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Full Length Research Papers

Assessment of Water Supply Situation in the Rural Areas of Kano State, Northern Nigeria

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An assessment for the rural water supply situation of Kano state was undertaken. Sixteen rural villages were visited. Interview was used in gathering data. A total of 394 respondents were successfully interviewed. The result indicated that open well is the common source of water in the rural villages of Kano with 41.4% of the total responses. In terms of usage of the water, reservoir recorded the highest responses of 30.7%. It was also determined that 60.7% of the respondent stated that they buy water from water vendors. It was also discovered that 62.9% of the respondents are of the opinion that drinking water is inadequate in the rural villages of Kano state. Research findings attributed that 39.3% of the respondents said the water sources are controlled by individuals and most of the water users obtain their water in less than 500m trek distance according to 67.8% of the respondents. In view of that it is strongly recommended that government, nongovernmental organisations, wealthy individuals and community should provide more bore holes and hand pumps in the study area to arrest drinking of untreated water.

Keywords: Evaluate, Present, water supply, Situation, Rural areas.

INTRODUCTION

Water as one of the natural resources required for the survival of man, animals and plants is unevenly distributed on the earth's surface and below the earth's surface. There are a lot of variations in terms of both quantity and quality of natural water whether surface or underground. Yet people and animals need clean potable water to survive. The major sources of clean water are either tap, bore hole, hand pumps and open wells. In the absence of good available water, people begin to use unsafe sources and encounter some heath problems. Pimentel et al (1996) states that about 90% of the diseases occurring in developing countries result from lack of clean water. It is also predicted that by the year 2025, many African countries will experience water scarcity (WMO, 2002).U.N.E.P (2006) reports that, degradation of groundwater is one of the most serious water resources problems in Africa and that is why its management is crucial.

Water is the resource that sustains all life on earth and is a key element of sustainable development. Water is an infinite resource, worldwide there is an imbalance between water utilisation and water resources management. This

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imbalance has brought a veritable crisis with regard to water in many regions of the world. Yatsuka (2002) reports that it is projected that by 2025, about 3.5 billion people- approximately 6.5 times as many people as in the year 2000- will live in water stressed countries. This indicates the level of water resource deterioration globally.

In most regions of the world, water availability has rapidly decreased for example in Asia water availability per capita ranks as least in the world with 4,200m3/capita per year a little more than half the world average of 7,000m3. In the year 2025, water availability per capita in Asian region and the rest of the world will probably be between 15 and 35 less than that of 1950 (ADB,2001).

As population increases and development calls for increased allocation of groundwater and surface for domestic, agricultural and industrial sectors, the pressure on water resources intensifies, leading to tension, conflicts among users and excessive pressure on the environment. UNDP (2006) reported that people in the slums of developing countries typically pay 5-10 times more per unit of water than do people with access to piped water. In another development WMO (2008) revealed that by 2025 1800 million people will be living in countries with absolute water scarcity and two-thirds of the world population could be under stress condition.

For poor people, water scarcity is not only about droughts or rivers running dry. Above all, it is about guaranteeing the fair and access they need to sustain their lives and secure livelihood. In Nigeria water scarcity as far back as even before the colonial period when people migrate from one part of the country to another in search of water. It is established that only 27.4% of the total population of the country was served with improved water supply in 1974, in the country, with rural population, accounting for not more than 0.30% (Oyebende, 1977 in Sheka, 2005.Cited in Nura and Sabo, 2011).

In many researches interview and questionnaires were used in determining presence water supply situation in different parts of the world. MOWI (2010) determine the condition of water supply and heath in Tanzania using interview and questionnaires among households. In their research it was discovered from the responses that more than ½ of the population of Tanzania's water supply is improved, 79% in urban areas and 44% in the rural areas.Overall findings of the research indicate that access to water supply stagnated in rural areas. In another development WHO and UNICEF (2010) conducted research on water supply situation in Bangladesh. In the work interview was used as a major tool of data collection. Their findings attributed that 44% of the respondents in rural areas stated that water supply problem is the major problem they want government to addressed, 16% said it is the single most important problem, 40% said it is not a problem. In the same research it was reported that 97% of the rural population depend on groundwater as the major source of drinking water and 56% have access to clean water. In rural areas of Bangladesh it was determined that 0.6% of water supply is from pipe born water, 96% is from tube wells and 2% from ponds, lakes and rivers.

