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Assessment of Water Service Delivery for Domestic Purposes in Agenebode Metorpolis of Edo State, Nigeria

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ABSTRACT

High cost and epileptic supply of water resources constitute a very serious problem to ten quarters that make up Agenebode metropolis in Nigeria. Therefore, this study tries to determine the present situation of water supply including the sources and limitations towards the provision of adequate water supply with a view to proffer solution for better water supply in the area. To achieve these, a total of 150 questionnaires were administered randomly to the respondents and oral interview coupled with detailed field observation and investigation of the area. Results obtained from the analyzed data show that the total volume of water supply for the period of study is 21639.9m^3 with average volume of 541m^3 per month. The highest total volumes and percentage value of water supply were recorded at Osomhegbe quarter with the value of 2737m^3 and 12.8% whereas Portu recorded the least value of 1557m^3 and 7.2%. Furthermore, the overall analysis indicated that water consumption per person per day is 0.011m^3. In comparison with the minimum standard volumes of 0.020m^3 and total of 0.035 m^3 for water requirements for domestic purposes, the volumes of water supply in the area are below the requirements for domestic consumptions. Based on the findings, it is recommended that Government in partnership with donor agencies should develop water supply projects from a nearby river Niger if the volumes are sustainable to meet the present water need of the people. It is also recommended that uncoordinated and uncontrolled sinking of boreholes be assessed in the area for necessary corrections.

Key words: *Water supply, Population, Quarters, Consumption, Standard.*

1. INRODUCTION

Water is vital for human survival, health and dignity and a fundamental resources for human development. Three basic needs influence the use and management of water resources: social, environmental and economic considerations. According to Ayoade, 1988; NEST, 1991) water forms the largest part of most living matter; Human beings can survive longer without food than without water. An average man is two-thirds water and would weigh only 13kg when completely without water (i.e. dry weight).

Also, ukpong (2006) stated that, water is a major constituent of all living matter and very essential to human being for sustenance of life on earth. It is very essential to plants and animals lives and can be considered as the most important raw materials for civilization. Food productions as well as other socio-economic activities depend on availability of water (Lawrence, 1997). Further more, he stated that the efficiency of food production is currently measured on the basis of a unit increase in the volume of production per unit volume of water. All human settlement services, provision of portable water are perhaps the most vital; every person depends on water for drinking, washing, waste disposal and other domestic needs. Water supply system must also meet requirement for public, commercial and industrial activities. These explain why, during drought, flood, earthquake or other emergencies, vigorous efforts must be made to maintain water supply.

Ogunnowo and Aderogba (2006) reported that the scarcity, the inadequacy and the poor supply of water in any community require urgent attention if the community must survive and develop. The total domestic water need in homes should be at least 115 litres per person per day (Ayoade and Oyebande, 1993).

The actual amount used may be greater depending on the ease and convenience of supply. According to World Health Organization (WHO), 75 litres of water per day is necessary to protect against household diseases and 50 litres a day is necessary for basic family needs. A report from 4th world water forum (March, 2006), indicates that a person living in an urban area, uses an average volume of 250 litres per day but individual consumption varies widely around the globe (THD, 2007).

WHO and UNICEF joint monitory program currently estimates that 1.1billion people (17% of the global population) lack access to water resources, where access is defined as the availability of at least 20 litres of water per person per day from any improved water sources within a distance of 1km (Bates et al, 2008). Growth in population, increased economic activity and improved standard of living lead to increased competition for, and conflict over, the limited water resources. In fact, a scarcity of water resources is one of the most pressing problems (Arms, 2008). Population grows the limited easily accessible water resources in rivers, lakes and shallow groundwater aquifer are

dwindling as a result of over exploitation and water quality degradation (IAEA, 2004). The United Nations (UN) predicts that by 2025, two-third of the world population will experience water scarcities, with severe lack of water blighting the lives of livelihood of 1.8 billion. According to UN world water assessment program, by 2025, 7 billion people in 60 countries may have to cope with water scarcity (Chenoweth, 2008).

