Socio – Economic Analysis of Pipe-Borne Water Supply in Mubi Metropolis of Adamawa State, Nigeria

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Abstract

The paper examined the trend of pipe- borne water supply as related to the population size in Mubi metropolis of Adamawa State, Nigeria. The main objective of the study is to determine how realizable is the vision 20, 2020 of public authorities in Nigeria In respect of water needs of people in Mubi metropolis .it was conducted with the aid of secondary data obtained from Adamawa State water board, Adamawa State Rural Water Supply and Environmental Sanitation Agency and Federal Office of Statistics in federal government secretariat, yola. The two variables examined are water supply (response variable) and population size (explanatory variables). Secondary data on the two variables were obtained for a period of ten years and were tested to determine the strength of linear relationship between the two. The outcome of the test enabled the author predict the conditions of water supply in Mubi metropolis for the period leading to the year 2020 using regression analysis as a tool. It was discovered that with political will and financials commitment, authorities in Mubi metropolis are capable of providing water that will meet the needs of Mubi residents in year 2020. As a guide to the authorities of the metropolis in achieving this objective, a combination of hard- path and soft-path approaches are recommended to resolve the water problems of the metropolis.

Keywords: water, population, vision, need, approach

Introduction

The growing awareness and consciousness on the part of authorities in Nigeria on the declining rate of water supply cannot be misplaced. The statistical data from the national and international bodies such as Population Action International, World Commissions on Dam, United Nations International Children and Education Funds and the Federal Office of Statistics is evident that all is not well within the water sector in Nigeria.

Studies conducted by the Federal Office of Statistics and UNICFF showed that as at 1999, only 54 percent of households in Nigeria obtained drinking water from safe sources. Unfortunately, with the rapid process of urbanization, the percentage would have reduced, one and a half decades after the conduct of the studies. The most pitiable of the chains of water related problems is that of health. The figure of Africans dying of water borne diseases is alarming and there are no evidences that the figure is reducing (Ogunleye, 2003).

In the words of Gleick (2003), cited in Adewusi (2011) the most serious unresolved water problem is the continued failure to meet basic human needs for water. More than billion people world wide lack access to safe drinking water; 2.4 billion people lack access to adequate sanitation services and the failure to satisfy basic water needs leads to hundred of millions of case of water related diseases; leading to between 2 million and 5 millions deaths annually (Gleick ,2003)

Unfortunately, rather than ameliorating the water supply problem, human activities are complicating it. Extolling the virtues of adequate water supply, Odum (2014) observed that catfish can be breeded in door in what is called circulation technique. Yet, this is possible in the conditions of uninterrupted water supply, devoid of contamination .Writing in the same vein, Iyatse (2014) lamented that Ugborodo community in Warri south local government area of Delta state is ringed by body of water , which provides ample opportunity for fishing, unfortunately', frequent crude oil spillage has made it impossible.

Growing awareness of these and other complex challenges led the United Nations General Assembly to declare 2003 the international year of freshwater. Among the millennium development goals adopted by the general assembly are new efforts aimed at reducing by half the proportion of people unable to reach or afford safe drinking water and adequate sanitation services by 2015.

The main objective of this study is to analyse the trend of pipe- borne water supply as related to the population size in Mubi metropolis of Adamawa State. Other specific objective is to determine if linear relationship does exist between water supply and population size in the metropolis. Besides, meeting the water needs of the people is one of the key objectives of the vision 20, 2020 of the federal government of Nigeria and the government of Adamawa State. The study, therefore, attempts to forecast the conditions of water supply in Mubi metropolis in years 2020. This enables us to conclude if the vision of the government is realizable or otherwise

Consequently, the study is focused to answer the following questions:

1. Does linear relationship exist between pipe-borne water supply and population size in Mubi metropolis of Adamawa State?
2. What will be the conditions of water supply in Mubi metropolis in years 2020?
3. How realizable is the vision 20, 2020 of public authorities in respect of pipe –borne water supply in Mubi metropolis?