In another development Thomas and Lucy (2005) conducted a similar research in India after the tsunami of 26/12/2004. The researchers use monitoring broadcast information, web and print media information and interview of households. It was determined that 61% of the total population uses tankers water 12.1% rely on shallow wells, 8.8% depend on bore hole and 5.8% depend on treatment units. Victor, Zvikomborero and Damas (2012) uses documentary review, household questionnaires and informants interview to accesses the performance of urban water supply utilities in small towns in Zimbabwe. Their findings show that more than 80% of customers complaints on water quality and water shortage. Likewise Gilbert kimanzi (2001) measured the challenges of rural water sub sector reform in Uganda using secondary data and interview. Their work identified that 20% of water supply is supported by major government/Donor funded projects in 1991-2000. It is also reported that 55% of the rural population have access to safe water supply and 52% to basic sanitation.

Researches of this nature are also conducted in northern Nigeria for example Abaje, Ati and Ishaya (2009) uses questionnaire survey to assesses nature of portable water supply in five wards of Jama'a LGA of Kaduna state. In which it was determined that 63% of the respondents have pipe born water from water board and 37% do not have. 60% of the respondents said they are not satisfied with their water source. The study adopted similar methodology to achieve its objective which is to assess the nature of water supply in rural areas of Kano state Nigeria.

METHODOLOGY

The study Area

Kano state extend between latitude $10^0 3^{'}$ N to $12^0 3^{'}$ N and longitude $7^0 35^{'}$ E to $9^0 20^{'}$ E (Figure: 1). It is made up of 44 Local Government Areas. Out of which 38 are in the rural areas of the state. The total land area of the state is about 20,760sq km (Research and Documentation Directorate Kano, 2009). The total population in 2006 national census is about 9,386820 people (N. P .C report, 2009). (Figure:1)

Rural areas of Kano are located on the high plains of Hausa Land. The areas are underlain by the Basement Complex rocks of Precambrian era. These basement complex forms part of the pan African mobile belt and lies between the West African craton and the Tuareg shield. Earlier workers have intricately linked the overall emplacement of the Nigerian basement complex to the earliest orogenic events that affected the African continent.

The vegetation of the Study area is Sudan Savannah type. Olofin (1987) observed that the natural vegetation of

