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Analysis of Water Supply, Demand and Distribution in Okene Town, Kogi State, Nigeria

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Abstract

Water is one of the most valuable natural resources for existence of any form of life. This study investigates the sources of water supply and distribution in Okene Town, Kogi State. To this end, data on various aspect of water supply such as sources of water, frequency of supply and uses of water were collected. The random sampling technique was used to select a total of 120 households for the survey to generate data which were analyzed in descriptive and inferential statistics and presented in tables, graphs and charts while the Chi square analytical technique was employed in testing the postulated hypothesis guiding this work and concludes that there is no significant variation in water supply in Okene Town. The Economic Approach as well as The Impact Analysis Approach were used in the analysis demand, supply and consumption of water by households. The findings from this work shows that most respondent within the study area get their water from pipe borne source, after moving a distance of between 20- 40 meters and employ the water to domestic uses. Households are faced with a number of domestic water supply problems including irregular water supply, long distance from water supply source, inadequate coverage of pipe distribution networks and inadequate fund to procure water such problems were tackled by provision of street boreholes, street wells, rain harvesting systems and provision of long lasting water project such dams and tap by Plateau State Water board. It was recommended that, government should make and execute policies that are targeted towards providing sufficient sources of water supply and distribution for the residents of Okene Town. People should adopt a self-help approach to solve the problems of water supply for domestic purposes, much can be achieved where the community unite together and involve in self-help projects.

Keywords: Water, Quality, Demand, Supply, Distribution.

Introduction

The Federal Government of Nigeria under the Federal Ministry of Water Resources in its effort to bring solution to billions of people starved with water problems in the country, drew up a roadmap for water sector in 2011 (Ali, 2012). The ministry estimates the water resource potential of Nigeria at 267 and 92 billion m^3 of surface and ground water respectively (Pruss- Ustun et al, 2013). Both the supply and the demand for water are further determined by variables that tend to be location specific. Nevertheless, a number of overarching factors influence levels of water use independent of location. These factors will undoubtedly be critical in determining future levels of water use in the study area, such factors are as population increases, water needed for domestic, transport, power, agricultural and industrial purposes also increase. This increase in population has led to the development of new settlement towns in Nigeria (Krause, Jana, 2011).

Potable water is one of the essential requirements for the sustenance of life. The problem is the accessibility of this life-guard to all and sundry. In most Nigerian communities, there is rarely or no access to potable water to rural areas that they resort other means that posse a great threat to lives. The importance of water to the nation is that only 0.5% of the world's water resources are available to provide for the fresh water needs of the earth's ecosystem and population. Water is not evenly distributed around the globe. Less than 10 countries possess 60% of the world's available fresh water supply. 1.8billion people still lack access to fresh water supply and 2.5million people need improved sanitation (Kyle et al, 2012).

Rikkos like most communities in Nigeria is facing its own share of water scarcity. Some factors that lead to water shortage in Okene Town includes, population expansion which is known as increase in family sizes and access to better health care and lifestyles. This means that the use of wholesome water for drinking, cleaning, cooking and sewage has tripled. Humans are a lot more careless in recent time, and waste more water than ever before. This has placed a lot of pressure on the same amount of water supplied in the state and indeed Okene Town. Inconsistency in government policy in Kogi State has led to inadequate supply of water, as well as the topography of Rikkos which is mostly mountainous that does not allow even distribution of water supply.Therefore this research is been carried out to find out the sources of water in Okene Town so as to ascertain the adequacy of its supply and give recommendation on improve water supply.

Materials and Methods

Data Collection

The research made use of well-constructed closed and opened questionnaires and physical observations and inspection (reconnaissance survey) of the study area to acquire data for the study. Random sampling technique was the sampling technique used in collecting data for this study because every household in the study area is given equal chance of been selected to represent the chosen population.

Data collected were subjected to descriptive and inferential statistics.

Results and Discussion

Table 1. Sources of Water Supply of Respondents

The response of sources of water from respondents in Okene Town is shown in figure 6