Although Nigeria is known to be endowed with abundant water resources, the availability of potable water is a problem in many parts of the country (Onokerhoraye, 1995). The Nigerian Government has long considered the provision and management of water supply resources services to be the domain of the Federal, State and local Governments. However, the public sector has not been successful in meeting more than a small portion of the demand for residential and commercial water users as such services are critically short in supply (FRN, 2000).

Since 1999, a huge amount of public funds have been spent on provision and management of water in Nigeria. However, there is still shortage of potable water and many lack access to adequate water supply. In the past years, Federal Government attempted to develop water infra-structure like dams, but these were basically for irrigation purposes, with retarded progress because little attention was paid to water for domestic use. Government insists it cannot handle water supply all by itself for lack of funds, and have ceded its statutory role to shylock water producers, who do not know or care about safe water standards (Oghifo, 2008). A successive Nigerian government has been pursuing with vigour aggressive water supply programs and donor agencies have also been making their impact in the sector through expansion of water supply infrastructures. Despite these efforts the public are still disenchanted with poor utilization of existing capacities, due to under-maintenance and lack of funds for operation (FRN, 2000).

The supply of water for domestic purposes in Agenebode has a difficult problem. In dry seasons, young men, women and children spend most of their days in search of water. Some trek up to 12 kilometres to obtain water which is not sufficient in quantity for use and also is not wholesome in quality. Moreover, in spite of the fact that Agenebode is located downstream of River Niger, activities being carried out upstream of the river adversely affect water resources development and management in the area. The river water is highly polluted by human activities especially during the rainy season which make the water unsuitable for domestic activities in the area. There is an existence of River Basin (Benin-Owena River Basin Development Authority) in Agenebode which was established by Federal Government in 1974, to pump and distribute sufficient water to the residents of the area. But over many years now, it has not been working due to lack of funds for operation and maintenance. Therefore, it is very important to carryout research and studies on the availability and sustainability of water resources supply in the area so that appropriate plan will be made to meet with water supply requirement for individual purposes among others.

The objectives of the present study is to determine the present water supply situations for domestic purposes including the sources and possible limitations towards provision of adequate water supply in Agenebode metropolis with view to proffer solutions for better water supply in the area.

1.1. Description of the Study Area

The study was carried out in Agenebode metropolis. Agenebode is located approximately between latitude 5^0 14^1 and 7^0 05^1N and longitude 5^0 2^1 and 6^0 40^1 E (Fig.1). It is the headquarter of Etsako East Local Government of Edo State, Nigeria. It is situated in the Edo North senatorial zone. It is bordered to the North by Uzanu village, to the South by Emokweme, to the west by Ivhioghe village and to the East by the River Niger which serves as a common boundary between the people of Agenebode and the people of Idah in Kogi State. It covers a land mass approximately 103 square kilometers.

The mean temperature is generally between 25^0C and 30^0C (77^0F and 88^0F). Agenebode has semi-tropical vegetations, humid and sandy soil and is blessed with arable land for growing varieties of both cash and food crops such as yam, cassava, groundnut, rice, cocoayam, mango, cashew, plantain among others. The rearing of animals and fishery activities is carried out in the area. The population of Agenebode is approximately 12730 people (geonames-enacademic.com/830/agenebode). The people engage in a multiplicity of occupations such as farming (subsistence), fishing and trading. Among the above mentioned occupations, farming dominates all and is largely depended on the surface water because of the presence of River Niger.

2. METHODOLOGY

In the first place, a total of 150 questionnaires were administered to households in the ten (10) quarters that make up the area (15 questionnaires in each quarter). The quarters include upland, Osomhegbe, Ewea, Otoukwe, Okponobi, Hausa, Nupe, Egbadu, Ighaewo and Portu. The questionnaires were designed to seek the resident's view on the volume of daily water supply to them from different water supply sources and actual quantity demanded in the area. To ensure that people from all the social strata and income levels and groups were adequately and equally represented in the study, purposive sampling method was employed to select the respondents. Rainfall data were obtained from meteorological station in the area to compliment the study. This was also complimented by detailed field observation and investigation of the area, and oral interviews with some of the quarter Heads, workers and managers of the pure water producing companies (industries) of the area.

