

ASSESSMENT OF THE CURRENT STATUS AND PROBLEMS OF POTABLE WATER SUPPLY IN DAMATURU METROPOLIS

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Abstract

Water has been viewed as the global common heritage and everyone should, albeit effectively have an inalienable social and political right to it. However, freshwater shortage has been noticed around the globe. The challenges of water supply have contributed a factor inducing conflicts in some parts of the world because the earth's freshwater is diminishing due to man's activities and climate change. In Nigeria today, the freshwater sources available to the local inhabitants are either unsafe or difficult to obtain and are severely stressed by poor management. In Damaturu the capital city of Yobe State, Nigeria, the situation is indifferent from that of the larger Nigerian scenario pointed out so far. Thus, a study was conducted to assess the current status and problem of potable supply in Damaturu Metropolis. The study discovered that, there is inadequate supply of potable water to the people of Damaturu and its environs and that the people solely depend on tube wells provided through community participation for their daily water requirement. It was also discovered that despite the large number of tube wells available, water supply is still inadequate and that the people depend mainly on water vendors to get the water they require. Besides, community participation in the provision of water supply was found to be commendable though tube wells were the only source provided by the community in spite of the fact that water from tube well is not completely safe for human consumption. Lack of dependable and constant power supply was found to be the main cause of shortage of water supply in Damaturu and its environs coupled with insufficient bore holes provided by the government.

Keywords: Portable water, Damaturu, safe, vendors, consumption

INTRODUCTION

Water has been viewed as the global common heritage and everyone should, albeit effectively have an inalienable social and political right to it. However, freshwater shortage has been noticed around the globe. The challenges of water supply have contributed a factor inducing conflicts in some parts of the world because the earth's freshwater is diminishing due to man's activities and climate change, (Samson, 2013). Access to drinking water is a critical global issue. What constitutes water access? The currently accepted definition comes from the United Nations as outlined in 2000. This UN definition focuses on 3 distinct measurable characteristics of drinking water sources; (1) The quantity of water, (2) The safeness or quality of water and (3) The distance for collecting water. The World Health Organizations (WHO) recommended 120 liters of water per person daily to meet domestic utilization and function effectively.

Water supply is the provision of water by public utilities, commercial organization, community endeavors or by individuals, usually via a system of pipes and pumps. In 2010, about 85% of the global population (6.77 billion people) had access to piped water supply through house connections or to an improved water source through other means including standpipes, water kiosks, spring supplies and protected wells. However, about 14% (884 billion people) did not have access to an improved water source and had to use unprotected wells or springs, canal, lakes or rivers for their water needs (Samson, 2013). A clean water supply in particular water that is not polluted with fecal matter from lack of sanitation is the single most important determinant of public health. Destruction of water supply and/or sanitation infrastructure after major catastrophes (earthquakes, floodwater etc) poses the immediate threat of severe epidemics of water borne diseases, several of which can be life threatening.

Water supply systems get water from a variety of locations after appropriate treatment including groundwater (aquifers), surface water (lakes and rivers) and the sea through desalination (WHO/UNICEF, 2015). The significance of water to humans and other biological systems cannot be over emphasized and there are numerous scientific and economic facts that, water shortage or its population can cause severe decrease in productivity and deaths of living species

(Garba *et. al.*, 2008). Reports by Food and Agriculture Organization (FAO), revealed that in African countries, particularly Nigeria, water related diseases had been interfering with basic human development (Galadima *et. al.*, 2011). The common sources of water that are available to local communities in Nigeria are fast being severed by a number of anthropogenic factors of which pollution remains the most dominant problem. Although the demand for fresh water is fast increasing at a rate greater than the world's population growth, access to safe water supply is a serious issue across the globe. Recent statistics indicate that 1.2 and 2.4 billion people suffered from lack of safe water supply and secure sanitation respectively (Galadima *et. al.*, 2011). In many developing countries, Nigeria in particular, more than half of the population is affected.