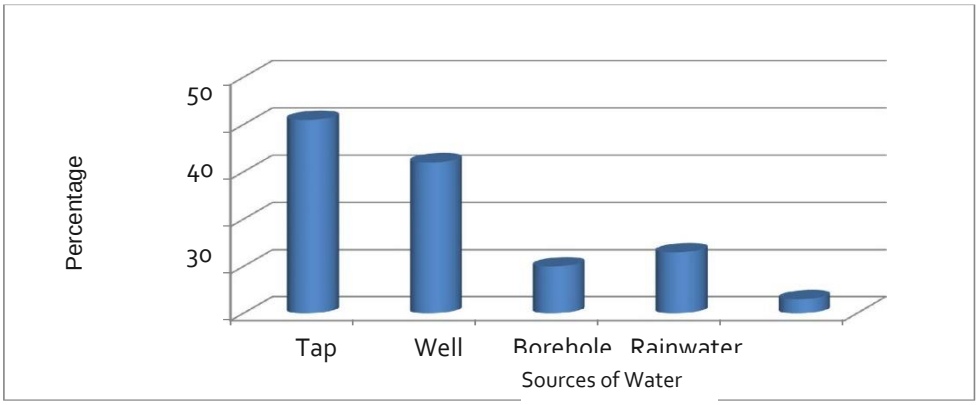


Fig 1. Sources of Water in Okene Town

Sources: Field Survey, 2021.

Fig 1. reveals that about 41% of respondents obtained their water from pipe borne sources (tap), water gotten from well and borehole account for 32% while stream water sources is the least with only 3%.

Frequency of obtaining Water

Table 2. is presenting how frequent water is obtained in Okene Town.

Table 2: How frequent water is obtained

S/N	Water obtained	Frequency	Percentage %
1	Daily	43	35.8
2	Weekly	17	14.1
3	Monthly	8	6.6
4	Twice a week	52	43.3
	Total	120	100

Sources: *Field Survey, 2021.*

Table 2. indicates that water is not frequently obtained within the study area as majority of the respondents get water twice a week with 43%, 35.8% respondents get water daily while the least Okene Town obtained water is monthly with 7%.

How is Water Distributed

Water distribution as assembled from the survey in Okene Town is presented in figure water is distributed.

This study in figure 4.5 reveals that water is mostly distributed by tap with 39% in Okene Town area. And stream which is ranked the least with 10% showing that the residents barely get water from the stream.

Table 3. Distance Travelled In Search for Water

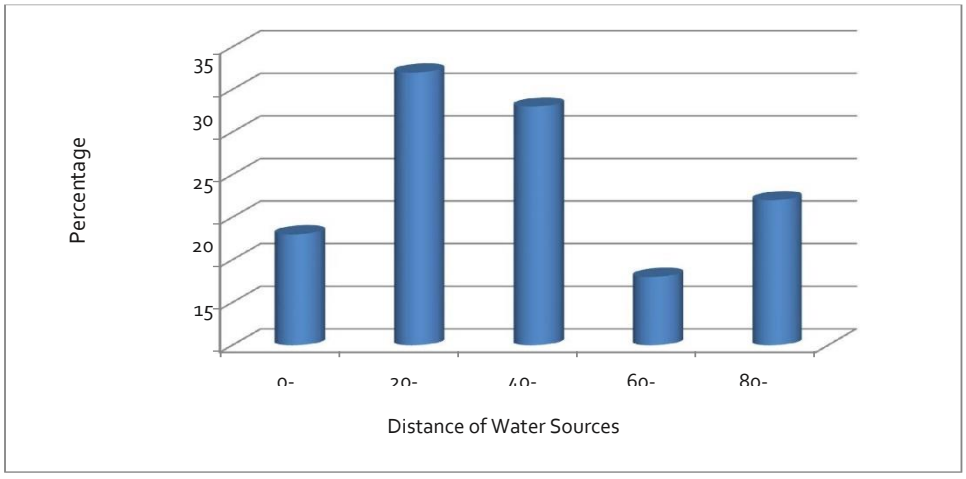


Fig 2. Distance of water sources from Respondents.

Sources: Field Survey, 2021.

Figure 2. indicates that 32% respondents travel between 20 and 40 meters, in search of water, 24% more between 60 and 100 meters to get water, only 13% respondents seek for water in places less than 20meters away from their residence.

Current State of Water Supply in Okene Town

Respondents in Okene Town were asked about the current state of water supply and the responses is presented in figure 9.

