can only mean a deplorable domestic water condition. Optimum water accessibility according to WHO (2004) is a state of water supply through multiple taps continuously. This would be possible in situations where public tap is provided to deliver water to various homes, with this distance and time as water access constraints have been eliminated. Where otherwise, these constraints become challenges that must be overcome in order to guarantee households optimal water accessibility.

Domestic Water Sources of the Respondents

Domestic water sources of the respondents is presented here as obtained in the field, it would be presented on table 5.9 below, the number respondents and percentage was given for each of the Local Government Area. Domestic water source is very crucial, because it determine whether the source is portable or not. It also determines how free the household will be from water related disease. The sources of water in the area include well, river, electric and hand pump borehole.

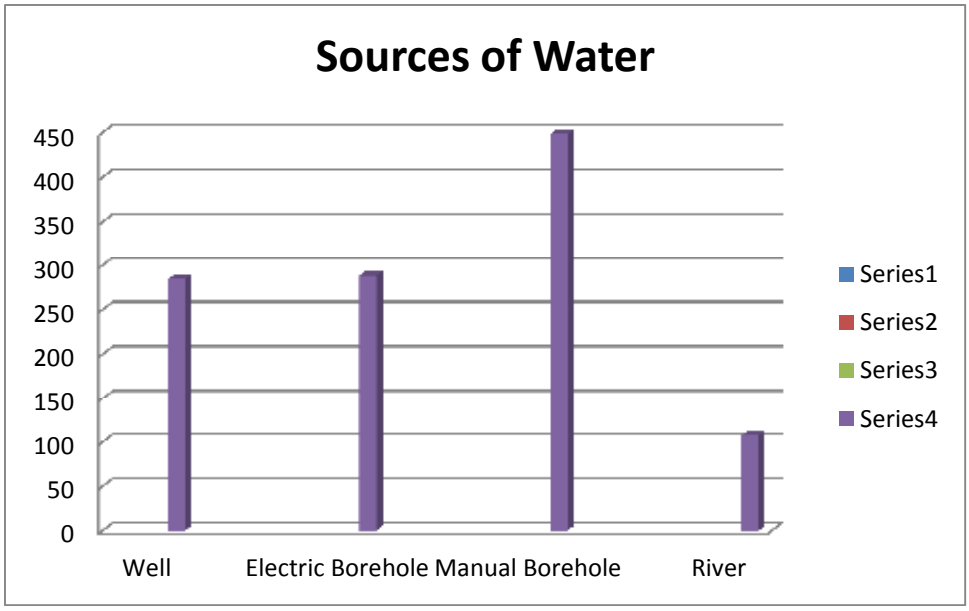

Fig 1.1. Domestic Water Sources of Respondent
Source: Authors Field Survey, 2014

Figure 1.1 above reveals the major sources of water in the area. It shows that the major sources of water in these areas are well, river, electric and hand pump borehole and this sources constitute 90% of water sources available to respondents in the area. The sources of water supply available can influence the quantity of water at the disposal of individual or household. This traditional sources of water supply such as river, lakes and springs have remained central in regional water supply (rural areas especially) in the developing countries. Well for example over the years have been the main sources of water in many communities. They have taken dominant position in areas where distance and relative availability of rivers proven to be major water supply constraints. Most of the household reveal that even with alternatives to well they still keep and maintain the well because of eventual failure of such alternatives. The difficulties associated with this traditional sources and the rise in commerce in the face of population increase may have resulted in commercial water sale. Of recent, different forms of water sale exist in the area range from bagged half liter pure water and wheeled biro water vendors. In many societies, this source of water supply has increasingly become important bridging the gap between demand and supply from the traditional sources.

In the study area river and well as a source of water are plagued with many problems, which reduces their utility and that is why only few respondents depend on them as their sources of water for domestic uses. The traditional sources like river and wells are prone to pollution because of their unprotected nature.