BACKGROUND

Although the demand for freshwater is fast increasing and at a rate greater than the world's population growth, access to safe water supply is a serious issue across the globe. Recent statistics indicates that 1.2 and 2.4 billion people suffer from lack of safe water supply and secure sanitation respectively (Galadima, A. *et. al.*, 2011). In many developing countries including Nigeria, more than half of the population is affected. Another report by the UNICEF/WHO (2015) indicates that nearly 3 billion people or 40% of the world population live in water stressed countries where it is difficult to get enough water to satisfy the basic human needs. The report also indicates that many countries have fallen short of the Millennium Development Goals (MDGs) target of reducing by half the proportion of people not having access to safe water supply by 2015. According to the same report, in 6 developing regions of the world, namely; Sub-saharan Africa, Oceania, Latin America, South East Asia, Southern Asia and Northern Asia, vast proportion of the rural population still lack adequate access to safe water supply (Chukuma, 2016). The situation further worsens the living standards of the people in the regions and constraints socio-economic development of the rural economy.

According to World Health Organization (WHO) and UNICEF, 2015, the African population without access to improved drinking water sources increased by 61 million from 280 million in 1990 to 341 million in 2006. Increase in coverage not keeping pace with population growth. It also indicated that the rate at which Africans gained access to improved drinking water sources, 245m people since 1990, falls short of that required to meet the MDG drinking water target; in 9 countries in Africa, access to improved drinking water sources is less than 50%; urban drinking

water coverage in African is 85% while that of rural area is 51%. Besides, according to same report, to meet the MDGs drinking water target, coverage needs to increase from 64% in 2006 to 78% in 2015.

Despite the fact that Nigeria is blessed with a vast water resources, 90 million of its people living in urban and rural areas lack access to improved drinking water sources; and that Nigeria ranks behind many other developing countries in sub-Saharan African in level of access to potable water. The UNICEF / WHO (2015) report indicates that currently only about 31% of the rural population has access to water of acceptable quality. In some urban and rural areas in the country, the effective coverage may be as low as 40% and 20% of the population respectively (Chukuma, 2016).

In recent years due to increase in population and urbanization, the provision of safe and portable water to the Nigerian public has been on steady decline in terms of service quality and distribution. Access to water in Nigeria was 47% in 1990 but rose slightly to 54% in 2010 while the national statistics coverage from 2010 was just 32%. Recently, it has been estimated that only 58% of the masses have access to potable water, that is 87m people while 63m people are sidelined (Samson, 2013).

STATEMENT OF THE PROBLEM

In recent years, due to increase in population urbanization and climate change as well as other anthropogenic and natural factors, the provision of safe and potable water to the Nigerian public has been on steady decline in terms of adequacy, quality and quality of service. In Nigeria today, the freshwater sources available to the local inhabitants are either unsafe or difficult to obtain and are severely stressed by poor management. This makes access to clean water a serious problem. In some instances, women and children need to walk for hours to fetch ordinary drinking water. These problems are more prominent and severe in rural areas than in the urban centres.

In Damaturu the capital city of Yobe State, Nigeria, the situation is indifferent from that of the larger Nigerian scenario pointed out so far. The problems of water supply in Damaturu might also be exacerbated due to the combined effects of drought, low rainfall and desertification for which the state is noted for. Government participation in the provision of potable water supply to

the people is grossly insufficient which forced the people to seek for sources of water supply through community endeavours, commercial sources and other individual initiatives. Improper sanitation in water supply systems as well as unhygienic water distribution methods coupled with the presence of heavy metals especially Iron in underground water (Emeka and Weltime, 2008) also poses considerable threats to the issue of portable water supply in Damaturu and its environs.

MATERIALS AND METHODS

STUDY AREA

Damaturu, the Capital city of Yobe State Nigeria is located at latitude $11^{\circ} 44' 55''$ N and longitude $11^{\circ} 57' 50''$ E with an altitude of 456m above sea level. It is located in the semi-Arid region of Nigeria with an area of 2,366 km². It has a population of about 255,895 according to 2006 census (NPC, 2010). The climate is characterized by short wet season (June-August) and a long dry season (October-May) with high temperatures throughout the year. The average annual temperature stands at 25.2⁰C with the month of May being the warmest (29.7⁰C). Annual rainfall is usually very low while evapotranspiration is high with an average of 649mm. greatest precipitation occurs in August (223mm). Damaturu is a water deficit region of very low surface water during the rainy season. It is not drained by any river, hence absence of surface water resources (Emeka and Weltime, 2008). The town depends mainly on underground water surfaces which are usually accessed through drilling of boreholes and artesian wells.

A total of 10 settlements within Damaturu metropolis were selected for the study with a total of 1000 target population. The Slovic's formula was used to obtain the 286 sample size. Accidental, Convenient and Random Sampling Techniques were used to select the respondents for the study. Two sets of self-made closed ended questionnaire were used to collect data from the local respondents and the officials of the Yobe State Water Corporation. The Questionnaires were self-administered. Finally, the Frequency and Percentage data analysis techniques were used to analyse the data collected.