Secondly, touring the whole study area in search of data helped a lot in getting information on the present and past situation of water supply in the area. Various published and unpublished materials were used on the review of relevant literature and comparative purposes more especially those

that pertain to existing water supply in other developing countries.

3. RESULTS AND DISCUSSION

The results of the study are represented in Table 1. The summation of the volumes of water supply for the five months in the area is 21639.9m^3 and the total average volume per month is 541m^3 whereas the average volume per month 4327.98 m^3 (not shown in the Table).

The highest total volumes of water supply irrespective of the sources were recorded at Osomhegbe quarter with the value of 2737m^3. The total volumes for other quarters such as upland, Ighaewo, Ewea, Egbadu, Okponobi, Nupe, Portu and Hausa were 2472m^3, 2406.4m^3, 2232m^3, 2200m^3, 2046.5m^3, 1753m^3, 1558m^3, and 1557m^3 respectively as represented in Fig 2.

The reason for those quarters recording the least values is because of the poor water resources development in the area. While the little increase in water supply in other three quarters above is because of the effort of both public and private organizations. The total volume of water supply from each source for the period of the study varies from 0 to 724m^3, 0 to 349m^3, 254 to 1382m^3, and 116 to 699m^3 for rainfall, rivers, boreholes, and pure water vendors (Fig.3).

An improvement was noticed in the month of June from rainfall source. This was due to the present rainfall increase in the area, thus increasing the volume of water supply. Effective water resources management should give special consideration to the month of lowest supply and in those sources of high water supply. Furthermore, the total volume of water supply per source were observed to be 7240m^3, 1557.5m^3, 8899m^3, and 3943.4m^3 for rainfall, rivers, borehole, and pure water venture respectively as shown in Fig 4.

The overall analyses indicate that water consumption per person per day is 0.054m^3. In comparison with the standard provided for minimum water requirements of 0.021m^3 per person per day (Table.2), the volumes of water supply in the area are above minimum requirement but below the total water requirements of 0.135 m^3 per person per day for domestic purposes (Table 3).

4. CONCLUSION AND RECOMMENDATIONS

Data analysis and observations revealed that the month of June has the highest volume of water supply. The least supply was found in the month of May followed by the month of April. The reason for this variation was as a result of rainfall variation and accessibility to water resources location centres. Similarly, observations also indicate that Osomhegbe, Otoukwe and Egbadu quarters have the highest supply of water, although this could not meet with the standard requirements for consumption per person per day. Hausa and Nupe quarters have the least volume of water supply. Water supply sources are very scarce and located far away from most of the residents of the area. Boreholes are the major water supply sources in the area, probably due to high level of water table of the area.

Based on the findings, the following recommendations are suggested:

- Community leaders in collaboration with the individual waters users should ensure adequate maintenance and management of the existing boreholes in the area.
- Most importantly, various tiers of Government, in partnership with donor agencies should develop sustainable water supply project from River Niger. To achieve these, cost implications and volumes of water generated from the river as well as its adequacy and portability must be given special consideration.
- Uncoordinated and uncontrolled sinking of boreholes in the area should be investigated to determine its impact on the environment and groundwater regimes. Based on the data gotten, decision could be taken on whether to discourage or correct indiscriminate sinking of boreholes in the area.
- Additional study should be extended from October to March (dry season). This will make the study more comprehensive in finding out the critical period of water supply, and as well the basis for planning and designing of sustainable water supply project in the area.