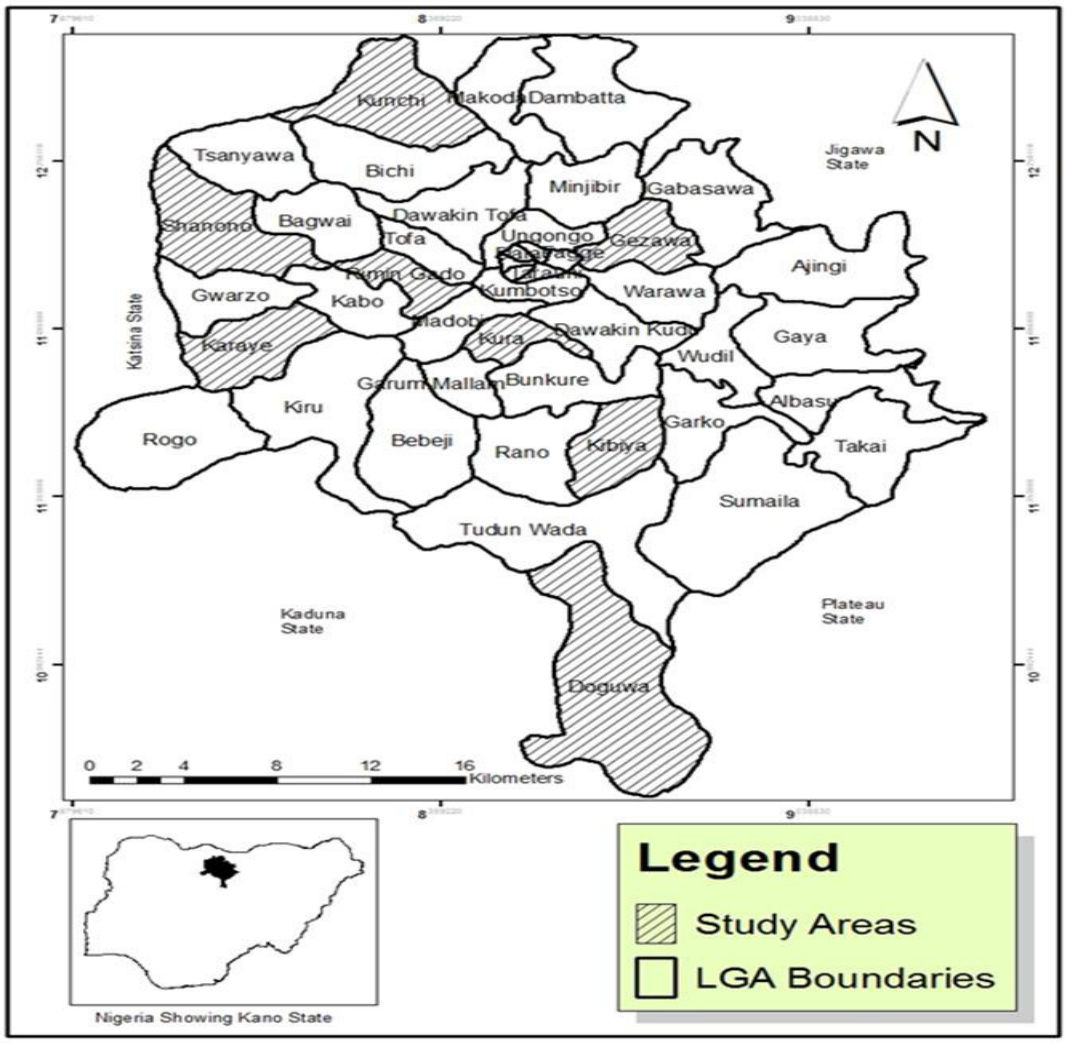

Figure 1 Map of the Study area

the study area is tropical grass land characterised by scattered trees which hardly exceed 20 metres high. The soil of the region is sandy ferruginous type, while the zonal soils are also influenced by human manipulation to varying degrees (Olofin,1987). Kano State is located in the tropics, a region characterised by alternating wet and dry conditions, with annual rainfall of 850mm occurring between April/May and September/October with peak in July and August.

Self administered interview was used to interview respondents in the rural villages of the state. This was done by the Researchers and two research assistants. Questionnaires were used; tape recorder was used during the interview session. Out of the 44 LGAs of Kano state 38 are considered to be rural among which 8 LGAs were selected on ratio 3:3:2 from the 3 senatorial districts. For the selection of respondent's sample, Population data of the 16 selected villages which are all wards was obtained from 1991 population results which were projected to march, 2012 using exponential growth model. Out of this 3% of the households' population were selected as a sample i.e at 95% confidence interval and 5% confidence limit as adopted from Krejcie and morgan (1970) A total of 394 respondents were successfully interview out of the total sample of 475 from the 16 rural villages.

To analysed the data interview result was coded in Microsoft excel. The result was transferred to SPSS for calculation of totals, means, percentages and standard deviation. Charts and graphs were also produced all using the SPSS package.

RESULTS AND DISCUSSION

Responses on common sources of drinking water

Table:1 show responses on common sources of drinking in the study area. The result indicate that in Kano north river

Table 1: Responses on the common sources of drinking water in the rural areas of Kano

Senatorial Zone	Common Source of Water															
	Open Well		River		Hand Pump		Bore hole		Reservour		River Well		Tap		Total	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Kano North	22	5.6%	49	12.4%	0	0.0%	16	4.1%	35	8.9%	0	0.0%	0	0.0%	122	31.0%
Kano South	74	18.8%	13	3.3%	11	2.8%	10	2.5%	27	6.9%	9	2.3%	24	6.1%	168	42.6%
Kano Central	67	17.0%	15	3.8%	5	1.3%	9	2.3%	1	.3%	7	1.8%	0	0.0%	104	26.4%
Total	163	41.4%	77	19.5%	16	4.1%	35	8.9%	63	16.0%	16	4.1%	24	6.1%	394	100.0%

