

## An Appraisal of Water Supply and Sanitation Situation in Some Selected Areas of Kaduna Metropolis

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**ABSTRACT:** This study examines water supply and sanitation situation in some selected areas of Kaduna metropolis. Primary data was collected from households residing in the area and. 366 copies of well structured questionnaires were administered to the households. Questions were related to the water supply and sanitation situation of households. Data collected were analyzed using descriptive methods. The study result reveals that majority of households in the study area use hand dug wells as their major source of water supply while privately owned boreholes; Kaduna State Water Board, water vendors and streams are other main sources. The risk of various sanitation related infections and diseases are high in the study area due to the poor methods of solid waste disposal. The implication of these poor solid waste disposal methods by the households in the study area is that; people who live close to waste dumps are exposed to various health risks. The paper recommends that the private sector be involved in water supply in the areas of fund mobilization for the construction, maintenance, rehabilitation and expansion of water supply and sanitation facilities in Kaduna metropolis as well as government agencies responsible for the provision of water supply and sanitation facilities should be adequately funded and equipped to carry out their services to the people in order to reach the goal 7 of the MDG 2015 target.

**KEYWORDS:** Water Supply and Sanitation (WSS); Waste Disposal; Service Provision and distance covered; Urban water use; Water resources

### 1 INTRODUCTION

Water and sanitation are the main components of public health, which means that once we can secure access to clean water and to adequate sanitation facilities for all people, irrespective of the difference in their living conditions, a huge battle against all kinds of diseases will be won. Water and sanitation targets feature under the United Nations' environmental sustainability - Goal 7 - of the Millennium Development Goals (MDGs). There have been calls on governments to "halve", by 2015, the proportion of people without sustainable access to safe drinking water and sanitation (UN, 2009)

Water supply is seen as the available water provided to fulfill a particular need; if the need is domestic, industrial, or agricultural, the water must fulfill both quality and quantity requirements. Water supplies can be obtained by several types of water resources projects, such as wells, dams, or reservoirs. Of all municipal services, provision of portable water is perhaps the most vital. All people depend on water for drinking, cooking, washing, carrying away wastes, and other domestic needs, water supply systems must also meet requirements for public, commercial, and industrial activities. Providing daily

water needs is a burden on households with inadequate services in a number of ways, in addition to the direct health threats. Often, water has to be carried long distances to the house which takes time and effort, a burden borne mainly by women and children. In urban and urban fringe areas, water is often only available from vendors at a price which is usually several times more expensive than the water provided through formal services and it is usually of poor quality. Inadequate water supplies are both a cause and an effect of poverty. (Shanmugham and Solomon, 2011).

With the growing population of Kaduna metropolis, pressure on water supply is being mounted in some parts of Kaduna metropolis especially in Kaduna South. The provision of water supply and sanitation services and their management facilities have not kept pace with the ever increasing population. The remarkable population growth translates to ever increasing pressure on water supply and sanitation services. Linkages between water supply and sanitation (WSS) and a cluster of key sectors, including health, education, agriculture, and environment are intuitively obvious, and documented with varying precision in different developing countries. Some of the data and project experience in Nigeria in these sectors suggest clear linkages between poor WSS standards and decline in health, education and productivity. Specifically, these include low enrollment in schools, particularly of girls who must spend time collecting water, higher crime against women due to lack of toilet privacy, as well as the more obvious impacts of disease, higher infant mortality, high absenteeism in schools and at work, and lower productivity.

## **2 AIM AND OBJECTIVES OF THE STUDY**

The aim of this paper is to appraise water supply and sanitation situation in some parts of Kaduna metropolis.

### **OBJECTIVE**

The above aim will be achieved through the following objectives;

- (i) To identify the sources of water supply in the study area.
- (ii) To appraise the existing sanitation facilities in the study area.
- (iii) To examine the existing sanitation situation in the study area.
- (iv) To identify health related effects of inadequate water supply and poor sanitation in the study area between January to April 2012.

### **THE STUDY AREA**

Kaduna, the study area, situates in north western part of Nigeria, between latitudes 8° 43' N to 10° 32'N and longitudes 5° 48' E to 7° 26' E. Kaduna is an urban agglomeration with a population of about 1.6 million people (Brinkhoff 2010). It is a flat city is at about 600 m above sea level, on the Kaduna River. Climate is tropical wet and dry (Koppen Classification Aw).