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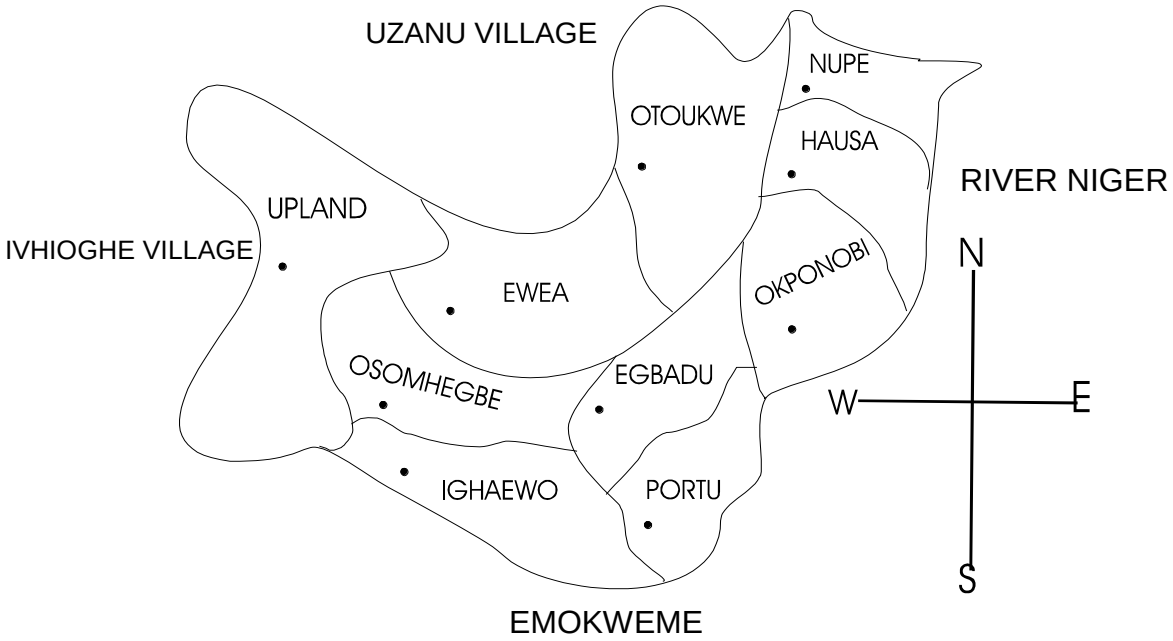

Source: Ministry of Land and Survey, Edo State, (2010)

Fig. 1: Map of Agenebode Showing the Various Quarters

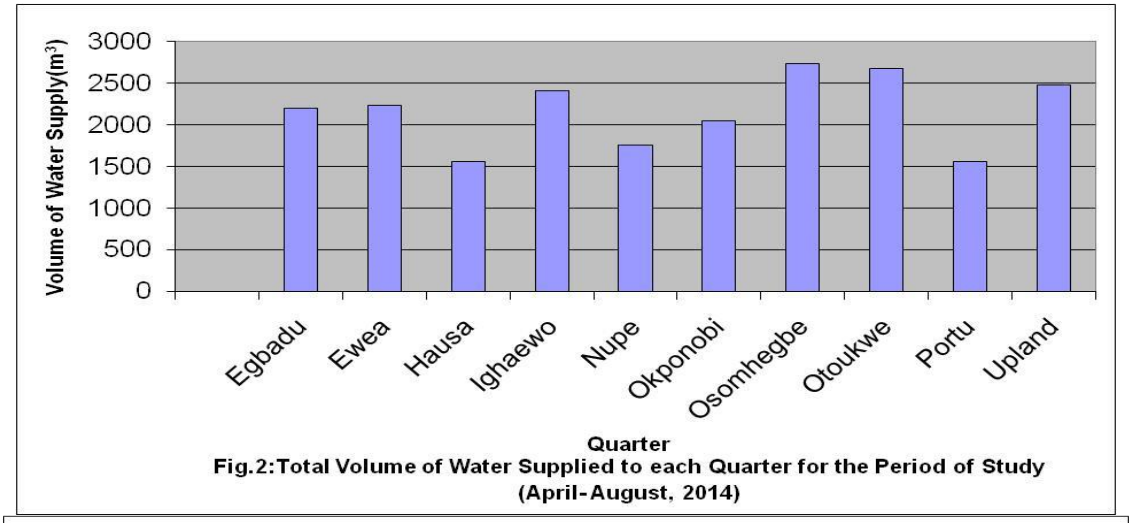

Fig.2:Total Volume of Water Supplied to each Quarter for the Period of Study (April-August, 2014)