Source: Field Survey, 2012

Table 2: Responses on usage of the water sources among the rural villages

Village	The Source Use													
	Not Applicable		Reservour		River		Open Well		Bore hole		Tap		Total	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Shuwaki	16	4.1%	3	.8%	0	0.0%	2	.5%	0	0.0%	0	0.0%	21	5.3%
Yandadi	10	2.5%	17	4.3%	1	.3%	1	.3%	0	0.0%	0	0.0%	29	7.4%
Doka/D	23	5.8%	11	2.8%	0	0.0%	1	.3%	0	0.0%	0	0.0%	35	8.9%
K/Yashi	0	0.0%	0	0.0%	12	3.0%	0	0.0%	0	0.0%	0	0.0%	12	3.0%
Shakogi	6	1.5%	0	0.0%	8	2.0%	0	0.0%	0	0.0%	0	0.0%	14	3.6%
Alajawa	3	.8%	1	.3%	7	1.8%	0	0.0%	0	0.0%	0	0.0%	11	2.8%
Riruwai	20	5.1%	7	1.8%	8	2.0%	0	0.0%	0	0.0%	0	0.0%	35	8.9%
Zainabi	2	.5%	8	2.0%	1	.3%	10	2.5%	0	0.0%	0	0.0%	21	5.3%
T/Kaya	3	.8%	11	2.8%	1	.3%	0	0.0%	0	0.0%	0	0.0%	15	3.8%
Turawa	0	0.0%	0	0.0%	4	1.0%	6	1.5%	0	0.0%	0	0.0%	10	2.5%
Fammar	8	2.0%	5	1.3%	1	.3%	0	0.0%	0	0.0%	5	1.3%	19	4.8%
Tarai	18	4.6%	24	6.1%	2	.5%	0	0.0%	6	1.5%	18	4.6%	68	17.3%
Babawa	0	0.0%	0	0.0%	5	1.3%	12	3.0%	0	0.0%	0	0.0%	17	4.3%
Tumbau	0	0.0%	1	.3%	11	2.8%	7	1.8%	0	0.0%	0	0.0%	19	4.8%
Karfi	12	3.0%	33	8.4%	7	1.8%	3	.8%	0	0.0%	0	0.0%	55	14.0%
Kosawa	9	2.3%	0	0.0%	0	0.0%	0	0.0%	4	1.0%	0	0.0%	13	3.3%
Total	130	33.0%	121	30.7%	68	17.3%	42	10.7%	10	2.5%	23	5.8%	394	100.0%

Source: Field Survey, 2012

is the common source of rural water supply with the highest responses of 49 or 12.4% followed by reservoirs 8.9% and open well 5.6%, in Kano central and Kano south open well is the common source of water with highest responses of 74 or 18.8% and 67 or 17.0% respectively followed by reservoirs and tap. In the whole state open well recorded the highest responses of 163 or 41.4% followed by river with 77 responses or 19.5%, reservoir with 63 responses or 16.0%. Hand pump recorded the least responses.

Table:2 show result of interview on the water sources use in the rural areas of Kano where 121 respondents or 30.7% indicates that they use reservoir water, 68 respondents or 17.3% states that they use water from river, 42 respondents or10.7% rely on open well, 10 respondents or 2.5% states that they use bore hole water while 23 respondents or 5.5% pointed out that they depend on tap water. Among the rural villages households in Karfi Kano central depend on reservoir with highest responses of 33 or 8.4%, Karofinyashi in Kano north depend on river water

Table 3: Responses on major sources of drinking water in the senatorial zone of Kano

Senatorial Zone	Major Source							
	Ground Water		Surface Water		Tap Water		Total	
	F	%	F	%	F	%	F	%
Kano North	23	5.8%	94	23.9%	5	1.3%	122	31.0%
Kano South	79	20.1%	66	16.8%	23	5.8%	168	42.6%
KanoCentral	45	11.4%	56	14.2%	3	.8%	104	26.4%
Total	147	37.3%	216	54.8%	31	7.9%	394	100.0%