RESULTS AND DISCUSSIONS

Responses of Local inhabitants

Table one: Assessment of common sources of water supply

What are the common sources of water supply in your area		
	<i>Frequency</i>	<i>Percentage %</i>
Bore hole	71	25.4
Tube well	205	73.2
Wash bore hole	-	-
Protected well	04	1.4
Others	-	-

What are the most readily available sources of water supply		
	<i>Frequency</i>	<i>Percentage %</i>
Bore hole	66	23.6
Tube well	210	75.0
Wash bore hole	-	-
Protected well	04	1.4
Others	-	-

Are there any other sources of water supply apart from these ones		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	0	0
No	28	100

Which of these sources is connected to your house?		
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	<i>Frequency</i>	<i>Percentage %</i>
Bore hole	76	27.1
Tube well	-	-
Wash bore hole	-	-
Protected well	-	-
Others	-	-

Which of these sources is the best		
	Frequency	Percentage %
Bore hole	280	100
Tube well	-	-
Wash bore hole	-	-
Protected well	-	-
Others	-	-

Table Two: Evaluation of mode of water distribution

How is water distributed to your house		
	<i>Frequency</i>	<i>Percentage %</i>
Through pipe	34	12.1
Water vendors	172	61.4
Water tankers	15	5.4
Fetching	59	21.1
Others	-	-

How do you assess the mode of water distribution to your house		
	<i>Frequency</i>	<i>Percentage %</i>
Good	152	54.3
Satisfactory	107	38.2
Bad	21	7.5

Which mode of distribution do you prefer		
	<i>Frequency</i>	<i>Percentage %</i>
Through pipes	237	82.5
Water vendors	22	7,0
Water Tankers	27	9,6
Fetching	-	-

How do you store water in your house		
	<i>Frequency</i>	<i>Percentage %</i>
Tanks	92	32.9
Dams	73	26.1
Pots	59	21.1
Drums	56	20.0
Others	-	-

Table Three: Assessment of the adequacy of water supply

How many jerry cans of water do you require daily		
	<i>Frequency</i>	<i>Percentage %</i>
1-5	178	17.1
6-10	52	10.6
11-15	59	21.1
16-20	62	22.1
21-25	58	20.7
26-30	01	0.4

Above 30	-	-
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Does the amount of water you get satisfy your daily need		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	63	22.5
No	217	77.5

If no, why		
	<i>Frequency</i>	<i>Percentage %</i>
Scarce	158	56.4
Financial constrains	48	17.1
Fetching problems	74	26.4
Others	-	-

For how many hours does the source of water operate daily		
	<i>Frequency</i>	<i>Percentage %</i>
1-5hrs	128	45.7
6-10hrs	106	37.9
11-15hrs	46	16.4
16-20hrs	-	-
24hrs	-	-

Table Four: Evaluation of the level of governments role in the provision of water supply

Is there any government provided source of water supply in your area		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	233	83.2

No	47	16.8
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If yes, what are these sources		
	<i>Frequency</i>	<i>Percentage %</i>
Bore hole	233	83.2
Tube well	-	-
Wash bore hole	-	-
Protected well	-	-
Others	-	-

Do you benefit from any government provided source of water supply		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	74	26.4
No	206	73.6

If No, why		
	<i>Frequency</i>	<i>Percentage %</i>
Not provided	58	20.7
Not functional	28	10.0
Scarce	120	42.9

Do people rely on sources of water supply provided by the government		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	50	17.9
No	230	82.1

Does the government encourage community participation in the provision of water supply		
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	<i>Frequency</i>	<i>Percentage %</i>
Yes	0	0
No	280	100

Table five: Determination of level of community participation in the provision of source of water supply

Which sources of water supply are provided by the community		
	<i>Frequency</i>	<i>Percentage %</i>
Bore hole	-	-
Tube well	280	100
Wash bore hole	-	-
Protected well	-	-
Others	-	-

Do people depend solely on community provided sources of water supply		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	199	71.1
No	81	28.9

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Can people get water if the community provided sources fail		
	<i>Frequency</i>	<i>Percentage %</i>
Yes	34	12.1
No	246	87.9

Table 6: Assessment of the common problems of water supply

Generally government has failed in its role of providing potable water supply		
	<i>Frequency</i>	<i>Percentage %</i>

