Herald Journal of Geography and Regional Planning Vol. 2 (2), pp. 105 – 113 June, 2013
Available online: http://www.heraldjournals.org/hjgrp/archive.htm

Full Length Research Paper

Dimensions of water accessibility in Eastern Kogi State of Nigeria

[1]Dr. ALACI, Davidson S. A (MNITP, RTP), [2]Dr. JIYA Soloman N and [3]OMATA Mercy I.

[1]Department of Urban and Regional Planning,Federal Polytechnic Idah, Kogi State Nigeria;
[2]Department of Geography,Ibrahim Badamasi Babangida Univesity Lapai, Niger State.
[3]Department of Architectural Technology, Federal Polytechnic Idah, Kogi State Nigeria.

Accepted May 13, 2013

In the history of human development and advancement, water has always played a key role. Within the realm socio-economic development, Water stands out as a critical need, such that over the years it has become a major factor in the location of human activities. The aim of this study is to examine the dimensions of water accessibility by households in the eastern part of Kogi State. The methods of data collection relied on secondary and primary sources. It involved the use of structured questionnaire to elicit information from households. In addition, revenue and expenditure on water infrastructure was analysed. The level of accessibility was assessed in the framework of World Health Organisation's (WHO) accessibility indicators. The result revealed that, eastern Kogi state is experiencing water crisis. The Major source water supply to households is traditional and unprotected water sources. Based on the WHO's standard households water access was classified into basic – no access level. The emerging dimensions in distance, time and money translating to a mean distance travel of 513meters daily; 65minutes and N145 respectively. Also it was discovered that neglect in general infrastructure provision and particularly water by government have worsen the challenge. Based on the findings, recommendations were made. One of such recommendations is the need to factor in some distributive guidelines in terms of percentage allocation to infrastructure development in general and sector specific allocation like water.

Keyword: Accessibility, Household, Nigeria, Water, Eastern Kogi State.

INTRODUCTION

Adequate and safe water supply is one of the basic services, which influences economic progress of human settlements and the health of the dwellers. Although household water demands constitute the least water use in the world, which is about 6% (Cunningham and Cunningham 2004), it is however, a use that has no clearly defined substitute. It is thus a critical demand that is not negotiable. This is because domestic water use, including drinking, cooking, washing and general sanitation entails a number of health implications. In many parts of Africa, domestic water supply is mainly an inter play of different traditional water supply sources; which often poses challenges to Households as supply is affected by such factors like income, household size and to a lesser extent distance. The impact of inadequacy, manifest strongly on households in terms of time and distance taken to obtain water.

According to Adeyemo (1989), adequate access to social welfare services, including potable water supply, is a strong index of development. Access to water connotes physical availability. It lays credence on the extent to which factors like distance, time and cost have decayed. Measuring access to water therefore, transcends just 'physical' accessibility. It includes cost (direct and indirect) borne by people in their quest for water. Optimum accessibility in the case of water therefore must be related to effectively over coming factors like distance, time and cost as well as an understanding of the economic implications of these variables.

A 2005 Millennium Development Goals (MDGs) project task force national survey on water and sanitation using different assessment ranked Nigeria among

*Corresponding Author E-mail: davidsonalaci@yahoo.co.uk

countries having moderate water access and where progress is also moderate. The report also revealed that, the performance in the sanitation sector was even worse. Accordingly, Nigeria was classified within the circle of nations making low progress and having low access (AWDR 2006). From the foregoing, it is obvious that a disaggregated data will reveal greater and a more widespread disparities both in quality and quantity as well as spatial and temporal variation in accessibility.

According to the National Population Commission (NPC) census and housing survey report published in 2009, only about 7% of households in Kogi state have access to pipe-borne water supply. This figure includes those who access water from public stand pipes and or the benevolence of kind neighbours. The same survey also shows that 14% of households obtain water from vendors; 35% from rivers and streams and 27% from wells. The emerging scenario is that majority represented by at least 90% of households in Kogi state obtain water from pollution prone sources. According to the African Development Water Report (AWDR,2006) the percentage of households in Kogi state relying on vendor services for water supply is about 4.5%, a figure higher than the national average of 1.8% and is ranked sixth in Nigeria, while the fifth state has 5.1% of household sourcing water from vendors; the seventh is a distant 0.9% households exemplifying wide disparity, further more households with access to piped water is only 8.5%, again lower than the national average of 9.4%; perhaps if dry pipes are discounted a lower percentage might emerge. The 70.1% of households relying on non - potable sources including unprotected dug well; vendor and pond (AWDR 2006), only further strengthened the NPC survey of 2006.In fact, compared to the national total only 1.43% and 1.39% of households in Kogi State have access to pipe water supply inside dwelling and outside dwelling respectively. The settlement Geography of the study area appears to have hampered the circumstances of water accessibility. This is because eastern Kogi state is made up of predominantly rural settlements, with few small and medium sized urban towns. Nigeria's, rural water coverage lags behind both urban and national coverage.