Source: Field Survey, 2012

Table 4: Responses on Trek distance to water sources

Village	Trek Distance															
	Not Applicable		<500m		500m		1km		2km		3-5km		>5km		Total	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Shuwaki	0	0.0%	14	3.6%	6	1.5%	1	.3%	0	0.0%	0	0.0%	0	0.0%	21	5.3%
Yandadi	0	0.0%	20	5.1%	9	2.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	29	7.4%
D/Dawa	0	0.0%	28	7.1%	7	1.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	35	8.9%
K/Yashi	0	0.0%	12	3.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	12	3.0%
Shakogi	0	0.0%	14	3.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	14	3.6%
Alajawa	0	0.0%	9	2.3%	2	.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	11	2.8%
Riruwai	0	0.0%	27	6.9%	2	.5%	1	.3%	2	.5%	1	.3%	2	.5%	35	8.9%
Zainabi	0	0.0%	7	1.8%	3	.8%	9	2.3%	2	.5%	0	0.0%	0	0.0%	21	5.3%
T/Kaya	0	0.0%	13	3.3%	0	0.0%	1	.3%	1	.3%	0	0.0%	0	0.0%	15	3.8%
Turawa	0	0.0%	6	1.5%	0	0.0%	0	0.0%	4	1.0%	0	0.0%	0	0.0%	10	2.5%
Fammar	4	1.0%	6	1.5%	0	0.0%	5	1.3%	3	.8%	1	.3%	0	0.0%	19	4.8%
Tarai	16	4.1%	24	6.1%	9	2.3%	13	3.3%	2	.5%	3	.8%	1	.3%	68	17.3%
Babawa	0	0.0%	16	4.1%	1	.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	17	4.3%
Tumbau	0	0.0%	16	4.1%	0	0.0%	1	.3%	1	.3%	1	.3%	0	0.0%	19	4.8%
Karfi	0	0.0%	44	11.2%	0	0.0%	2	.5%	7	1.8%	2	.5%	0	0.0%	55	14.0%
Kosawa	0	0.0%	11	2.8%	1	.3%	1	.3%	0	0.0%	0	0.0%	0	0.0%	13	3.3%
Total	20	5.1%	267	67.8%	40	10.2%	34	8.6%	22	5.6%	8	2.0%	3	.8%	394	100.0%

Source: Field Survey, 2012

with 12 responses or 3.0%, Babawa in Kano central depend on open well with 12 respondents or 3.0% and Tarai in Kano south uses bore hole and tap with responses of 6 or 1.5% and 18 or 4.6% respectively.

Major sources of drinking water

Table:3 show responses on the major sources of drinking water in the rural villages of Kano state. The result shows that in rural villages of Kano north Surface water recorded the highest responses of 94 or 23.9% followed by groundwater then tap, in Kano south groundwater recorded highest responses of 79 or 20.1% followed by surface water then tap and in Kano central surface water is leading with 216 responses of 54.8% followed by groundwater then tap water.

Trek distance to water sources from houses

Table:4 show responses on trek distance from houses to water distance. It indicated that most of the respondents in the sixteen rural villages stated that they obtained their drinking water in less than 500m distance from home i.e. 267 respondents or 67.8%, 40 respondents or 10.2%

Table 5: Control of water sources in the rural villages of Kano

Village	Control of Water Source											
	Nature		Individual		Community		Entrepreneur		Government		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Shuwaki	11	2.8%	6	1.5%	0	0.0%	0	0.0%	4	1.0%	21	5.3%
Yandadi	9	2.3%	3	0.8%	0	0.0%	1	0.3%	16	4.1%	29	7.4%
DokaD/w	3	0.8%	1	0.3%	0	0.0%	0	0.0%	31	7.9%	35	8.9%
K/Yashi	11	2.8%	0	0.0%	1	0.3%	0	0.0%	0	0.0%	12	3.0%
Shakogi	8	2.0%	0	0.0%	3	0.8%	3	0.8%	0	0.0%	14	3.6%
Alajawa	8	2.0%	1	0.3%	1	0.3%	0	0.0%	1	0.3%	11	2.8%
Riruwai	9	2.3%	0	0.0%	0	0.0%	3	0.8%	23	5.8%	35	8.9%
Zainabi	3	0.8%	10	2.5%	7	1.8%	0	0.0%	1	0.3%	21	5.3%
T/Kaya	0	0.0%	13	3.3%	1	0.3%	0	0.0%	1	0.3%	15	3.8%
Turawa	6	1.5%	4	1.0%	0	0.0%	0	0.0%	0	0.0%	10	2.5%
Fammar	1	0.3%	10	2.5%	0	0.0%	1	0.3%	7	1.8%	19	4.8%
Tarai	2	0.5%	37	9.4%	0	0.0%	2	0.5%	27	6.9%	68	17.3%
Babawa	5	1.3%	11	2.8%	1	0.3%	0	0.0%	0	0.0%	17	4.3%
Tumbau	8	2.0%	9	2.3%	1	0.3%	0	0.0%	1	0.3%	19	4.8%
Karfi	3	0.8%	46	11.7%	2	0.5%	0	0.0%	4	1.0%	55	14.0%
Kosawa	1	0.3%	4	1.0%	1	0.3%	0	0.0%	7	1.8%	13	3.3%
Total	88	22.3%	155	39.3%	18	4.6%	10	2.5%	123	31.2%	394	100.0%