Literature Review

This section examines the sources of water in mubi metropolis and presents options for water problem solution, notably the hard- path and soft-path approaches

Sources of Water Supply in Mubi Metropolis

The main source of pipe-borne water supply in the metropolis is a water treatment plant which is located on river Digil. The plant has a capacity of pumping (480m3) of water per hour. The channels of supply are two reservoirs which are strategically constructed at Tudun Wada and

Nassarawo areas of the metropolis. The capacity of the former is (1250m3) and that of the latter is (2500m3).At full capacity, the two reservoirs cannot satisfy 50% water demand by the residents of the metropolis. The result of the earlier study conducted in 2004 revealed that only 30% of the respondents are served water through this sources while 70% are not served. Worse still, the reservoirs have never operated at full capacity due to myriads of problems, prominent among which are epi leptic power supply, dearth of funds to buy diesel, lack of chemicals due to irregular supply from the headquarters, sedimentation of the dam in rainy season and poor pipe network(Adebayo et al ,2004). Under this condition, majority of the residents depends on sources of water other than pipe borne water network. Water supply is principally from borne holes and wells. If most of the bore holes are not functional due to mechanical problems, large numbers of the wells are not productive because they are shallow, seasonal and liable to contaminations. These factors combined together to complicate water problems in Mubi metropolis. Related to these peculiar sources of water are informal employments in water – related endeavours. These informal employments are evident in water hawking by water vendors and the management of privately owned bore holes and wells. Individuals that are engaged in these informal employments constitute significant proportion of the population in the metropolis.

Options for Water Problem Solution

There are hard – path and soft-path approach to water problem solution (Gleick,2003). The hard path approach to water problem solution relies on the construction of massive infrastructure in the form of Dams, aqueducts, pipelines and complex centralized treatment plants to meet human demands. This approach has its benefits as well as demerits. In terms of benefits, it reduces the incidences of water – related diseases, expands the generation of hydropower and irrigated agriculture and moderates the risks of devastating floods and drought. But, despite these benefits the hard-path approach has substantial, often unanticipated social, economic and environmental cost. For examples, there were cases of million of people being displaced from their home by water project over the past century. In short, the case of hard-path approach has been to identify and meet the growing human demands projections and the construction of tens of thousands of large facilities for storing, moving and treating water. Yet, these are fraught with uncertainty. Three possible basic features are: Exponential growth in water demand as population and economics grow, a slowing and ultimately a reversal of demand (Gleick 2003)

On the other hand, the soft –path approach is the one that continues to rely on carefully planned and managed centralized infrastructure but compliments it with small –scale decentralized facilities. The soft path for water strives to improve the productivity of water use rather than seek endless sources of new supply. It delivers water services and quantities matched to users need rather than just delivering quantities of water. It applies economics tools such as market and pricing, but with the goal of encouraging efficient use, equitable distribution of the resource, and sustainable system operation over time.

And it includes local communities in decisions about management, allocation and use (Gleick, 2003)

The Study Area

The study area covers Mubi Metropolis in Adamawa State, Nigeria Mubi Metropolis is bounded in the north by Michika Local Government Area; in the west by Hong Local Government Area; in the south by the maiha local government area and in the east by the republic of Cameroun (Adebayo et al, 2004). It has a population of 181,031 (2006 population census of federal republic of Nigeria). In the metropolis is located Mubi burnt bricks which requires uninterrupted water supply in order to meet customers demand. In the study area are four tertiary institutions including school of health technology; a federal Polytechnic; college of Agriculture and Adamawa State University, Mubi. The metropolis has a general hospital which provides higher order health services. In addition to these are health services provided by the private sector; prominent among which are New Life Maternity Hospital, Ubis Maternity Clinic and Misan Clinic. These Socio –economics development and many other accentuate the urgent need for uninterrupted water supply in Mubi Metropolis

Methodology of the Study

The economic blue print of public authorities in Nigeria seek to elevate Nigeria economy to the 20th position in the world in the year 2020. The public policy direction to achieve this objective is encapsulated in vision20, 2020. One of the objectives of vision20, 2020 is to meet the water need of the people at the federal, State and local levels. This study sought to determine how realizable is the vision in Mubi Metropolis of Adamawa State. The study was conducted with the aid of secondary data obtained from Adamawa State Water Board, Adamawa State Rural Water Supply and Environmental sanitation Agency and Federal office of statistics in federal Government Secretariat, Yola. The two variables examined by the study are water supply (response variable) and population size (explanatory variable). Secondary data on this variable for period of ten years were collected. the author tested the strength of linear relationship between the two variables in order to establish if the out come could be used to forecast water supply conditions for the years ahead. on the basis of the outcome, the author was able to predict the condition of water supply in Mubi metropolis up to the time scope of 2020. this facilitated the conclusion on how realizable is the vision 20, 2020 in respect of water supply in Mubi metropolis of Adamawa State.

Discussion and Findings (I)

Does liner relationship exist between water supply and population size in Mubi metropolis of Adamawa State?
To answer the question, we present the data obtained on the two variables as shown in the table below.