Against this background on water, water related problems are likely to abound in the study area. The crisis is further made complex as the, the poor suffer greater hardship from lack of access to services. The poor for example may suffer ill health that results from the consumption water of poor quality. While it is possible to demonstrate emotional indignation to water crisis face by households, such indignation may not only be momentary but, often results in unplanned intervention by politicians and policy makers. Consequently, designed interventions are not sustainable. This paper contends that domestic water crisis would attract better policy attention and sustainable intervention if the true cost of inaccessibility can be reduced or measured in economic or monetary terms. Disease occurrence resulting from the consumption of water of poor quality has economic impact that can be quantified economically. Diarrhoea, for example, which results from poor sanitary/hygienic habits and consumptions of water of poor quality, is the second main cause of infant mortality after malaria (FGN, 2004).These and several cross cutting issues attest to the need to examine the situation of accessibility within the ambit of economic dimensions of water inaccessibility in Nigeria. This study, therefore, is aimed at demonstrating the monetary or quantitative dimension of household water inaccessibility in Nigeria using the eastern Kogi state as a microcosm of the country.

Study Objectives

1. Provide a catalogue of water accessibility in the area.
2. Examine the implication of access within the existing systems on households.
3. Evaluate the efforts of Government as an actor in water infrastructure provision.

HYPOTHESES

The study is premised on two basic assumptions that
1. Per capita water vary significantly from given standards (national and international)
2. Determinants of accessibility (distance, income and household size) positively influence access.

LITERATURE REVIEW

The United Nations Millennium Declaration confirmed the central role of water and sanitation in sustainable development and the major contribution that expanded access to safe drinking water and adequate sanitation can make to poverty alleviation World Health Organization (WHO) 2004. Water infrastructure stands out of all infrastructures (Physical and Social) as critical to the attainment of the MDGs. This is because beside goal number 7 and target 10 which are specifically water based, issues addressed by goals 1-7, in general, directly or indirectly relate to water availability". Therefore, meeting the water needs of Nigerians would be scores of ladder closer to attaining the overall MDGs. According to the African Water Development Report (AWDR 2006), in Africa, poor access to water and the attendant water scarcity affect women and girls disproportionately, the situation is worse in rural areas due to institutional and cultural barriers, including those of disparities in rights, decision-making power, tasks and responsibilities over water for productive and domestic activities.

Infectious diarrhoea is mainly responsible for the

Table .1 Benefits of access to water supply

Beneficiary	Direct economic benefits of avoiding diarrheal disease	Indirect economic benefits related to health improvement	Non-health benefits Related to water
Health sector	- Less expenditure on treatment of iarrheal disease	-Value of less health workers falling sick with diarrhea	-More efficiently managed water resources & effects on vector bionomic
Patients	-Less expenditure on treatment of diarrheal disease and related costs; - Less expenditure on transport in seeking treatment -Less time lost due to treatment seeking	-Value of avoided days lost at work or at school - Value of avoided time lost of parent/caretaker of sick children - Value of loss of death avoided	- More efficiently managed water resources and effects on vector bionomics
Consumers			- Time savings related to water collection or accessing sanitary facilities - Labor-saving devices in household -Switch away from more expensive water sources - Property value rise - Leisure activities and non-use value
Agriculture and industrial sectors	- Less expenditure on treatment of employees with diarrheal disease	-Less impact on productivity of ill health of workers	-Benefits to agriculture and industry of improved water supply, more efficient management of water resources – timesaving or income generating technologies and land use Changes

Source: *WHO 2004*

burden caused by water-borne and water-washed diseases. From the health perspective, improving access to safe water supply and sanitation services is a preventive intervention, whose main outcome is a reduction in the number of episodes of diarrhoea and accordingly a proportionate reduction in the number of deaths. Consequently, water and sanitation constitute one of the primary drives of public health. As summarised on Table 1, the benefits of access to water in socioeconomic development is obvious, making access to water and sanitation a major factor of human well-being.

The benefit of access to water supply is monumental. As shown in table 1, the benefits cut across health to general socio – economic issues. The realization of these and several other actual and potential benefits of water are hinged on an accessible water infrastructure.

The notion of accessibility will be the prime framework for the study appraisal. Understanding the most excellent location, characterize accessibility discuss and it is probably the most complex task facing those concerned with the provision of social service facility, (Knox, 1979). According to Adeyemo et al (2006), accessibility is the balance between the demand for and the supply of consumer services over a geographic space and narrowing or bridging the gap between geographic spaces is the all significance of transport. Access to vital resources and services has come to be recognized as positively related to development such that inaccessibility or lack of access is cited as lack of development or symptom of underdevelopment (Ayeni 1987). To the extent that, improved access to essential services has become an accepted part of the rubrics or measure of development and standard of living. Accessibility therefore establishes the extent to which factors like distance, time and cost have shrunk.