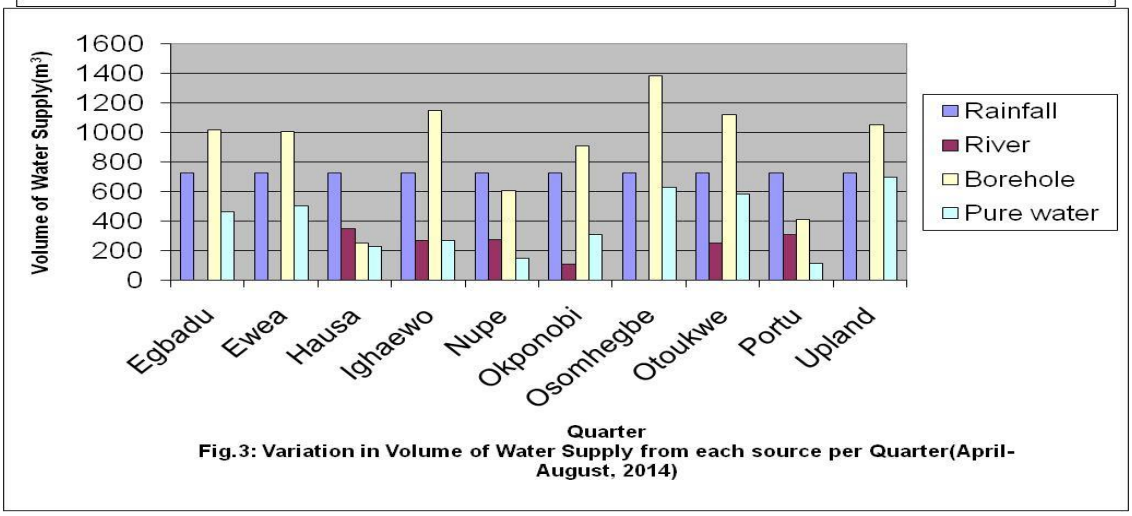

Fig.3: Variation in Volume of Water Supply from each source per Quarter(April-August, 2014)

Table 1: Estimated Total Volumes of Water Supply for the Period Of Study (April To August, 2014)

	Total Vol. Of Supply per Quarter						
Name of Quarter	Rainfall	River	Boreholes	Pure water	Summation	Average value of water supply	% vol. Of water supply
Egbadu	724	0	1015	461	2200	550	10.2
Ewea	724	0	1008	500	2232	558	10.3
Hausa	724	349	254	230	1557	389.25	7.2
Ighaewo	724	267	1148	267.4	2406.4	601.6	11.0
Nupe	724	274	608	147	1753	438.25	8.1
Okponobi	724	106	908.5	308	2046.5	511.63	9.5
Osomhegbe	724	0	1382	631	2737	684.25	12.7
Otoukwe	720	252.5	1117.5	584	2678	669.5	12.4
Portu	724	309	409	116	1558	389.5	7.2
Upland	724	0	1049	699	2472	618	11.4
Total	724	1557.5	8899	3943.4	21639.9	5409.98	100
Average total	724	155.75	889.9	394.34	2163.99	540.998	10

Sources: field work, 2014.

Table 2: Minimum Amount of Water Required Per Person per Day

Level of Allocation	Use	Amount (litres per person per day)	Amount(m^3 per person per day)
Minimum survival allocation (sustainable for only a few days)		**5 – 7**	**0.005-0.007**
	Drinking	3 – 4	0.003-0.004
	Food preparation and clean up	2 – 3	0.002-0.003
Medium term allocation(sustainable for a few months)		**15 – 20**	**0.015-0.020**
	Drinking	3 – 4	0.003-0.004
	Food preparation and clean up	2 – 3	0.002-0.003
	Personal hygiene	6 – 7	0.006-0.007
	Laundry	4 – 6	0.004-0.006

http: //www.searo.who.int/Link Files/List-of-Guidelines-for-Health-Emergency-Minimum-Water- quantity.pdf

Table 3: Water Requirements for Domestic Purposes

Description	Amount(Litres Per Head Per Day)	Amount (m^3 Per Head Per Day)
Bathing	55	0.055
Washing of clothes	20	0.020
Flushing of W.C	30	0.030
Washing of house	10	0.010
Washing of utensils	10	0.010
Cooking	5	0.005
Drinking	5	0.005
Total	135litres	0.135 m^3

Source: Punmia et al, (1995)