ANALYSIS OF TAP WATER SUPPLY IN KEFFI LOCAL GOVERNMENT OF NIGERIA

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ABSTRACT

The need for portable drinking water in any settlement is the concern of any government which that settlement locates; hence, it is the task of that government to adopt better technology and policies towards achieving a sustainable and secured water future. Field measurements and direct observation was collected through inspection of the water supply scheme, tap to tap water use survey, inspection of distribution system. Similarly, the primary data were collected using systematic random sampling with the aid of a structured questionnaire. Descriptive statistics were used to analyze the collected data. From the result of the quantity of water supply is far below demand, water are lost through leakages and breakages due to poor connection or lining, Finally, government should call the attention of experts in construction, and maintenance of projects. The study recommends that water schemes should be funded to increase water production and on the side of the consumers, they should do more with less water, pay their bills and always notify the board whenever there is breakage or leakage of pipe.

Keywords: Water, Tap, Technology, Survey

INTRODUCTION

Water is one of the most valuable natural resources vital to the existence of any form of life. The growth and civilization of every community began within the region of abundant water supply. In many communities, human numbers have outstripped the ability of local water supplies to sustain a moderate standard of living. Pastel (1991) observed that, water is the basis of life and our stewardship of it will determine not only quality, but the staying power of human societies. As such, it is principally used for drinking, cooking, bathing, laundry and so on.

Nevertheless, the development of any economy will not be complete without adequate water supply. So it has to be essential all over the world. To meet the needs of our fast growing population of the world, water has to be made readily available. With such consideration; Keffi, water supply project was executed to meet the needs of the people in the area.

AIMS AND OBJECTIVE OF THE INVESTIGATION:

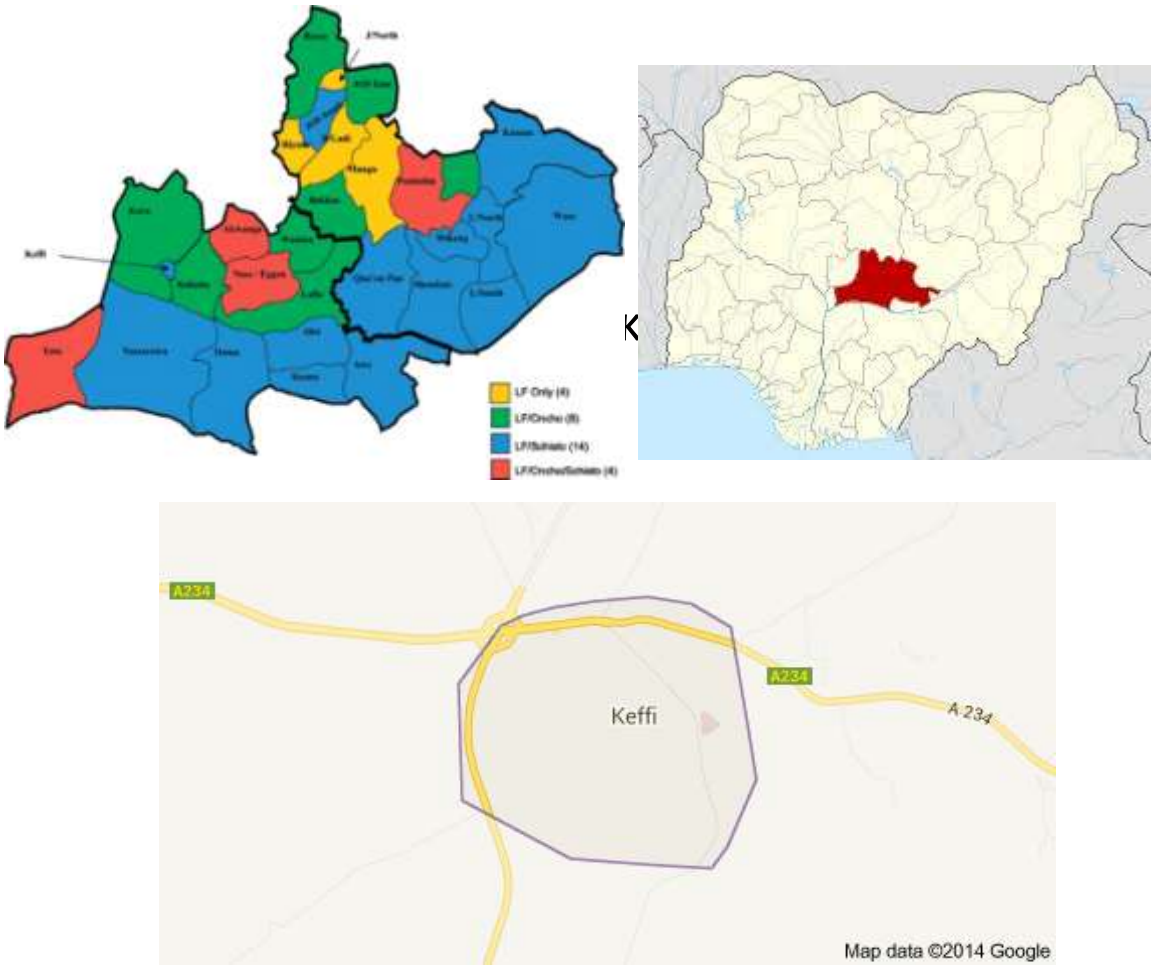
The basic aim of this study is to identify the causes of water shortages in the area, with the view to proffering solution and also suggesting action that could be carried out promptly to remedy problems in the existing water supply schemes. Furthermore, major potential objectives of this study includes:-

a. Assess the degree of service of the existing treatment plant.
b. To know the amount of discharge per unit time of the tap.
c. To identify the cause of water shortage through the investigation of pipe network (leakages and breakages).
d. To assess the efficiency of boreholes depths as well as hand dug-wells to see if they are up-to standard in the study areas.