The World Bank defines access to safe water, as the share of the inhabitants with reasonable access to an ample quantity of safe water. Safe water includes treated surface water and untreated but uncontaminated water; water for ingestion, basic personal and domestic hygiene and cooking; excluding water for clothes washing e.t.c. An improved drinking water source is defined as a type of drinking water facility or water delivery point that by the nature of its design protects the drinking water source from external contamination, (WHO/UNICEF, 2009). In urban areas the water source may be a public fountain or a stand pipe not more than 200meters away. An adequate amount of water is that which is needed to satisfy metabolic, hygienic and domestic requirements usually about, at least 20 liters of safe water per person per day (UN-HABITAT 2003; World Bank 1997 in Meseret 2008). This minimum quantity, however, vary depending on whether it's an urban location or rural and whether warm or hot climate. Perhaps this is why the AWDR (2006), described basic water need of human beings to be 20 to 50 litres of uncontaminated water daily. The basic indicators for measuring water

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

Travel distance to collect Water	(WHO) Standard	Average Time spent to collect water	(WHO) Standard
Water supplied Through multiple taps continuously	(optimal access)	Water supplied through multiple taps Continuously	Optimum access
<100 m	one tap on plot or within 100m (Intermediate access)	Within 5 minute	Intermediate access.
101-200m	Between 100 and 1000m	5-30 minute	Basic access
201-500m	(Basic access)	30 minute-2hours	
500m – 1000		2-4hours	
1.1-2km(1.5km)	More than 1000m	>4 hours	No access
>2km(3km)	(No access)		

Source: WHO, (2004)

accessibility according to the WHO revolve around distance and time indices. These indicators show 4 paramount levels of accessibility; No access, for the worst scenario; Basic access; Intermediate access and Optimal access all on the basis of Time and Distance.

The indicators as shown in table 2 would be a major basis for interpreting and assessing the level of water accessibility in the study area. Realistic measure of water accessibility is that which captures the three key indicators of, distance and time.

STUDY AREA

The study area is the eastern half of Kogi state. It is located between Latitude $6^{O}31^{1}$ and 8^{O} 00^{1} and Longitude $6^{O}30^{1}$ and $7^{O}50^{1}$, South of River Benue and of the east of the Niger below the confluence. According to the 2006 National Population Census, the population of the study area is one million four hundred and eighty five thousand, twenty six (1,485,026) people, divided into (9) nine local government areas of Ankpa, Bassa, Dekina, Ibaji Idah, Igalamela/Odolu, Ofu, Olamaaboro and Omala. The area is peopled dominantly by the Igala ethnic group occupying eight of the nine local government areas. Bassa the ninth local government area is occupied by the Bassa-Komu; Bassa-nge and Igbirra-mozum ethnic nationalities, culturally different from the Igalas (Figure 1)

METHODOLOGY

The data for this study was derived from secondary and primary sources. Primary data involved household survey using structured questionnaires. Four of the nine Local Government Areas were selected for secondary data collection, and two of the four were the focus of household survey. The household survey principally focused on Sources of household water supply, extent of water inaccessibility and coping or adjustment strategies. Secondary data collected included revenue of government as well as expenditure on infrastructure. The choice of the study areas and sampling frame was purposive given resource limitations. Household survey involving questionnaire administration was carried out in Bassa and Dekina Local Government Areas and secondary data coverage extended to Ofu and Igalamela Local Government Areas.

A combination of random; stratified and clustered sampling techniques were employed in questionnaire administration. Questionnaire was administered across eight localities in each of the two Local Government Areas. The choice of localities was influenced by population size and distance from each other. Care was taken to ensure spatial spread and avoid duplications both in the choice of localities and responses. With the aid of topographical map, localities sampled were made to maintain at least five kilometers distance apart. While all localities with less than 300 people were not considered. The number of questionnaires administered per locality in Bassa range between fifteen and Twenty five, While for Dekina it was between twenty and ninety five per locality. Disparity in number of household heads and the consistency of locality number is to take care of the contradiction of Dekina LGA having higher population, yet Bassa LGA has more localities. The 2006 National Population Census put the population of Bassa Local Government Area at 139,993 people spread across 313 localities, while Dekina Local Government Area, with the total population of 260,312 is spread across 259 localities (National Population Commission office Lokoja).