Strongly Agreed	280	100
Agreed	-	-
Disagreed	-	-
Strongly Disagreed	-	-

Lack of standard bore holes provided by the government is the main cause of problems of water supply

	<i>Frequency</i>	<i>Percentage %</i>
Strongly Agreed	280	100
Agreed	-	-
Disagreed	-	-
Strongly Disagreed	-	-

Distance of sources of water supply create another problems

	<i>Frequency</i>	<i>Percentage %</i>
Strongly Agreed	100	37.5
Agreed	100	37.5
Disagreed	80	28.6
Strongly Disagreed	-	-

Mode of Distribution of water is also a factor of problem of water supply

	<i>Frequency</i>	<i>Percentage %</i>
Strongly Agreed	220	78.6
Agreed	33	11.8
Disagreed	27	9.6
Strongly Disagreed	-	-

Lack of Dependable and constant power supply compounds problem of water supply

	<i>Frequency</i>	<i>Percentage %</i>
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Strongly Agreed	253	90.1
Agreed	27	9.9
Disagreed	-	-
Strongly Disagreed	-	-

Fetching of Water by women and children affects their productivity

	<i>Frequency</i>	<i>Percentage %</i>
Strongly Agreed	239	85.4
Agreed	33	11.8
Disagreed	8	2.9
Strongly Disagreed	-	-

Responses of Officials of Water Corporation and RUWASA

1. How many government bore holes are there in Damaturu township 105
2. How many out of these are functional? 73
3. What is the ideal ratio of number of bore holes to that of households? 1:70
4. How many bore holes are found in each of these settlements?

Settlements	Total No of bore holes	No of functional bore holes
Ajari	3	3
Bundugari	2	1
Gwange	3	3
Jerusalem	2	2
Maisandari	2	2
Nayi nawa	3	3
Nyanya Quarters	3	3
Sabon fegi	5	5
Waziri Ibrahim Quarters	3	3
Zanna Zakariyya Quarters	3	2

5. for how many hours do these bore holes operate daily? 6hrs

6. The number of bore holes available is enough to cater for peoples water requirements.

	Frequency	Percentage (%)
Yes	0	0%
No	6	100%

7. Does government encourage community participation in the provision of portable water supply?

	Frequency	Percentage (%)
Yes	0	0%
No	6	100%

8. What kind of support does the government give in respect community participation in the provision of potable water supply?

	Frequency	Percentage (%)
Advice	0	0%
Financial	0	0%
Supervision	0	0%
None	6	100%

9. What is the cause of government's inability to provide enough bore holes?

	Frequency	Percentage (%)
Insufficient finances	0	0%
Lack of constant power	6	100%
Technical problems	0	0%
Not a priority	0	0%
Others	0	0%

10. Is the government aware of the health hazards associated with the type of sources of water supply being provided through community participation?

	Frequency	Percentage (%)
Yes	6	100%

No 0 0%

11. If yes, what measures are being taken nothing

With regards to the most common and readily available source of water supply, 75.0% of the respondents pointed out that Tube wells provided through community participation are the most dependable source. Only 23.6% of the respondents had varying views. This agrees with the findings made at the Yobe State Water Corporation where it was discovered that in Damaturu township with a population of over 300,000 people, only 105 government provided boreholes are available while only 73 are functional. It was also gathered that ideally, a standard borehole should supply only 70 houses in order to meet people demand for fresh water. This indicates that the number of bore holes is grossly insufficient. Whereas 100% of the respondents agreed that the best source of water supply is the bore hole, only 27.1% of them are connected to the only few functional bore holes available. This is the reason why 71.1% of the respondents stated that they solely rely on Tube well provided through community participation for their daily water requirements. It is worth noting that, water from Tube well is not always pure so not completely safe for human consumption. Tube wells are commonly contaminated with fecal organisms (Hoque 1999; Islam *et.al.*, 2001). Although most of the contaminations detected in tube wells was at a low concentrations. Besides, Islam *et.al.*, 2001 reported that water analysis of some tube wells in Matlab, Bangladesh showed contamination with zooplanktons and Bacteria. A clean water supply in particular water that is not polluted with fecal matter from lack of sanitation is the single most important determinant of public health. Emeka & Weltime (2008) found that Damaturu is a land locked location so depend solely on ground water for their water supply and that the ground water contains traces of elements such as iron which can be hazardous to human health.