*Fig1 Map of Nigeria showing Kaduna State*

### 3 METHOD AND MATERIALS

The method of data collection was through the use of simple random sampling techniques. Since the research population is made up of the households in the study area, there are numerous areas in the study area. Out of the numerous areas in the study area, six were selected for the purpose of the study; i.e. two (2) areas per Local government Area as three (3) Local Governments make up the study area namely: Kaduna North Local Government, Kaduna South Local Government and part of Chukun Local government, these selected areas include;

**Table 1. Sampled Areas And Number Of Households**

SAMPLED AREA	NUMBR OF HOUSEHOLDS	SAMPLE
Ungwan Dosa	1226	62
Ungwan Rimi	2377	118
Barnawa	620	31
Kakuri	306	15
Ungwan Pama	1059	53
Mararaban Rido	1739	87
<b>Total</b>		<b>366</b>

Source: Health Unit of Kaduna North, Kaduna South and Chukun Local Government Areas

The research population is made up of the households in the study area, the researchers carried out a stratified sampling to delimit the area of study into sampled areas. The research chose a sample size of 5% for the households in the study area. The sample size of 5% was chosen for convenience due to the limited time available to carry out the research; a total number of 366 questionnaires were prepared and administered to selected households in the sampled areas by the authors.

#### SOURCES OF WATER SUPPLY

The tables below shows water supply sources in the study area, information on water supply sources, quantity of water used and distances to the source of water supply, problems faced as a result of sourcing water and others are presented.

**Table 2. Sources of water supply in the sampled areas in the dry season**

Sources	Sampled Areas						Total	Percentage
	Ungwan Dosa	Ungwan Rimi	Barnawa	Kakuri	Ungwan Pama	Mararaban Rido		
Pipe	10	2	8	1	5	6	32	10
Hand dug Well	62	6	47	32	10	21	178	55
Borehole	18	5	18	16	11	16	84	26
Vendors	8	2	6	5	3	3	27	8
River/stream	0	0	1	1	0	1	3	1
Others	0	0	0	0	0	0	0	0
<b>Total</b>							<b>324</b>	<b>100</b>

Source: Field Survey, 2012

The major sources of water supply in the study area are shown in Table 2. The results shows that 55% of the study sample gets their water supply source from hand dug wells while 26% of the respondents get their water from boreholes. This situation was also observed by the researcher during the field survey. Many residents of the study area go to private borehole owners to purchase water on a daily basis especially during the dry season when the water levels of most hand dug wells drop. Only 10% of the respondents get their water supply from the government owned piped water system while 1% of the respondents' source of water supply is from streams. This shows that there is little dependency on the government for water supply as people resort to "self help" in sourcing for water. This situation is worrisome as the target for sustainable

water supply to at least 80% of households in Kaduna metropolis by 2015 might not be realized. Those that get their water supply through water vendors make up 8% of the respondents.

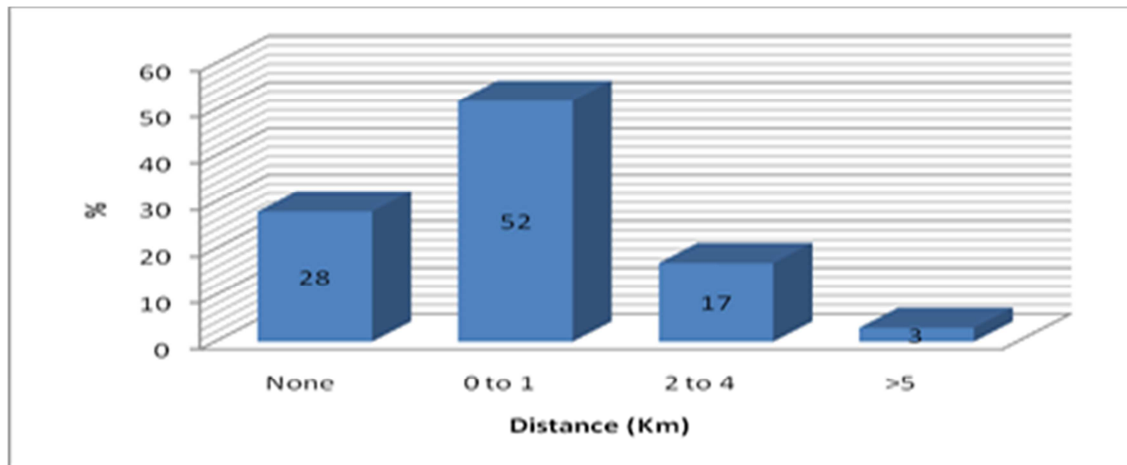


Fig 2: Distance to water supply source in the sampled areas

Source: Field work, 2012.