Source: Field Survey, 2012

travelled for about 500m to obtained water, 34 respondents or 8.6% obtained their drinking water in about 1km distance and 5% of the respondents pointed out that they obtained their water at zero distance. It can be observed that most of the respondents get water from less than 500m distance i.e. 97 respondents or 79% in the Kano north , 83 respondents or 49% in Kano south and 87 or 83% in Kano central respectively. The result also indicate that in Kano north 29 or 17% of the respondents state that they have to walk for 2 kilometres to get water, in Kano south 14 respondents or 8.3% and in Kano central 8 respondents or 8%.

Control of water sources in rural villages of Kano

Table:5 indicate that most of the water sources are controlled by individuals with 39.3% of the responses, followed by Government with 31.2%, nature 22.3% and the one with lowest responses is entrepreneur ship with 2.5%. This shows that most of the water sources are open well controlled by individual households. Among the villages it can be seen that Shuwaki and K/yashi from Kano north recorded the highest responses on control of water source by nature with 2.8% each. Karfi in Kano central recorded highest responses on control of water sources by individual with 11.7%, Dokadawa in Kano north recorded the highest responses on control of water sources by Government with 7.9% followed by Tarai and Riruwai in Kano south with 6.9% and 5.8% respectively. Entrepreneur recorded highest responses in Shakogi and Riruwai all with 0.8%.

Adequacy of water supply in rural areas of Kano

Figure:1 indicates that 62.9% of the respondents said water supply is not adequate in their rural villages, 33.0% are of the opinion that water supply is adequate in their end and 4.1% of the respondents didn't responded to this question. Highest percentage of respondents that say water is not adequate is recorded in Karfi Kano central with 11.4% and Tarai in Kano south recoded highest percentage of yes with 6.6%.shows that in Kano north 86 respondent states that drinking water is in adequate, 36 said it is adequate. In Kano south 104 respondents believed that drinking water is inadequate and 55 said it is adequate. In Kano central 58 respondents are of the view that drinking water is inadequate and 39 said it is adequate.

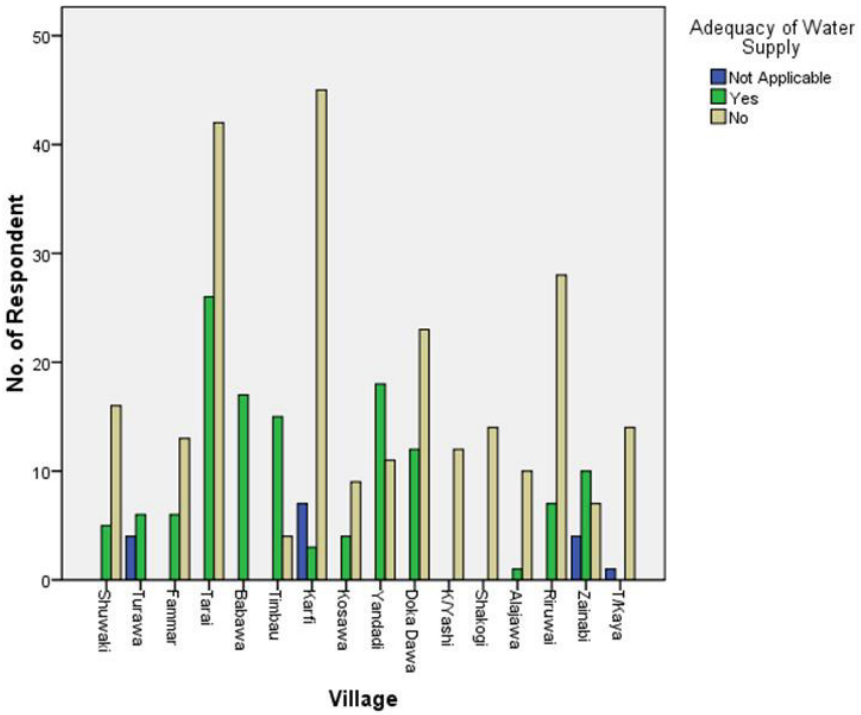

Figure 1: Adequacy of water supply in the rural areas of Kano
Source: Data analysis, 2013