1.2 Regularity of Water Supply by the Vendors

The regularity of vendors sometimes posed challenge to those that depend on vendors as their sources of water. In most cases vendors have more than one customer and would like to satisfy all. This situation put in a serious fix to satisfy all the customers, thereby making it impossible for them to supply their customers with water at the right time. Accessibility is hampered with when a resource is not made available when it is needed, the challenge for those that depend on vendor sources are therefore two,i.e money paid for the service and inconveniences of not having it at the right time.

Table 1.2: Regularity of Water Supply by the Vendors

Vendor Services	**Lapai Local Government**		**Bda Local Gvernment**		**Edati Local Government**		**Cumulative Total**	**Cumulative Percentage**
	Freq	Per	Freq	**Per**	Freq	**Per**		
Daily	37	10	25	**7**	10	**3**	**72**	**7**
2days interval	5	1	12	**3**	6	**2**	**23**	**2**
Fortnightly	7	2	8	**2**	3	**1**	**18**	**2**
Weekly	4	1	10	**3**			**14**	**1**
None	**332**	**86**	**311**	**84**	**357**	**94**	**1000**	**88**
	385	**100**	**366**	**100**	**376**	**100**	**1127**	**100**

Source: Authors survey, 2014

Table shows that majority of those households that depend on vendor services indicated that vendor's relative

regularity is mainly on daily basis. This is attested to by about 7% that depend on vendor service as their source of water daily, 2% of the respondents obtain water from vendors at 2days interval, while 1% obtain water from vendors weekly and 88% do not obtain water at all from vendors, this shows that about 12% depend on vendor services. Dependance on vendor service is low, this revealed that majority of the respondents obtain water from available sources of water despite the constraints of distance and time wasted. However, the major problem associated with water vendors as indicated by the respondents is cost, reliability and certainty of water quality. Cost implication of water therefore translates to the quantity a household is prepared to put to particular use. Usage is influenced by the amount of water available which is also the result of the effective water demand because increase in price may result into decrease in quantity demanded and reduction in quantity to be used for domestic and other uses.

1.3 Amount Spent Daily on Water by Respondent

Amount spent on water by respondents that dependent on vendor supply as sources of water. Accessibility is constrained by how much one paid before obtaining a resource. In events that one has to pay before getting access to resource and eventually, you have no money to pay then accessibility become problem. In developing Nations where most people live below poverty line, some cannot afford three square meals, paying for water in addition to existing problem of food should be of great concern to the government

Table 1.3 : Amount Spent on Water Daily by Respondents

Amount Spent Daily on Water	*Lapai Local Government*		*Bida Local Government*		*Lapai Local Government*		*Cumulative Total*	*Cumulative Percentage*
	Freq	*Per*	*Freq*	*Per*	*Freq*	*Per*		
N20- N100.00	*7*	*2*	*11*	*3*	*6*	*2*	*24*	*2*
N101- N200.00	*24*	*6*	*32*	*9*	*9*	*3*	*65*	*6*
201- N400.00	*18*	*5*	*9*	*3*	*4*	*1*	*31*	*3*
400 and Above	*4*	*1*	*3*	*1*			*7*	*0.62*
None	*332*	*86*	*311*	*84*	*357*	*94*	*1000*	*88.*
Total	*385*	*100*	*366*	*100*	*376*	*100*	*1127*	*100*

Source: Authors field Survey, 2014

The table 5.13 above is a summary of amount spent on water on daily basis by some respondent that dependent on vendor services. In the area 2% of the respondents spent between N20.00 – N100.00, 6% spent ₦101.00-₦200.00 and 3% spent between ₦201.00 – ₦400.00. In the area only few respondents spent money on daily basis to obtain water. This is because to spend money on daily basis to obtain water a lot of money would be expended. In an area where monthly income is low people find it difficult to spend much on water because of their economic status. This implies that despite constraint of distance and time spent to obtain water people still endure to obtain water from available sources.