Fig 2 shows the distance travelled by the respondents to source for water. The finding reveals that 28% of the respondents do not travel any distance to source for water. This can be attested to the fact that most of the households that source their water from hand dug wells have the facility within their compounds. Fifty two percent of the respondents travel a distance of up to 1km to source for water while 17% of the respondents travel between 2km-4km to source for water. A little proportion of 3% travels more than 5km to source for water. This finding validates that of Buhari, (2010) in his report in This Day/allAfrica.com "Nigeria: Water Scarcity Hits Kaduna Metropolis". He discovered that the main perceived problem associated with water use is poor access to water supply. He further stressed that the problems include the burden of drawing water from wells and conveying it through the long distance, and water shortage during the relatively long dry season.

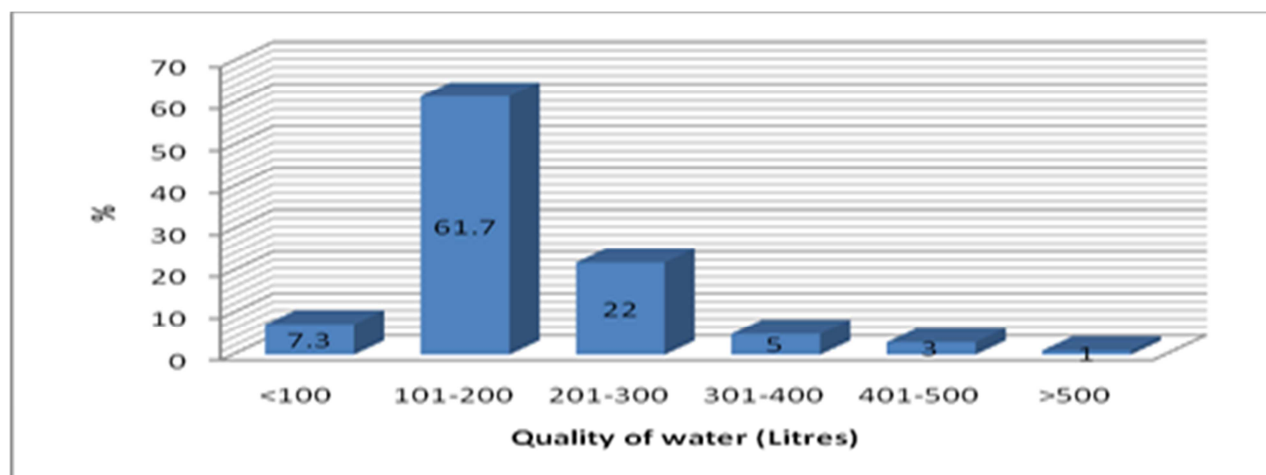


Fig 3: Average daily water usage by the households

Source: Field work, 2012.

Figure 3 shows the average daily water usage per household in the study sample. The result indicates that about 7% of the respondents use below 100 litres of water in their households per day. This is inconsistent with the UNICEF’s stipulated 50 litres of clean water a day per individual which it considered necessary to stay healthy - for drinking, washing, cooking, sanitation and personal hygiene. A greater proportion of the respondents make use of about 100-200 litres of water per day. Twenty two percent of the respondents make use of 201-300 litres of water per day while 5% of the respondents use between 301-400 litres of water per day. Those that use about 401-500 litres of water per day were just 3% while as little as 1% of the respondents make use of more than 500 litres of water per day. These shortfalls could be attributed to the fact that most of these respondents do travel some distances to access water as seen on Figure 2