Table: 7 Responses on buying drinking water

Senatorial Zone	Do You Buy Water					
	Yes		No		Total	
	F	%	F	%	F	%
Kano North	65	16.5%	57	14.5%	122	31.0%
Kano South	118	29.9%	50	12.7%	168	42.6%
Kano Central	56	14.2%	48	12.2%	104	26.4%
Total	239	60.7%	155	39.3%	394	100.0%

Source: Field Survey, 2012

Responses on purchase of drinking water in the rural villages

Table 7 present that 60.7% of the respondents said they buy water and only 39.3% said they don't buy water at all. Rural villages in Kano south recorded the highest number of respondents that said they buy water with 29.9% followed by Kano north with 16.5% responses and Kano central with 12.2% responses.

Table: 4 outline amount of money spend by households in the rural villages of the state in which 33.0% of the respondents stated that they spend less than N100 per day on drinking water, 18.0% spend up to N100, 11.7% N150-N200, 2.5% N250-N500 and 0.5% more than N500. Rural villages in Kano south recorded the largest percentage of those that buy water at <N100 of 15.0%. It can be seen that 34.3% of the respondents do not spend any amount on drinking water.

Table 8: Responses on amount of money spend per day on drinking water

Senatorial Zone	If yes How Much													
	Not Applicable		<N100		N100		N150-200		N250-500		>500		Total	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Kano North	57	14.5%	21	5.3%	30	7.6%	12	3.0%	0	0.0%	2	.5%	122	31.0%
Kano South	43	10.9%	59	15.0%	25	6.3%	31	7.9%	10	2.5%	0	0.0%	168	42.6%
Kano Central	35	8.9%	50	12.7%	16	4.1%	3	.8%	0	0.0%	0	0.0%	104	26.4%
Total	135	34.3%	130	33.0%	71	18.0%	46	11.7%	10	2.5%	2	.5%	394	100.0%

Source: Field Survey, 2012

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

Water is an essential resource for life and good health. A lack of water to meet daily needs is a reality today for one three people around the world. Globally, the problem is getting worse as cities and population grow and the needs for water increase in agriculture, industry and household. Water supply in rural areas depends mostly on groundwater sources. In the rareas of shallow water deposits hand dung wells are sunk to supply the water need by the local inhabitants. Aditi et al (2002) reports that groundwater has emerged as the primary domestic water source and poverty reduction tool in India's rural areas.

The interview result established that most of the respondents obtained their water at less than 500m from their residents. It was observed that distance covered to get water in Kano north is greater than that of villages in Kano central and Kano south.

The research findings through interview identified that in the sixteen rural villages studied most of the water sources are constructed and owned by individuals. It was deduced from the interview result that in most of the rural villages of Kano State water supply is inadequate. The study also established that villages in Kano south suffer much in terms of water shortage followed by village of Kano north and then villages in Kano central. This finding is in line with that of Sara and Charles (1988) that areas at the southern part of Kano suffer more from water shortage. This is also supported by Macdonald (2005). Who established that water supply is grossly inadequate in most of the rural community of Kano. Appendix I and II indicated amount of water released and water treated for use in the whole state which is reducing every year and is mostly for urban centres of the state,

The study revealed that majority of the households in the rural villages buy drinking water from water vendors. The study also established that households of the rural village in Kano south buy water more than those of Kano north and Kano central. The survey result also identified that in most of the rural villages of the state households are spending N100 to N200 daily on drinking water. This is an indication of water scarcity in the rural villages of Kano.

RECOMMENDATIONS

Reference the findings of the research it is recommended that Government, nongovernmental organisations, wealthy individuals and community should provide more bore holes and hand pumps in the study area to arrest drinking of untreated water. More especially in the villages of Kano south and north where water shortage is more pronounced and taken river and reservoir water is very common.

Further studies are recommended in the study area that involves validation of result using bore holes and dug wells data.

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