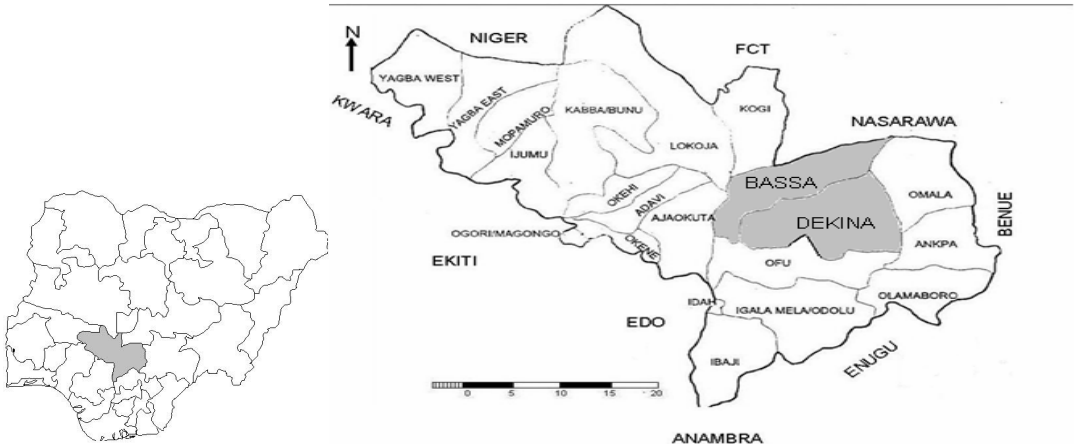

Figure 1. GEOGRAPHICAL SETTING OF THE STUDY AREA

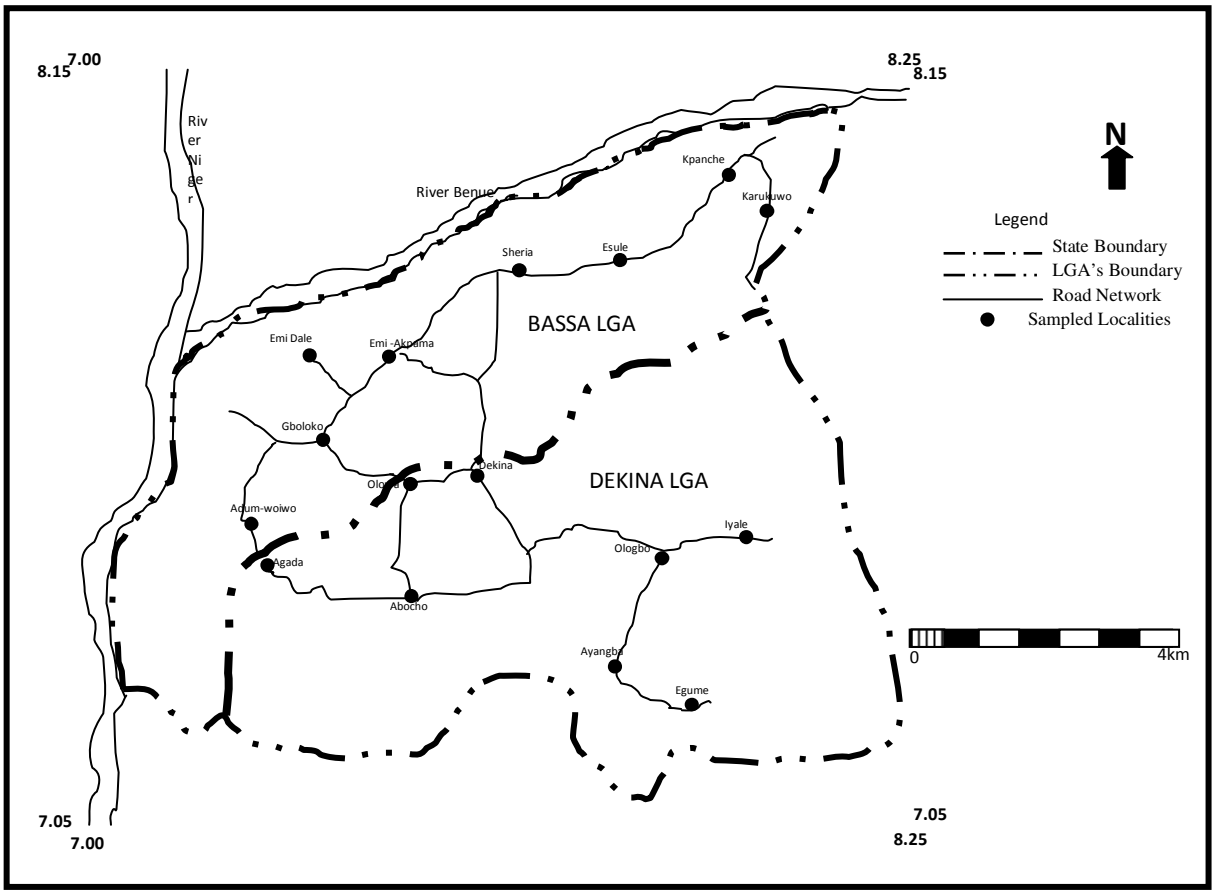

Figure 2. Location of Sampled Localities; **source**: *GIS LAB, KSU*

The over-all household coverage is four hundred and ninety five households (Figure 2)

Data presentation and analysis uses both qualitative and quantitative approaches. Tables and graphs are employed specifically for the presentation, while analysis uses frequency count, proportions and averages/mean as basis for qualitative discussion, analysis are carried out within the frame of water accessibility indicators.