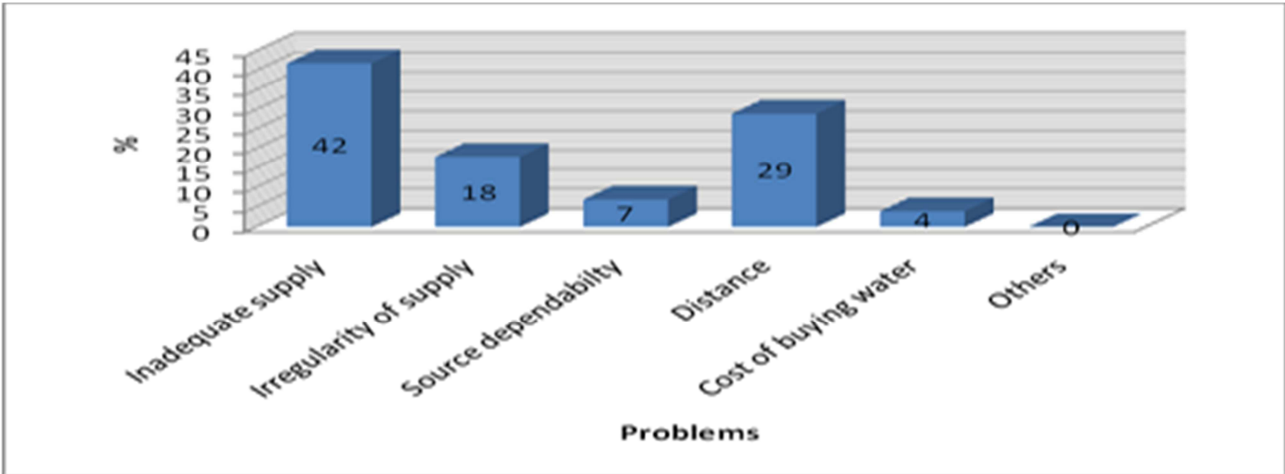


Fig 4: Problems of water supply in the sampled areas

Source: Field work, 2012.

The problems of water supply are shown in Figure 4. The table shows that most of the respondents face the problem of inadequate supply of water. This group represents 42% of the total respondents. 29% of the respondents attributes distance to the source of water supply as a problem to them whereas, 18% of the respondents are facing the problem of irregularity in water supply in their respective households. 4% of the respondents attribute their water supply problems to the cost of buying water from water vendors such as tankers, cart vendors and borehole owners. The problem of low reliability/dependability of water supply source is faced by 7% of the respondents which is as a result of uncertainty of source of water.

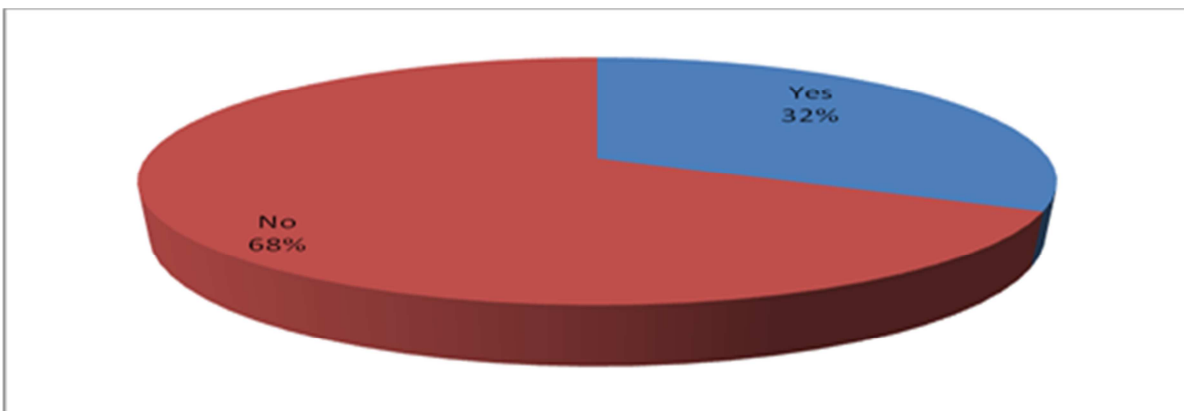


Fig 5: Sickness as a result of water usage in the sampled areas

Source: Field work, 2012.