1.4 Distance Travel to Obtain Water by the Respondents.

The distance travelled to obtain water is a serious measure of accessibility, as it determines whether or not respondents would be able to obtain enough for domestic and other uses. Where someone would have to travel for long distance to obtain water, this may be a barrier to accessibility, because he may not be able to obtain enough that would meet up with his demand.

Table 1.4: Distance Travel to Obtain Water by the Respondents.

Distance Travel To obtain water.	***Lapai Local Government***		***Bida Local Government***		***Edati Local Government***		***Cumulative Total***	***Cumulative Percentage***
	Freq	*Percentage*	*Freq*	*Per %*	*Freq*	*Per %*		
<100 Metres	*167*	*43*	*100*	*27*	*107*	*28*	*374*	*33*
1-2Km	*137*	*36*	*161*	*44*	*97*	*26*	*395*	*35*
2-4Km	*17*	*4*			*43*	*12*	*60*	*5*
No Distance	*64*	*17*	***105***	***29***	*129*	*34*	*298*	*27*
	385	*100*	*366*	*100*	*376*	*100*	*1127*	*100*

Source: Authors field Surveys.

River and well are the traditional sources of water, and it is the backbone of some community water supply in the study area. The centrality of this supply source relates to its function as a factor of settlement location. Before the discovery or emergency of sources such as boreholes and vendor services, rivers play important role of being the main sources of community water supply with the complimentary support from rainfall. In the area 33% of the respondents travel for 100 meter to obtain water, 35% of the respondent travelled between 1-2 Km to obtain water, 5% of the respondents travelled 2-4Km to obtain water, while 27% travelled no distance to obtain water.This therefore revealed that distance travelled to obtain water constitute a barrier to accessibility

in the area. This is because majority of respondents has distance as a limit to the quantity of water the household can obtain for domestic uses and therefore it served as constraints to accessibility.

1.5. Time Spent Daily on Fetching Water by Respondents with no Taps

The time spent daily on fetching water by respondents with no tap as obtain in the field is here by presented in table 1.15. Time is precious, the fact that most of those involved in scotching for water are mostly children of school age that are supposedly to be in the school at the time they are struggling to get water. Their time is wasted scotching for water, aside children of school, women are also involved in fetching water and spent time that would have been used in another economic activities.

Table. 1.5 : Time Spent Daily on Fetching Water by Respondents.

Time Spent To obtain water	***Lapai Local Government***		***Bida LGA***		***Edati Local Government.***		***Cumulative Total***	***Cumulative Percentage***
	Freq	*Per %*	*Freq*	*Per %*	*Freq*	*Per %*		
5-30Minutes	*87*	*23*	*164*	*45*	*129*	*34*	***380***	***34***
1hour	*229*	*59*	*192*	*52*	*166*	*44*	***587***	***52***
2hours	*69*	*18*	*10*	*3*	*81*	*22*	***160***	***14***
3hours								
Total	***385***	***100***	***366***	***100***	***376***	***100***	***1127***	***100***

Source: Authors field work 2014.

The time spent to obtain water is critical in measuring water accessibility, the most formidabe challenge to dug wells or sank boreholes as sustainable sources of household water has to do with time spent in obtaining the water out of the well, boreholes; energy spent, quality of the water obtained and where these facilities are not located at the compound level, then distance becomes another challenge. From table 5.15, that summarized distance travelled to obtain water, in the area, 34% of the respodents spent 5-30minutes to obtain water, 52% of the respondents spent 1hour to obtain water 14% spent 3hours to obtain water. The highest percentage of respondents spent 1hour to obtain water. It also shows that majority of the respondents has distance as constriants to accessibility to water, as they have to travel some distance to obtain water. The implication of time spent to obtain water in the area has far reach effect, especially for childeren of school age, some children goes to school late because they had to search for water for bathing and other domestic uses. The time is very important, accessibility studies must consider time taken to obtain the resources in question to be able to ascertain the level of accessibility.