Table1: Water Supply and Population Size in Mubi Metropolis, Adamawa State, Nigeria (1999-2008)

Year	Water Supply (000m3)	Population Size (000People)
1999	**500**	**154**
2000	**575**	**158**
2001	**625**	**162**
2002	**430**	**165**
2003	**485**	**169**
2004	**390**	**173**
2005	**585**	**177**
2006	**625**	**181**
2007	**525**	**185**
2008	**590**	**189**

Source: Adamawa State Water Board, Yola and Federal Office of Statistics, government secretariat, Yola, Adamawa State.

If water supply (response variable) is denoted by Y and population size (explanatory variable) is demoted by X, the data in table 1 reveal that Y =533 while X= 171.3

Consequently, COV (Y, X) =$\frac{5294.8}{9}$ = 588

COR (Y, X) = $\frac{5294.8}{8558.4}$ = 0.619

The positive value of COR (Y, X), that is 0.619 is an indication that there is positive linear relationship between water supply and population size in Mubi metropolis of Adamawa State, Nigeria.

Discussion and Finding (II)

Regression analysis is an extension to correlation analysis which can be used to predict the value of one variable given the value of the other. The key objective of this study is to forecast the quantity of water supply y for years ahead, most especially for the year 2020, which is the terminal period of the vision 20, 2020. To achieve this objective, we compute the population size of Mubi metropolis up to the time scope of year 2020. This objective is achieved by using the official population growth rate of 2.29%. The projected population size is shown in table 2

Table 2: Projected Population Size of Mubi Metropolis in Adamawa State (2008-2020)

Years	Population size 000 people
2008	189
2009	193
2010	197
2011	202
2012	207
2013	212
2014	217
2015	222
2016	227
2017	232
2018	237
2019	242
2020	248

Source;- projected population size for Mubi metropolis based on official growth rate of 2.29%

Using Y and X to denote water supply and population size respectively, the relationship between the two variables is postulated as a liner model

$Y = \beta o + \beta_1 X + E$

Using this relationship, we can forecast water supply for Mubi metropolis of Adamawa State between 2014 and 2020

Consequently: water supply = $\beta o + \beta_1$. Population size

$\beta_1 = \frac{52,948}{1238.1} = 4.277$

$\beta o = \bar{Y} - \beta_1 \bar{X} = 533 - 4.277 \cdot 171.3 = -200$

Using the equation of the least squares regression line above, we can forecast the quantity of water supply in Mubi metropolis (2014-2020) as shown in table 3 below.

Table 3: Forecast for Water Supply in Mubi Metropolis (2014-2020)

Year	Projected population size "000" people	Forecast for water supply "000"$_{m3}$
2014	217	728
2015	222	749
2016	227	771
2017	232	792
2018	237	814
2019	242	835
2020	248	861

The data in the table reveal that if authorities are to meet water demand of the people in the metropolis by the year 2020 , water supply would have increased to 728000m in 2014.The quantity of water supply should grow steadily between 2.9 and 3% annually and rise to 861000$_{m3}$ in 2020.

Discussion and Finding (III)

How realizable is the vision? Meeting water need of the people in the metropolis by the year 2020 will depends largely on political will and financial commitment on the part of the authorities in the metropolis. The projected population size in the metropolis between 2014 and 2020 is derived based on official growth rate of 2.29% within the same period, forecast for water supply grows between 2.6% and 3.1%. With this statistics, it is safe to conclude that meeting the water needs of the people in the metropolis is not beyond the reach of the authorities.

Summary and Conclusion

The study reveals that water, which is an essential commodity, is in short supply in Mubi metropolis of Adamawa State, Nigeria at least from safe sources. The volume of pipe borne water supply from water treatment plant which is located on river Digil is not only inadequate, but could not get to residents of Mubi metropolis due to the myriad of problems. Residents, therefore, had to supplement supply from this source with water from boreholes and wells. Pipe borne water supply to the metropolis rose from 500,000m3 to 590,000m3 between 1999 and 2008. Within the same period, population size of 154,000 people to 189,000 people. the Cor (Y,X) of 0.619 is an indication that linear relationship exist between water supply and population size of in Mubi metropolis . The projected population size of the metropolis in the 2020 is 248000 people. In order to meet the water needs of this population size, authorities in the metropolis should strive to provide 861000m3 volume of water in the year 2020. The combination of both hard path and soft path are recommended to the authorities in order to achieve this objective. In summary, it is safe to conclude that vision 20, 2020, in respect of water supply, is realizable in Mubi metropolis. All that is required on the part of authorities is the political will and financial commitment.

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