The respondents were asked if any of their household members have experienced any sickness as a result of water usage from the sources listed in Figure 5 above. About 32% of the respondents admitted that members of their households have fallen sick as a result of water usage from the afore mentioned sources while about 68% of the respondents have never recorded any sickness as a result of water usage.

**SANITATION**

The sanitation situation of the study area is presented in tables and succinct analysis is made on each variable. The data presented includes the methods of waste water and solid waste disposal by the respondents, the available toilet facilities in the study area and the problems encountered as a result of usage of the available sanitation facilities.

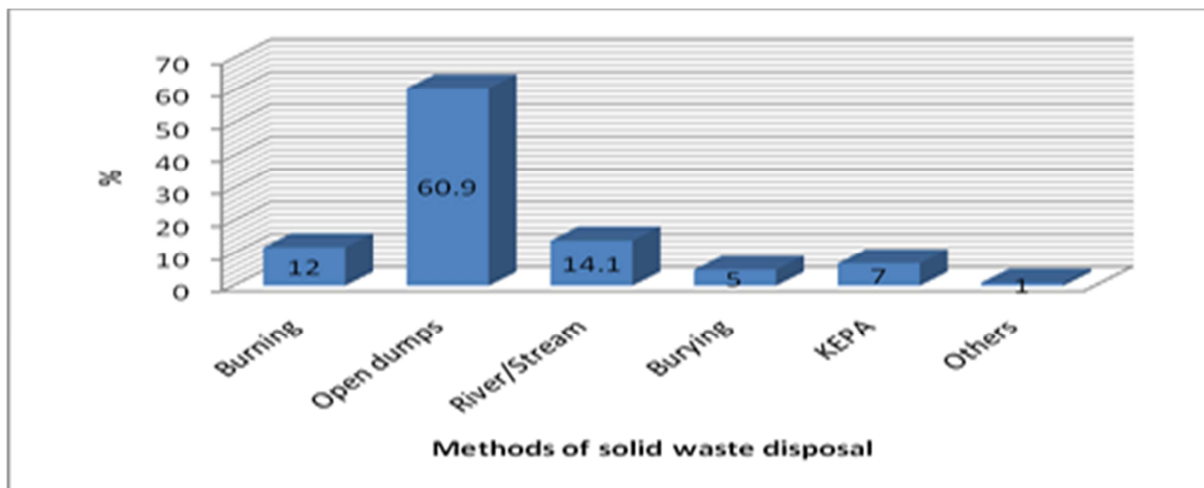


Fig 6: Methods of solid waste disposal in the sampled areas

Source: Field work, 2012.

Figure 6 reveals that open dumps, burning, burying, river/stream and through Kaduna State Environmental Protection Agency (KEPA) are the major solid waste disposal methods of the study area. They show that 39% of respondents dispose their solid wastes by burning; about 61% dispose theirs in open dumps. This explains why the researcher observed numerous open waste dumps on major streets in the study area. This method of solid waste disposal is a major sanitation challenge as it can cause certain diseases and it also reduces the aesthetics of the environment. About 14% of the respondents dispose their wastes into flowing rivers and streams while 5% bury theirs. The state owned sanitation agency evacuates the wastes of only 7% of the respondents while 1% of the respondents dispose theirs through other methods.