Hypothesis test used the student t test and multiple linear regression. The regression analysis was carried out within the environment of Statistical Package for Social Sciences (SPSS) analysis. Student t-test is a

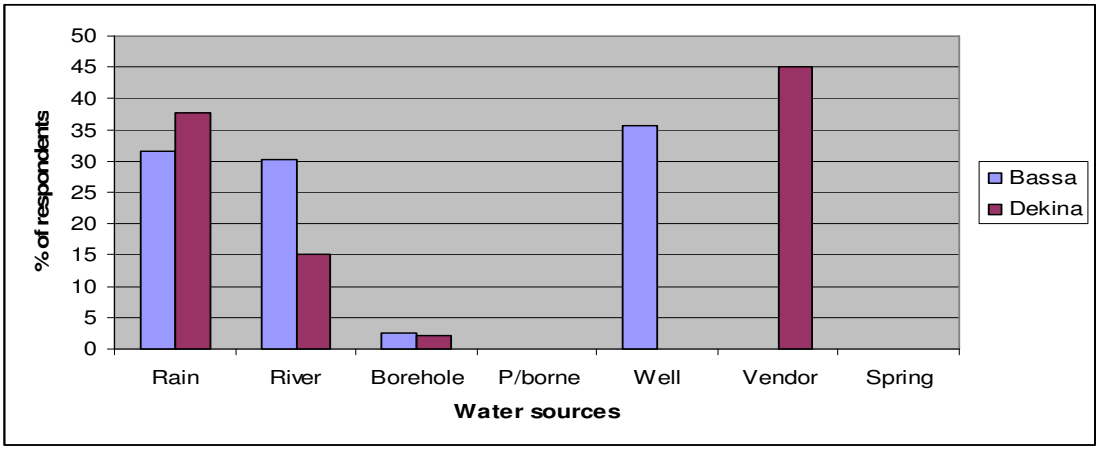

Figure 3. Water supply sources used by Households in the study area
Source: *Author's field survey, 2010.*

parametric test statistics for testing hypothesis when data are in ratio or interval. The regression analysis is relied upon to bring out role of various factors like household size and income on quantity of water accessible by households in the study area. Regression analysis is useful in cases where the occurrence of an event Y may be explained by a number of factors. (Eno, 2001)

RESULT AND DISCUSSION

Domestic water supply is mainly interplay of dissimilar but predominantly traditional supply sources. Currently, the infrastructure for water supply is composed of stream, rain, wells, and borehole water. These are accessible to households at different degrees. Basically, people use both piped and non-piped (traditional well and streams) as source of water supply. The major sources of water supply are shown on figure3.

In the study area, water supply in the form of water sale, using motorised water tankers and rain are the major sources available for households. The results of the field survey shows that 31.76percent and 35.88 percent of the surveyed households rely on water vendors and rain respectively for their supplies. The vendors actually operate large water tankers delivering various quantities to different households. The percentage of households relying on river sources is about 20 percent of the sample.

Three sources (vendor, rain and river/steam) account for over 85percent of water sources to households in the sampled population. Rivers/streams are largely unprotected; they are also source for the vendor supplies. The remaining gap is filled up with sources such as well and bore hole. Well Water is only 10.49percent. Bore hole is the least important water source in the study area. Only 2.25percent of the sampled households have access to borehole; a measure of the absence of modern water infrastructure.

These principal sources of water supply in the study area are plagued with many problems, which reduce their utility. Observation shows that traditional sources like rivers and wells are prone to pollution because of their unprotected nature. Weather vagary is the major limitation of rain as a reliable domestic source. Rivers fluctuate depending on the vagary of weather, for example at the peak of rainy season in September; rivers are characterized with bank full discharges, with many streams, rivers and rivulets coming alive. At the peak of dry season in March/April several of such streams, rivulets and become dry valleys. In addition, streams and rivers also suffer limitations in terms of distance that needed to be traversed. Beside transportation being wholly human labour, during the dry season a more precarious situation tends to obtain as distance to rivers may double or even triple. Distances therefore dictate the quantity that can be brought home. The practice of motorized water vendor service is exclusive of Dekina Local Government Area where it accounts for nearly 46percent of household water supply. Vendor supply services rely on the available river sources in the community. Constraints such as pollution are therefore inherent. This is in addition to cost as operators are profit oriented by nature. The emerging scenario depicts a poor water access situation.

Considering the actual and potential benefits of improved water accessibility, how people obtain water especially drinking water has a direct impact both on health and on their economic status. Households relying on remote and unprotected sources can have a jeopardized health situation arising from using contaminated water pollution. In addition, the quantity of water obtained is most likely to be too little, capable of compromising appropriate sanitation and personal hygiene, carrying out bathing, laundry and similar activities at source notwithstanding. It then means that if