While 82.5% of the respondents believed that distribution of water through pipes is the best, only 12.1% of them are actually connected to the few government provided bore holes through pipes where as 61.4% get their water requirements from water vendors. It is a known fact that, sanity of the Jerry cans which the water vendors use cannot be guaranteed. Most a times the Jerry cans are infested with spirogyra and stay for weeks or even months without being washed yet 54.3% of the respondents agreed that the mode of distribution of the water is good. The world Health Organization (WHO) recommends sanitary inspections of water points as part

of the comprehensive risk based assessment of drinking water quality. The objective of the sanitary inspection include supporting operations and maintenance of the water point by providing clear guidance for remedial action to protect and improve water supply (Luby *et.al.*, 2008).

While the WHO recommends 120 liters of water per person daily to meet domestic utilization and function effectively, this study observed that the WHO's recommendation is just a mirage in many places including Yobe State. Out of the 280 respondents, only 22.5% agreed that the water they get daily satisfies their water requirements, while 77.5% expressed that the live in water stressed areas managing the little water they get just to stay alive. Water shortage or its pollution can cause severe decrease in productivity and deaths of living species (Garba *et.al.*, 2008). This finding agrees with that of Chukuma (2016), who stated that vast proportion of the Nigerian population still lack adequate access to safe water supply.

Although water has been viewed as a global common heritage which everyone should have an inalienable social and political right to, many people especially in the developing countries have lost that right. Ideally, governments should provide the public with portable drinking water; this is not a privilege but a right. This study has discovered that government has grossly failed in its role to provide portable water supply to the people of Damaturu metropolis. About 82% of the respondents agreed that they do not rely on the government for water supply but rather depend on water sources provided through community participation where as 73.6% stated that they do not benefit from any government provided water supply.

Despite the heavy reliance of people on community provided tube wells for their water needs, 100% of them believe that neither does the government encourage nor supports the efforts of the communities in this respect. This was confirmed at the Yobe State Water Corporation where it was gathered that government is aware of the peoples' heavy dependence on tube wells provided through community participation despite the inherent risks associated with it and that no measure is being taken to manage the problem.

Meanwhile, the major problem associated with the provision of portable water supply in Damaturu metropolis is the lack of a dependable and constant power supply which frustrates both community and government efforts towards ameliorating the shortage of water supply. Out of the 105 government provided bore holes available in Damaturu of which only 73 are functional, none is connected the national grid instead, all operate on diesel powered electric

generators. The absence of a constant power supply is a national issue of concern in Nigeria. If there is a constant power supply, more bore holes could be provided and the huge amount being spent on the purchase of diesel to power the electric generators can be spared. Besides, even the hundreds of the community provided tube wells on which people depend solely for their water requirements, operate on diesel powered electric generators. All the respondents (100%) agreed that lack of sufficient government provided standard bore holes is the main cause of shortage of water supply in Damaturu and its environs. Though only 21.1% of the respondents agreed that the water they get daily is being fetched by their wives and children, 85.4% agreed that fetching of water by children and women affects their productivity.

CONCLUSION AND RECOMMENDATION

In conclusion, the study was able to discover that, on its part, government has failed in its responsibility of providing adequate potable water supply to the people of Damaturu and its environs and that the people solely depend on tube wells provided through community participation for their daily water requirement. It was also discovered that despite the large number of tube wells available, water supply is still inadequate and that the people depend mainly on water vendors to get the water they require. Besides, community participation in the provision of water supply was found to be commendable though tube wells were the only source provided by the community in spite the fact that water from tube well is not completely safe for human consumption. Lack of dependable and constant power supply was found to be the main cause of shortage of water supply in Damaturu and its environs coupled with insufficient bore holes provided by the government.

Based on the above outlined findings, the following recommendations are hereby made:

1. Since Damaturu is a land locked location and mainly depends on underground water for its water supply, government should reconsider its over dependence on electric and generator powered bore holes and consider the utilization of the abundant solar energy provided by nature and make available more solar powered bore holes in order to meet people's demand for fresh water.
2. Community participation in the provision of potable water supply should be encouraged and supported by the government through the provision of comprehensive supervision as well as technical support.

3. Since the people depend mainly on tube wells for water supply, government should enlighten the communities on the to make tube wells deep enough in order to avoid the supply of polluted water for human and animal consumptions.
4. In order to avoid the health risks associates with drinking water, the general public should be enlightened on the need for a proper ad hygienic storage of water as well as the need to purify water for human consumption by boiling and through other purification processes.

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