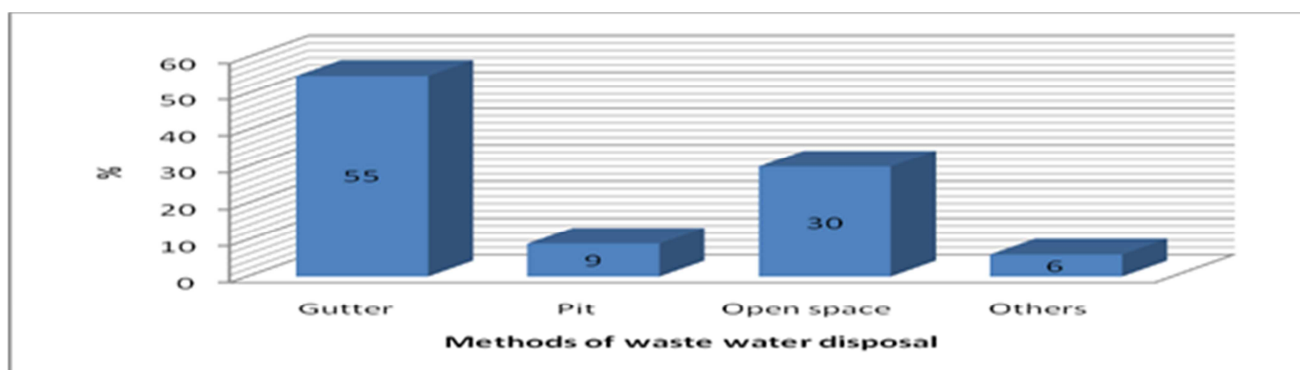


Fig 7: Methods of liquid waste disposal in the sampled areas

Source: Field work, 2012.

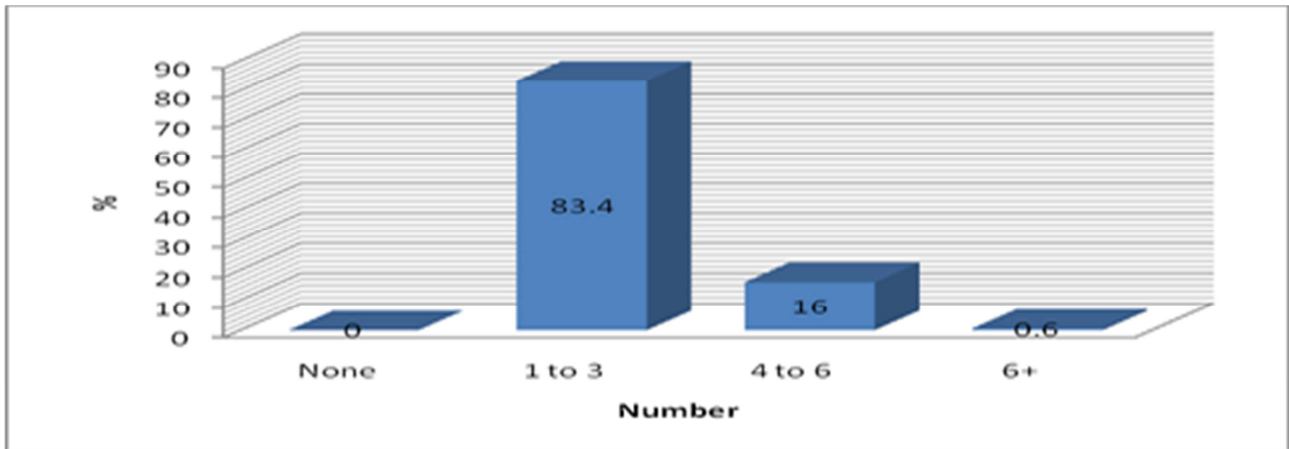
Figure 7 shows that 55% of the respondents make use of gutters as means of disposing their waste water, 30% of them dispose theirs in any available open spaces within their residence. Nine percent dispose their waste water into pits while just about 6% disposes theirs through other means which includes using the waste water on their gardens or to flush their toilets.

**Table 3: Toilet facilities used by respondents**

Facility	Sampled Areas						Total	Percentage
	Ungwan Dosa	Ungwan Rimi	Barnawa	Kakuri	Ungwan Pama	Mararaban Rido		
Pit latrine	20	5	31	20	9	13	98	30.2
Flush toilet (water closet)	72	5	43	25	13	29	187	57.7
Bucket latrine	0	0	0	0	0	0	0	0
Public toilet	6	5	6	10	7	5	39	12.1
Open field	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0
<b>Total</b>							<b>324</b>	<b>100</b>

Source: Field work, 2012.

Table 3 show that water closet system; pit latrine and public toilets are the toilet facilities in the study area. About 58% of the households use flush toilets. This could be attributed to the fact that the area of study is an urban setting while about 30% of the sampled households make use of pit latrines and the remaining 12% use public toilet facilities.



**Fig 8: Number of toilet facility per household**

Source: Field work, 2011.

The 2010 Joint Monitoring Program Report by the UNICEF and WHO on sharing of sanitation facilities indicated that sharing of sanitation facilities is more prevalent in urban areas of developing countries (WHO and UNICEF, 2010). This report is consistent with the results shown in Figure 8. The table shows that about 83% of the households have 1-3 toilet facilities, 16% have 4-6 toilet facilities while about 1% of the study sample have more than 6 toilet facilities in their households. This means that almost all the households in the study sample share their sanitation facilities.