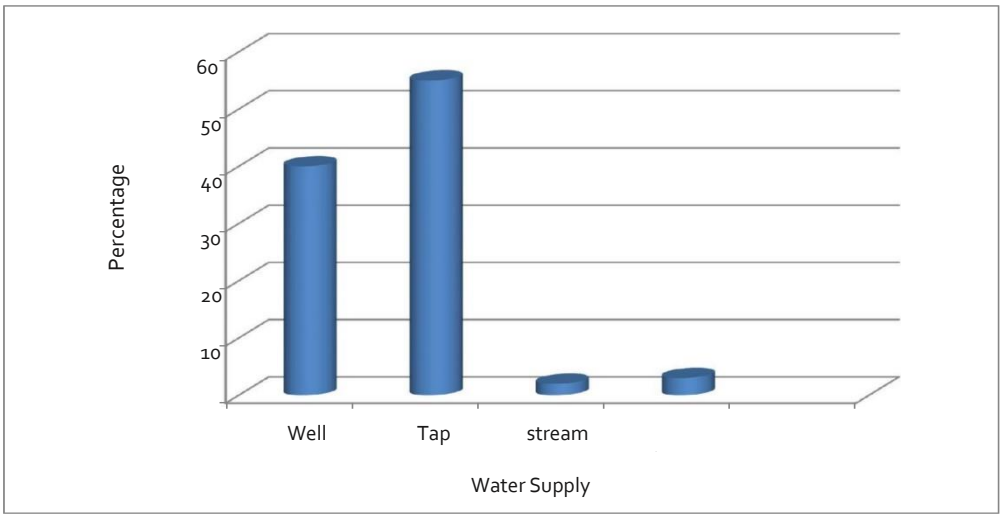


Fig 3: State of water supply in Okene Town.

Sources: Field Survey, 2021.

Figure 9 reveals that 55% respondents currently get water from tap, 40% get water from wells, 38% currently get water from wells while less than 5% get water from stream and rainfall.

Patterns and Quantity of Water Usage

This section looked at household activities that uses water and its quantity, problems encounter during water supply, water scarcity and suggestion on how to improve water supply.

Table 4. Domestic Use of Water among Households

Table 4.5: Presents Domestic Use of Water among Households

S/N	Uses	Frequency	Percentage %
1	Drinking	15	12.5
2	Cooking	17	14.5
3	Laundry	20	16.6
4	Washing of dishes	11	9.1
5	Flushing of toilets	15	12.5

6	Room cleaning	13	10.8
7	Bathing	14	11.6
8	Watering of flowers	12	10
9	Others	3	2.5
	Total	120	100

Sources: *Field Survey, 2021.*

Table 4.5 reveals that the highest domestic use of water in Okene Town is laundry with 16.6%, drinking of water accounts for 12.5%, watering of flowers 10% while the least is other uses with 2.5% only.

Table 5. Quantity of water used for domestic purpose by household

The quantity of water use for domestic purposes is presented in table 6 Table 4.6: Average Water used by Respondents for Domestic purpose.

S/N	Quantity use	Frequency	Percentage %
1	1-5 Gallons	24	20
2	6-10 Gallons	22	18.3
3	11-15 Gallons	18	15
4	16-20 Gallons	18	15
5	21-30 Gallons	16	13.3
6	31-40 Gallons	12	10
7	40 above	10	8.3
	Total	120	100

Sources: Field Survey, 2021.

Table 5 indicate the quantity of water use in Okene Town, the highest quantity of water use is 1-5 gallons with 20% and the least of quantity of water use is 40 and above gallons with 8.3%.

Conclusion

The availability of a reliable and clean supply of water is one of the most important determinants of our health. Water scarcity poses risks and stress for human society. The World Health Organization (WHO) identifies improvement in access to safe drinking-water as a contributing factor to tangible benefits to health. The provision of water supply systems in the region is thus, important and urgent, requiring the use of existing, emerging and innovative technologies that are also sustainable. Public water supply is a herculean task which is indispensable to sustain the economy, competitiveness and quality of lives of cities in developed and developing countries. Estimates of public water supply demand-gap varies with population growth rate assumptions and should be evaluated taking into consideration the maximum, middle and minimum limits to guide effective decision-making.

Most of the towns and cities in developing countries experience rapid urbanization without corresponding expansion of facilities to cater for the increasing population. Rikkos being in the heart of the state witnessed a tremendous influx of people from all angles, and the water facilities were installed about 40 years ago when Adamawa state was created. Thus, the facilities have been over stretched and that led to acute shortage in supply, low quality of water being distributed due to obsolete equipment at the treatment plant, as well as rusted and broken pipes due to intermittent supply, as revealed by this study. Therefore, consumers tend to spend much in buying water from vendors or travel some distances to fetch water.

From the study, it was discovered that Okene Town is faced with problems of water supply within the area. Such problems include Financial, unclean water supply, long distance from water supply, Technical no-how and lack of maintainers. Generally, most people are of the opinion that government agencies of water resources are not well positioned to control the water supply in the area. However, private agencies should be encouraged towards the task of more effectiveness to provide more sources of water supply to the rural community.

Conclusively, this work has assessed in identifying the sources of water supply and distribution in Okene Town, also it recommended the ways in which government should aid to improve the sources of water supply to the community.

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