GEOGRAPHY LOCATION OF THE STUDY AREA

The study area is located in the north central area of the study. It lies between latitude $6^0 36^1$N to $9^0 25^1$N and longitude $7^0 48^1$E to $8^0 35^1$E with geological formation of undifferentiated Gneisses and magmatites, also having granite formation in the southern part of the area. The area falls on the middle belt zone of the country. Rainfall last between 195 to 210 days. Mean annual rainfall is 156mm with September recording the highest rain of 362mm. The highest monthly temperature is recorded in March at 34.20^0C and lowest in August at 23.40^0C.

MAP OF STUDY AREA



METHODOLOGY

The technical research instruments employed in this project includes; Physical measurement and direct observation, data collection from tap to tap using systematic random sampling, data collection from supply scheme and distribution system. The data will be subjected to descriptive statistical analysis of means and percentage.

$F = p(1 + r/100)^n$

Where:

F = projected population
p = present population
r = growth rate
n = period of forecasting

RESULT AND DISCUSSION

WATER DEMAND

The study find out the total water required of a town, and it is done by finding out water needs for each water demand. Addition of all the demands will give the gross water requirements. Water demands of different heads are summarized up and the figure are multiplied by the population of the local government. This gives equivalent per capital water demand. These domestic and non-domestic needs are expressed in relation to population.

For any developing country, the World Health Organization (WHO, 2004) standard consumption rates of a town under various heads maybe summed up as:

i.	Domestic needs	100/c/d
ii.	Institutional / public requirement	201/c/d
iii.	Industrial demand	301/c/d
iv.	Fire demand	151/c/d
v.	Water unaccounted for	351/c/d
	Total	**2001/c/d**

WATER SUPPLY

Water supply is the total water supplied to a town from the treatment plant via all the reservoirs, in that area. For the study, all the distribution tankz and water supply are categorized into district and these districts are grouped under local government area. Mada water works was designed to produce about 38.2 million liters per-day of water i.e if working for 24 hours water supply, but the treatment is normally done with 10 hours which produces about 3.2 million liters in 2 days, which half is distributed the first day while second half is dispensed the second day. The distribution is shown below.

POPULATION FORECASTING

Oyegoke (1984) said the demand for water in a community is a function of its population and industrial production ultimately; securing sufficient water for people while leaving enough for a health environment overall depends on slow population growth. If rapid growth persist per capita, water supplies worldwide have to drop, unless a serious technology research is done as an effort

to raise the living standard of the people. Moreover, human numbers continue to grow faster in some of the most water short regions.

Therefore, it is necessary to estimate the population and industrial growth as a base for exceptional water gauge and securing water future. Various methods exist for population forecasting but for the purpose of this research, the compound interest method of forecasting is employed.

Keffi	Tank Capacity	Quantity (lit./day)
	$12500m^3$	1.7×10^6

Source: Nasarawa State Water Board,2014

Generally, growth of population assumed by water bodies is 2.5% (Ayesina, 1984).

$F = p(1 + r/100)^n$

Where: F = projected population
p = present population
r = growth rate
n = period of forecasting

For the purpose of this study, 2006 population census date was projected and used for 2014, which is then used to determine water demand and water supplies required for various local governments in the study area.

Local government area	Population
Keffi	92, 664(2006, population census)

Keffi $F_p = 92,664 (1 + 2.5/100)^8$
$F_p = 92664 (1.025)^8$
$F_p = 112,902$

Local government area	projected Population
Keffi	112,902

Comparing water demand and supply

$QD = P \times D$
$QD = 112902 \times 200$
$= 22580400$

Calculating percentage shortages

For Keffi QS = $1.7 X 10^6$ 1/d

QD = 112902 x 200

= 22580400

= $22.5 x 10^6$

Calculating percentage shortage

QS = $1.7 x 10^6$ lit./day

QD = $22.5 x 10^6$ lit./day.

% shortage = $22.5 x10^6 - 1.7 x 10^6 x 100/22.5 x 10^6$

= $20.8 x 10^6 x 100 / 22.5 x 10^6$

= 92.44%

CONCLUSION

It is clear from the analysis that water supply is far below demand. Even at full operation the Mada water treatment plant is not enough to meet up with the demand of the populace. The department of operations and maintenance handles system operation and maintenance. However, these operations are sometimes handicapped due to poor organization, insufficient man power both skilled and unskilled and shortage of equipment. It is therefore recommended that the government of keffi should put more effort to proffer a lasting solution to problems of water supply. The populace should also encourage the use of other sources of water such as hand dug wells, boreholes, etc.

Water shortages is sometimes caused by pipe leakage, breakage, and poor connection, so the people of keffi should always notify the necessary authority when such problems arises.

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