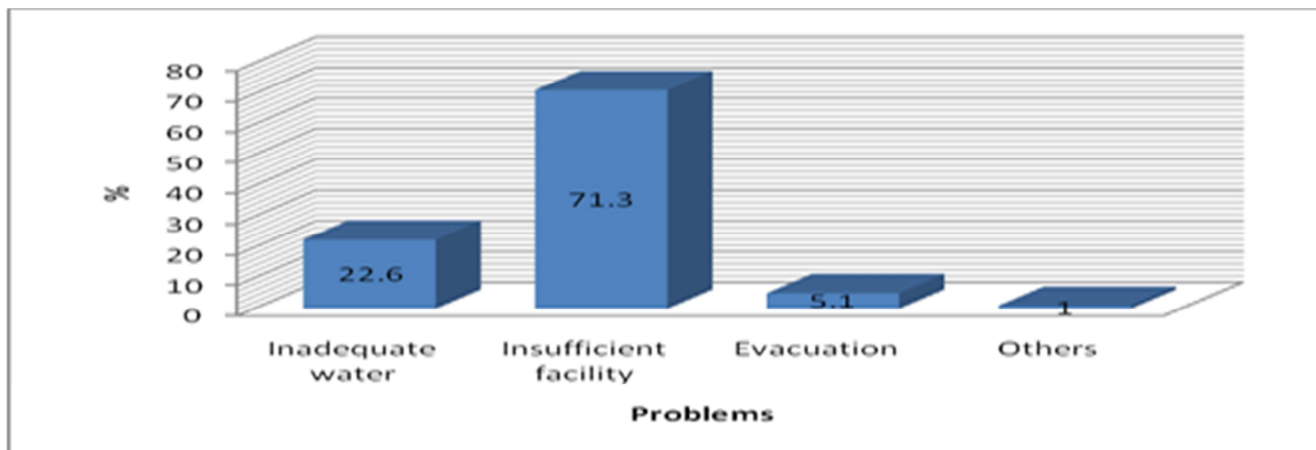


Fig 9: Problems associated with the use of toilet facilities

Source: Field work, 2012.

Figure 9 shows the problems associated with the use of the sanitation facilities in the sampled area. The major problem the people have is that of insufficient facilities in their households. Most of the people in the study area share their sanitation facilities. About 23% of the respondents face the problem of inadequate water supply during the use of their sanitation facilities while about 5% of the respondents have the problem of evacuating excreta from their households. Most of the households that have the problem of evacuating excreta are those in slum areas such as Mararaban Rido and Kakuri areas where the houses are not built according to the stipulated plans. This makes it very hard for evacuation vehicles to have access to these areas.

**ASSESSMENT OF WATER SUPPLY AND SANITATION SITUATIONS BY THE RESPONDENTS**

The respondents were asked to assess the present water supply and sanitation situation in their various areas. Their responses are presented and analyzed in the tables below.

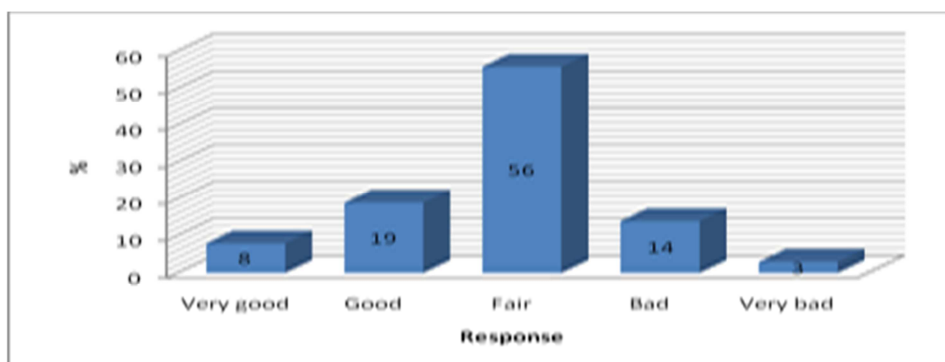
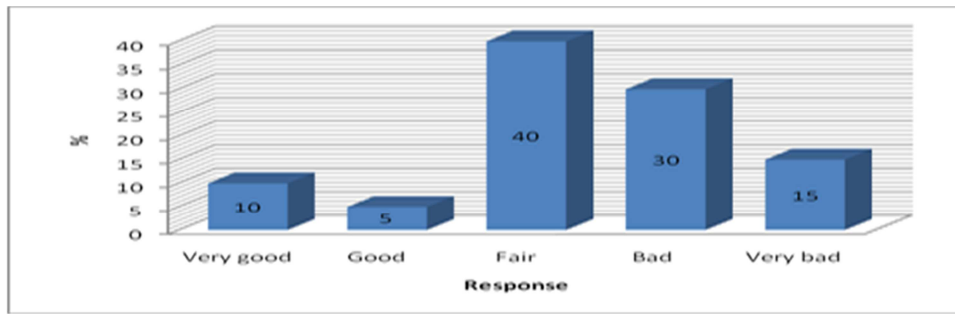