Profile of Modern Water Facilities in the Samples LGAs to Determine Locational Effciency.

Modern facilities (Boreholes and Pipe Born Warer) are the sources of portable water in our societies today. In the study area people depend on these modern sources for domestic use, especially for cooking and dringking. Other sources suck as well and stream is often used for washing domestic utensils, axcepts in some rural communities where there are no alternatives. The profile of facilities was used to determine the Locational Efficiency of Facilities (LE). The locational efficiency of facilities is thus determined with the following formula:

$$LE = \frac{Total\ Population}{Total\ No.of\ Functional\ Facilities}$$

Table 5.10 presents profile of modern water facilities that can provide portable water. It is this profile that was used to determine locational efficiency of water infrastructural facilities in the area. The (WHO) standard of facility location is one (1) borehole to 25 people, and a well to 10 people. However, in the study area some infrastructural facilities are not functional and therefore people cannot access water through them. On the basis of this, only those functional facilities were used to determine locational efficiency of facilities. In the area infrastructural facilities are grossly inadequate as reveal by the locational efficiency of facilities calculated in appendix ii. These functional facilities were complimented by sources such well and streams that are unprotected. Therefore water from these sources are either treated or used as obtained.

In study area no community meets up with standard of facility provision, there is no locality with less than 50 people per bore. In Bida for example, Bangbara area had 85 people per borehole, Esso Area and Project Quarter had about 100 people per borehole. In Lapai town a borehole is to about 87 people, in Gulu a borehole is to about 110 people, and in Tashibo, a borehole is 87 people.

Table 1.6: Profile of Modern Water Facilities in the Sampled LGAs

lOCALITY	NO	TYPE	CURRENT STATE
Lapi Local Government Area			
Lapai	5 2 2 1	Electric Borehole Electric Borehole Hand Pump 1 Hand Pump Borehole	Ft Nf Ft Nf
Gulu	2 3 1	Electric Borehole Hand Pump Borehole Hand Pump Borehole	Ft Ft Nf
Duma	2	Hand Pump Borehole	Ft
Ebbo	3	Hand Pump Borehole	Ft
Tashibo	4 1	Hand Pump Borehole Hand Pump Borehole	Ft Nf
Bida Local Government Area			
Bangbara Area	6 2	Electric Pump Borehole Electric Pump Borehole	Ft Nf
Central Market	5 2	Electric Pump Borehole Electric Pump Borehole	Ft Nf
Esso	5 1	Electric Pump Borehole Electric Pump Borehole	Ft Nf
Wadata	6 2 1 1	Electric Borehole Electric Borehole Hand Pump Borehole Hand Pump Borehole	Ft Nf Ft Nf
Project Quarters	3 2	Electric Borehold Electric Borehole	Ft Nf
Edati Local Government Area.			
Sakpe	3 1	Hand Pump Borehole Hand Pump Borehole	Ft Nf
Fada	1 2	Electric Borehole Hand Pump Borehole	Ft Ft
Enagi	3 3 1	Electric Borehole Hand Pump Borehole Hand Pump Borehole	Ft Ft Nf
Auta	2 1	Hand Pump Borehole Hand Pump Borehole	Ft Nf
Mapaworo	1 1	Hand Pump Borehole Hand Pump Borehole	Ft Nf

Key: Ft= Functional, Nft= Non Functional

Source: Authors Field Survey, 2014

In Edati Local Government Area, the locational efficiency of facilities revealed 91 people per borehole in Enagi, while in sakpe 100 per borehole, and Mapaworo where one borehole serve the entire community, it is about 300 people per borehole. This scenario correlates with the inadequacy of portable water observed by the respondents in the study area in table 5.19, when about about 64% indicated inadequacy of water. With this inadequacy of infrastructural facilities in the area, access to adequate water supply would be impossible as every one in the area has right to access water from these inadequate sources. For these reason it would not be possible for one to obtain water to his/her satisfaction.

Household per capital Water Consumption.