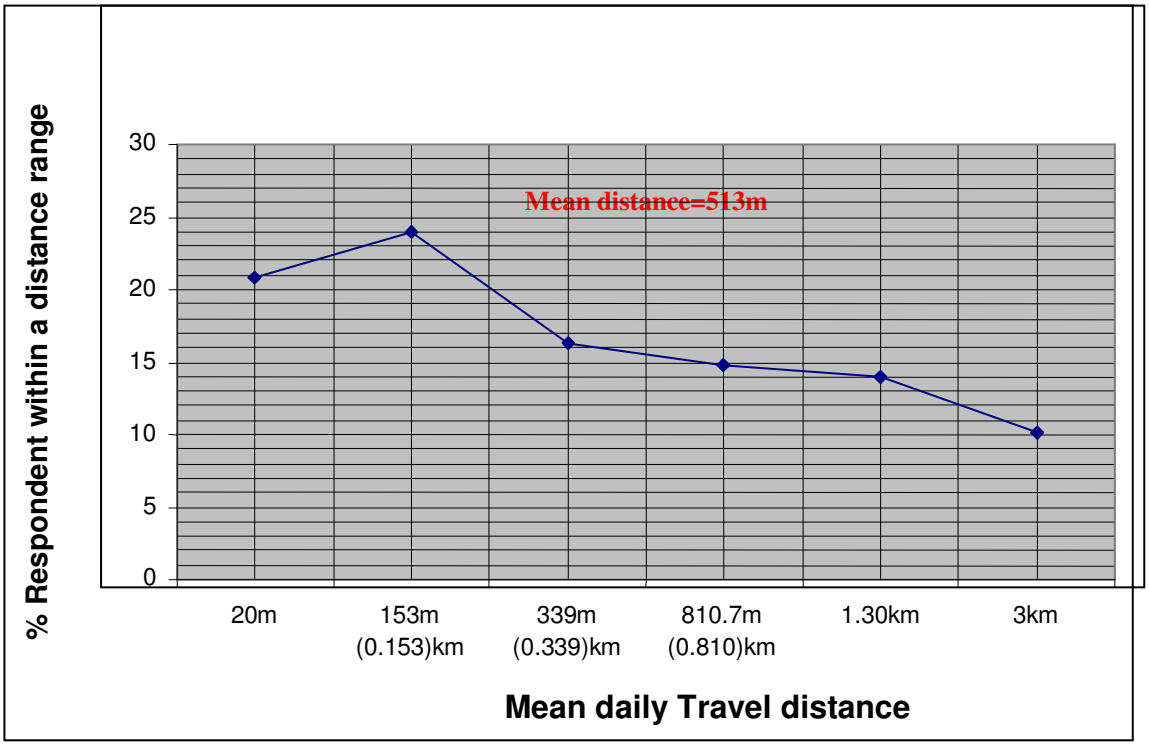

Figure 4. Water inaccessibility, implication of Distance Travel
Source: *Author's field survey (Measured against WHO 2004 Standards)*

household have access to improved water sources, such as a protected spring or well within a reasonable walking distance, it has the propensity of providing substantial health benefits. However, efficient hygiene may still be compromised as water may be contaminated either in transit or and in storage. Optimum access involving water being available at home either through a yard or house Tap connection, for example, is an assurance for appropriate hygienic manners and water quality the maintenance becomes easier.

A Major improvement in household health is therefore expected to usually accompany the availability and use of piped water at home. Correspondingly, the time saved in not having to collect water may also contribute appreciably to improvements in domestic economies. This is a truism when resources such as time and distance are analyzed with some uncomplicated fiscal description.

The water crisis: addressing market failure through fiscal description.

The attempt here is to offer explanation in terms of fiscal implication of water inaccessibility. A common knowledge is that access to water affects households in many fronts; time and energy for example, because of long travel distance, time spent in hunting or even waiting for water, money and indeed energy. But how much does it really cost in terms of time, money, distance, and quantity etc, based on the field appraisal its gravity is expounded using data from the graph that follows; which is derived from information provided by respondents.

From the perspective of distance, the average travel by households is 513 meters daily. This means travelling for 3.5 kilometres per week, 14 kilometres per month and 172 kilometres per year. It also means that average households have no access based on the WHO standard. A disaggregated data as shown on figure 4 above shows that the distances travelled generally vary from a low of 6.7 kilometres yearly (20meters daily) for household with intermediate access level to a high of 1008 kilometres, made up of households who technically have no access and who travel averagely above 2kilometers daily. The energy used in travelling through this distance amount to losses in productive cycles, this is one of the many fronts where improved access to water can be a reliable instrument in the war against poverty (Figure 5)

The average time spent by an average household is 65 minutes per day, 455 minutes (8 hours) per week, 1820minutes (30 hours and 33 minutes) per month and 21840 minutes (364 hours) yearly to fetch water. By implication this is what is actually lost due to the present water situation. It shows that a household loses so much on a daily basis due to amount of time spent either in search of or to fetch water. In monetary terms, if a household head works for 7 hours as a daily labourer and