Fig 10: Assessment of water supply situation by the respondents

Source: Field work, 2012.

The result from Figure 10 shows that 8% of the respondents see the water supply situation in their areas as very good, 19% of the respondents see the situation as good while 56% of the respondents see the water supply situation as fair. In the views of 14% of the respondents, the water supply situation in their area is bad while 3% of the respondents see the situation as being very bad in their respective areas.





**Fig 11: Assessment of sanitation situation by the respondents**

Source: Field work, 2012.

Figure 11 shows that 10% of the respondents see the sanitation situation in their areas as very good, 5% of the respondents see the situation as good while 40% of the respondents see the sanitation situation as fair. In the views of 30% of the respondents, the sanitation situation in their area is bad while 15% of the respondents see the situation as being very bad in their respective areas. As per the laboratory report, the water test concluded that it was physico-chemically and bacteriologically unsafe for consumption.

## 4 SUMMARY AND CONCLUSION

### 4.1 SUMMARY

The results of findings show that majority of households in the study area use hand dug wells as their major source of water supply while privately owned boreholes, Kaduna State Water Board (KSWB), water vendors and streams are other main sources. This simply implies that a large proportion of households in the sample area get their water from untreated and sometimes unhealthy sources,

Analysis of the distance travelled to the source of water supply revealed some information about their situation. Majority of the respondents travel long distances to their respective sources of water supply.

The results obtained from the study also reveals that the major water supply problems faced by the households in the study area includes inadequate supply, distance to the source of water supply and irregularity in supply from the sources as well as water being supplied from various sources. The implication of this is that although the various sources of water supply in the study area include hand dug wells, boreholes, KSWB, water vendors and streams, differences in the sources vary significantly from area to area.

The risk of various sanitation related infections and diseases are high in the study area due to the poor methods of solid waste disposal. The implication of these poor solid waste disposal methods by the households in the study area is that; people who live close to waste dumps are exposed to various health risks such as malaria, bad odour, cholera, diarrhea, hepatitis B and dysentery. It also causes serious environmental problems such as water pollution, poor environmental quality and aesthetics, air pollution and water pollution, as this confirms a similar study carried in Ambo town Ethiopia carried out by Shanmugham and Solomon in 2011.

### 4.2 RECOMMENDATIONS

Based on the results and findings of this research work, it is necessary to get the private sector involved in water supply in the areas of fund mobilization for the construction, maintenance, rehabilitation and expansion of water supply and sanitation facilities in Kaduna metropolis. It is also recommended that the government agencies responsible for the provision of water supply and sanitation facilities should be adequately funded and equipped to carry out their services to the people in order to reach the goal 7 of the MDG 2015 target as reported by the Public Relations Officer of Kaduna State Water Board.

#### 4.3 CONCLUSION

The water supply and sanitation situation in Kaduna metropolis illustrates the scenario in other urban and rural areas of Kaduna state in particular and Nigeria in general. To some extent, the poor sanitation and water supply situation in Kaduna metropolis is due to inadequacy of the state government and private sector participation in the provision of these basic facilities coupled with the rapid increase in the population of people in Kaduna metropolis. This explains why majority of the people in the study area resort to untreated sources of water supply such as hand dug wells, water vendors, streams. Also, the people employ various unhygienic ways of disposing their solid wastes and waste water.

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