Households water rationing are adjustment mechanism employed to cope with the situation of water inadequacy. The extent of rationing depend largely the quantity of water available to the household and the need for water by the household members. This manifest in per capita water accessibility and sectoral-use allocation. Household per capita water accessiblity is summarised on table 5.17 below.

Table 1.7 Household Per Capita Water Consumption.

	Lapai L G A			***Bida LGA***			***Edati LGA***		
	Freq	***Mean Hhsize***	***Per Capita Water***	***Freq***	***Mean Hhsize***	***Per Capita Water***	***Freq***	***Mean Hhsize***	***Per Capita Water***
0-45 liters	*15*	*2*	***22.***	*9*	***1***	***27***	*21*	***2***	***22***
68 liters	*67*	*3*	***22***	*48*	***3***	***22***	*85*	***3***	***22***
115liters	*101*	*5*	***22.6***	*63*	***5***	***22.6***	*129*	***6***	***18***
160 liters	*89*	*7*	***22***	*103*	***7***	***22***	*53*	***7***	***22***
205 liters	*59*	*9*	***22.5***	*33*	***7***	***29***	*23*	***8***	***25***
250 liters	*34*	*10*	***25.3***	*61*	***9***	***28***	*35*	***10***	***25***
>280liters	*20*	*13*	***21***	*49*	***10***	***28***	*30*	***11***	***25***
Average			***19***			***26***			***22***
Cummulative Average				***22***					

Source: Authors field work 2014.

The table above show per capita water consumption ranges from 6 liter to 29 liters. Although variations exist in per capita water consumption based on location, vailability and status of the family. The average per capita water consumption in Bida is 26 liter per person, in lapai 19 liter per person, while in Edati 22 liter per person. However this gives an average of 22 Liters per person as capita accessibility status of the area. From the table majority of the households have within the range of 12-22 liters per capita water. The internationally recommended; World health Organisation (WHO) per capita water is 45 liters per day. This is obtained where water is adequately availble to every member of the household for all purposes. In the study area, although water is in short supply generally, variations exist in par capita water consuption across Local Government Areas. In Lapai Local Government Area the average per capita water is 19.3 liters per day, while in Bida Local Government Area, the average per capita water per is 26 liters, and in Edati Local Government Area it is 22.7 liters per day. This variation in per capita water consumption reveals variation in the accessibility to water and also the variation in the use water is put to. In urban areas for example water is consumed more because of utilities such as regular washing of clothes, flushing of toilet, washing of room, watering of flowers, all this different uses consume water in urban centers.

Findings

(1) Only 2% of the respondents have door to door service water delivery, 42% obtain water outside their compound, 28% obtain water within locality but not within the vicinity of the compound, with 0.26% obtaining water outside their locality.

(2) 25% of the respondent depend on well, 26% depend on electric pump borehole, 40% depend on hand pump borehole, and 9% depend on river.with average of 80 persons per borehole and 12% depending on vendor services for water. 2% of those that depend on vendor services spent N20.00 to N100.00 daily, 6% spent between N100, 00 to N200.00 and 3% spent N200 to N400.00 per day.

(3) 33% travel less than 100 metres to obtain water, 35% travelled 1 to 2 kilometres to obtain water, 5% travelled between 2 to 4 kilometres to obtain water, with only 27% travelling no distance to obtain water. 34% spent 5 to 30 minutes to obtain water, 52% spent 1 hour to obtain water, and 14% spent 2 hours to obtain water.

(4) Per capita water consumption varies from 18 litres to 25 litres per person per day, however average per capita water consumption of Lapai Local Government is 19 liters, Bida 26 liters and Edati 22 liters. While average per capita water consumption for the area is 22 liters per person.