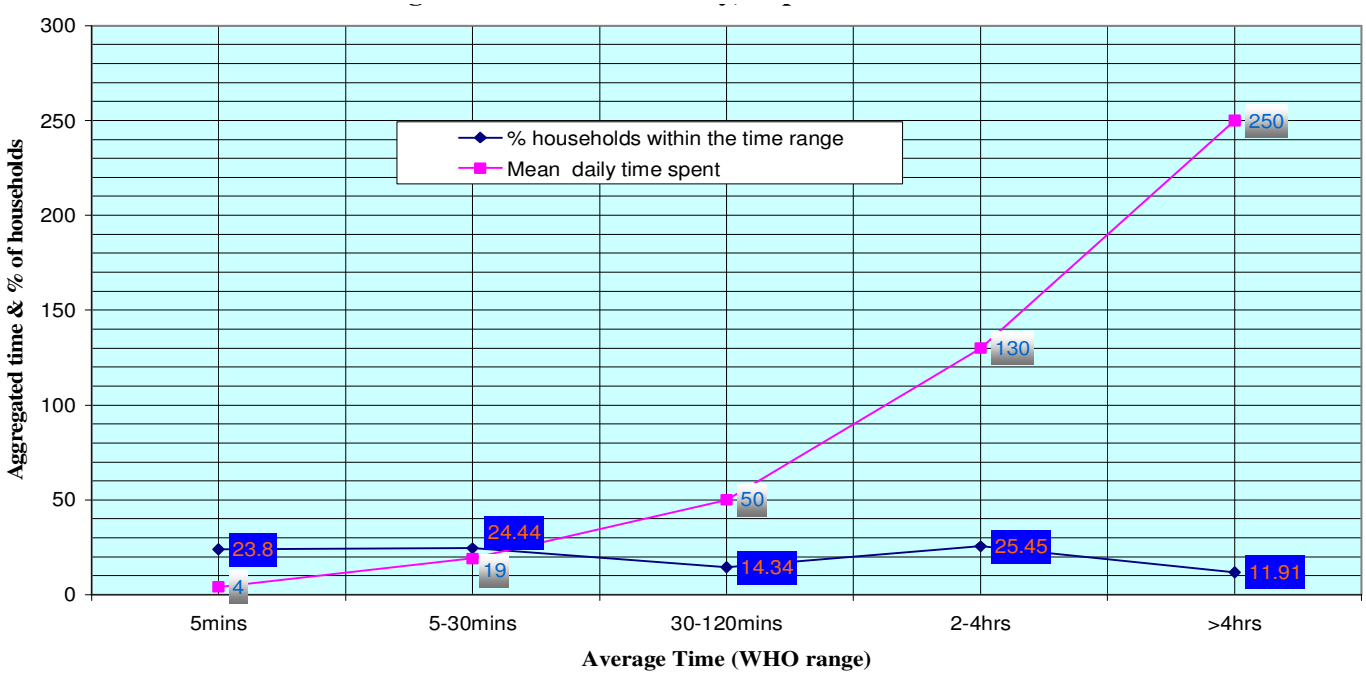

Figure 5. Water inaccessibility, implication of Time
Source: *Author's field survey (Measured against WHO 2004 Standards)*

Table 3. Accessibility Indicators Regression Table

Variable	Quantity	HHSize	Income	Distance
Quantity(dependent)	1.0	0.70	0.66	-0.11
HHSize(independent)	0.70	1.0	0.20	-0.44
Income(independent)	0.66	0.20	1.0	-0.12
Distance(independent)	-0.11	-0.44	-0.12	1.0

Source. Derived from the SPSS Regression output

earns 1000 Naira; the household loses at least 145 Naira, 24Kobo per day, 1016Naira, 68Kobo per week, 4066Naira, 72Kobo per month and 48,800Naira, 64Kobo annually. The time frame of 4 minutes, the least by households in the study area is equal to intermediate access level and this is about 23.8 percent of sampled households. On the other hand, as many over 36 percent of household are within 2-4hours time range, implying a no access situation. In this regard it is obvious that combating poverty should start in the water front, by first combating the poverty of water. Given the grave implication of inaccessibility as illustrated, an exciting analysis would be a further statistical analysis. This is the focus of the next section.

Testing of Hypotheses

Hypothesis

The hypotheses formulated for the study are:-

1. Determinants of accessibility (distance, income and household size) positively influence access.
2. Per capita water accessible vary significantly within and against given standard (international)

Hypotheses are tested using the multiple linear regression and student t test statistics.

Relationship of Accessibility Indicators

The relationship and impact of water accessibility indicators on household water supply in eastern Kogi state is shown on Table 3

In order to understand the relationship between accessibility indicators, an initial correlation analysis was carried out. Result obtained indicated that Quantity of water is strongly correlated with household size and it is significant (r= 0.001). This shows that quantity of water accessible by households in the study area is highly related to the size of the household. This is consistent with an earlier study by Ogbonna (1997), noting that,

increase water demand is closely related to population increase. Domestic water uses such as bathing, drinking, personal sanitation among others are uses that are tied to individuals; consequently, the size of the household plays is a significant factor in household water usage. This finding is also consistent with findings of Tadesse (2001) and Meseret (2008), which observed that, larger household tend to have less quantity of water. The reasons advanced include those of distances and cost which reduces quantity with increase in the unit of the variables. Therefore, the higher the size of a household, the more the domestic water need and thus, should be factored in any domestic water supply provision.