Conclusion

Accessibility to adequate and safe water supply is important and can influence socio-economic progress of human settlements and the healthy living of the dwellers. The provision of this basic service in the Southern part of Niger State is largely inadequate thereby creating a situation of poor water accessibility in the area. Domestic water supply in the area is mainly an interplay of different traditional water supply sources and few available sources of modern boreholes which are grossly inadequate. Household water accessibility is seriously affected by the factors of income, time spent to obtain water and distance travelled. The impact of inadequacy, which is the most critical manifest strongly on households in terms of waiting time and distance taken to obtain water and low per capita water availability. This study shows the attitude of Government to provision of water in the area. The political will by those in the government in the form of sectoral allocation for the provision of water infrastructure is the major challenge. Another challenge in some part of the study area is complete absence of

electricity from the National grid which would have been used to facilitate the functioning of the available water infrastructure in the area.

Water as a basic human right should be accessible to all adequately and safely. This is because water is not only natural resources but also it is a base for the dignity and quality of life. Therefore the recommendation of this study is necessary for any serious government that is concerned about the wellbeing of its people and committed to alleviating the water crisis in the area.

Recommendations:

The recommendation arising from the findings of this study are put forward as follows.

Most importantly, one would point out that solving the problem of water need of the area requires commitment and political by the government and also both pro-active and reactionary approach to water planning principles.

Government at all levels should see provision of water to the citizens as their social responsibility and therefore should be committed to water infrastrastructural development, so as to solve the problem of inadequacy of water infrastructure in the area.

Water boards in the area are not functional; Government should intensify effort towards rehabilitation and maintenance of existing water board and expand their capacity so as to meet up with the growing population in the urban centres. If the facilities are put in good condition tarrifs should be charged for maintenance and development of additional infrastructure.

At the community level, community effort is needed in the form of mobilization of member to contribute money towards development of water infrastructure and maintain existing ones.

At family level members of the family should see water as necessary ingredient of development of the family that will promote their well being and therefore they should contribute money to develop modern infrastructure (borehole) for the family use.

The problem of power supply is serious in some communities in the area; it is therefore recommended that government should intensify effort to restore back light to those communities that have light problem to enhance water accessibility through electric pump boreholes.

It is also recommended that plan should be made to harness the existing major rivers such as River Gurara and River Kaduna and create multiple water intake points along the length of these rivers to cover the villages nearby and pump into a central distributor reservoir at an elevated point. This would make it easier for water to be distributed to the scattered settlements. A good example is the peak of fada village of Edati Local Government Area, A reservoir at Fada Emishaba would generate significant gravity that can transport water to many distance localities such as Fada Emindadu, Fada Emimama, Fada Emi-Ndazan, Fada Ndagbara, Fada Kpandaragi and Sakpe.

Key Findings

The key finding of study

Only 2% of the respondents have door to door service water delivery, 42% obtain water outside their compound, 28% obtain water within locality but not within the vicinity of the compound, with 0.26% obtaining water outside their locality.

25% of the respondent depend on well, 26% depend on electric pump borehole, 40% depend on hand pump borehole, and 9% depend on river.with average of 80 persons per borehole and 12% depending on vendor services for water. 2% of those that depend on vendor services spent N20.00 to N100.00 daily, 6% spent between N100, 00 to N200.00 and 3% spent N200 to N400.00 per day.

33% travel less than 100 metres to obtain water, 35% travelled 1 to 2 kilometres to obtain water, 5% travelled between 2 to 4 kilometres to obtain water, with only 27% travelling no distance to obtain water. 34% spent 5 to 30 minutes to obtain water, 52% spent 1 hour to obtain water, and 14% spent 2 hours to obtain water.

Per capita water consumption varies from 18 litres to 25 litres per person per day, however average per capita water consumption of Lapai Local Government is 19 liters, Bida 26 liters and Edati 22 liters. While average per capita water consumption for the area is 22 liters per person. 66% of the respondents indicated inadequacy of water supply, with 34% indicating adequacy of water supply. 9% of the respondents indicated that Niger state government is trying in the provision of water infrastructure, 48% described effort by state government as poor, while 78% described efforts of local government as poor.

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