In the earlier section, correlation (Pearson product moment) was used to examine the interrelationship between household water and accessibility indicators or factors. However, correlation analysis cannot and do not adequately explain cause – effect relationship, (Drapper and Smith 1984, Johnstone 1984 and Norticliffe 1977). Hence multiple regression (Stepwise model was employed for a more expository consideration of the causal-effect relationship. In this method, the dependent variable (Y= water) was regressed with the 3 explanatory or independent or predictor variables.

The result of the stepwise multiple regression was used to further explore the relative contribution of each individual predictor variable to the explanation of the dependent variable. Result of the regression in Table 3 shows that only 2 variables were extracted or entered into the selection, out of a total of three variables considered. The selected variables are household size and income. These variables accounted for a high proportion of the explained variance 69.86%. However household size alone accounted for 42% of total predictor contribution. This emphasizes the importance of household size as a determinant or indicator of quantity of water available to households in the study area. The second variable, income accounted for 27.83%, thus becoming an important influence on household water accessibility in the area.

From the summary of regression results, the predictive or explanatory model can be developed. The regression model for the quantity of water is of the form Y = 16.639+0.598HHS+0.547INC, *where Y is the predicted quantity of water, HHS is the household size and INC is income.*

The value 16.6 is the quantity value of the regression slope, which indicates the rate of change in Y because of changes in X represented as household size and income. Therefore, the null hypothesis; that, determinants of accessibility (distance, income and household size) do not significantly influence access to water is rejected. As a result the alternate hypothesis, determinants of accessibility (distance, income and household size) positively influence access to water is hereby upheld although only to the extent of household size and income. Furthermore, the second null hypothesis; ' there is no significant difference in per capita water accessibility within the study area'. The value of the student t test calculated is 0.830 while the table value is 2.228.The implication is that, there is no significant difference in quantity of water accessible by households across the study area. For the difference to be significant the value of t calculated should be equal to or greater than 2.228. This is a further confirmation that water needs and by extension water problems across the study area replicates. However, the 21litres per capita in the study area compares poorly with the WHO/international minimum water survival standard of 45litres per capita. The conclusion thereof is that household water accessibility in eastern Kogi state is poor; comparing poorly with international standard.

RECOMMENDATIONS

The first step is for a review of both the water and financial allocation policies of the federal government. This is because of the need to factor in some distributive guidelines in terms of percentage allocation to infrastructure development in general and sector specific allocation like water. Following the heels of policy review, is the urgent need for government to create a water department at the local government level, similar to what obtains currently at the state level. The department which should solely be in charge of water provision should be headed by an executive secretary and be made accountable to the parliament both at the council level and also at the state level. The water department should be jointly funded by the federal, state and local government. This is similar to the way education department of local government councils in the country are funded. This will improve policy implementation as the water policy document contains clear cost sharing formula for water investment. This will go a long way in addressing the present situation of water supply as catalogue in this paper, which is mainly from unprotected, unreliable and unsustainable sources. The need for a mega water supply project in the area is urgent as this will reduce/alleviate the existing challenges of water access that has been expressed in quantities in this paper.

REFERENCES

Adeyemo AM (1989). 'spatial variation in accessibility to secondary school facilities in Oyo State' Unpublished PhD thesis, Geography Department university of Ibadan – Nigeria

Adeyemo AM, Afolabi SB (2006). "Inequality in the service provision between the coastal and hinterland areas in the Niger Delta region; *B*eing a paper presented at the *47th annual Conference of Association of Nigerian Geographers* held at the University of PortHarcourt.

AWDR (2006). African Water Development Report; UN Water/Africa Economic Commission for Africa www.unwaterafricauneca.org

Ayeni B (1987). "Access, Equity and Efficiency in the location of rural

public services" in E.E Okpara and G.A Wigwe (eds) Resource Mobilization for Rural Development (BooK of Abstract).School of Environmental Studies Imo State University, Okigwe.
Cunningham WP, Cunningham MA (2004). *Principles of Environmental Science: inquiring and applications* McGraw. Hill Higher Education
FGN (2004). Draft National Water-Sanitation Policy; The Federal Ministry of Water Resources, September
Knox PL (1979). *"The accessibility of primary care to urban patients: A geographical analysis"* in Journal of the Royal College of General Practitioners March 1979, 160-168.
Meseret A (2008). 'Analysis of Household Water Access in Dessie City, Amhara Regional State of Ethiopia'; Unpublished M.A thesis, Urban Management Masters Program, Ethiopian Civil Service College Addis Ababa
Ogobonna DO (1999). *Water issues in the context of resource development in the semi arid region of Nigeria* in M.M. Daura (ed) Issues in Environmental monitoring in Nigeria, Nigeria, Nigerian Geographical Association pp183 -190
UN-Water (2009). Global Assessment of Sanitation and Drinking Water (GLAAS) WHO/UNICEF http://www.who.int/water_sanitation_health/glaas/en/
WHO (2004). Water sanitation and Health (WSH), water, sanitation and hygiene links to health, Facts and figures.