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EVALUATION OF THE STATUS OF WATER RESOURCES AND INFRASTRUCTURE FOR COMMUNITY DEVELOPMENT IN WARWADE, DUTSE, JIGAWA STATE, NIGERIA

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ABSTRACT

The Study examined the status of water resources and infrastructure for community development in Warwade town. Water scarcity and ineffective water infrastructures are among the major problems hindering community development in the area. The aim of the research was to evaluate status of water infrastructures. Availability sampling technique was adopted. Data was gathered using check list, self-administered questionnaire, field observation and FGD. The data was analysed using simple statistics and Likert Scale. Findings of the research shows that most of the respondents involved in patching water are between the ages of 30 to 59. Findings on educational status indicated that 44% of the respondents attended primary school. Results indicated that majority of the respondents are farmers 24 (48%). Also result shows that there is one major dam in the area which is underutilised. Result from check list shows that there are 20 open well, 6 functioning and 14 non-functioning, 6 hand pumps 4 are functioning and 2 non-functioning. The result shows that ''Pipe born water was provided to the village in 2003 which is no longer functioning and prior to that time there was only one single borehole powered by electricity at Zobiya which was converted to solar''. Similarly research findings revealed that the major source of water for the community are street open wells with 46% responses. The most popular traditional method of water management is Kwari with 60% responses. Likert scale of analysis shows that the computed means of the performance of stakeholders in the provision of water infrastructural facilities in the study area are below non satisfactory range of (0.50-1.27) and satisfactory range of (2.80-3.42). It is concluded that the area is backward in terms of community water management. It was recommended that the dam should be fully utilise by constructing a treatment plant and providing more water infrastructures for community development.

Keywords: *Community, Water Resource, Infrastructure, Rural Areas, Development*

INTRODUCTION

Water as a resource is essential for sustainable life and development on the planet Earth and it is unevenly distributed that is even why it is regarded as a source of permanent conflict. The growth of human population coupled with the climate variability has significantly affect water availability and access in different parts of the world. This problem is made more severe by the nature of geologic formation in different areas and anthropogenic activities that affect the actual water quality. One basic fact about water is that the physical reality of life depend on water; it is the essence of man's existence and is therefore the most critical resources occupied by earth systems (Robert, 2007). As populations and economies continue to expand and as anthropogenic climate change accelerates, pressures on regional freshwater resources are also growing. A wide range of assessments of water pressures has been produced in recent years, including the regular updates from the United Nations World Water Development Reports (WWAP) (Gleick, 2015).

In Africa the amount of water needed for development have increased but the population have tripled and demand for water is set to grow markedly in coming decades due to population growth and need for more water to use (MacDonald., *et al*, 2013). It was discovered by scientists that the notoriously dry continent of Africa is sitting on a vast reservoir of groundwater. They argue that the total volume of water in aquifers underground is 100 times the amount found on the surface (Bonsor, 2012). Community water infrastructural provision and maintenance is becoming inadequate in many developing countries particularly in rural areas. Over the last decades, community management has become the default approach for rural water supply in many low and middle-income countries (Hutchings *et al*., 2015 in Lukas, 2016). Provision of water infrastructures are confronted with weak local governance and failing public service provision whereby many development actors hand

over management of rural infrastructure facilities to the community. Community water infrastructural development is based on the three main principles that (i) communities should participate in the development of water supply schemes, (ii) take ownership of them and finally (iii) take on the responsibility to carry out operation and maintenance (Lukas, 2016).

In semi-arid environments like the Chad formation in which Jigawa State belongs to, community water management often still focuses exclusively on management of water assets. The practitioners do not often consider the importance of providing communities with information concerning their available water resources this is due to inadequate data on water supply and management. In arid, semi-arid and drought-prone regions, vulnerable groundwater sources and seasonal surface water ponds may be the only viable option for water supply, however, responsible planning for drought mitigation at community level is often omitted (Day, 2009).

Nigerian government established Small Towns Water Supply and Sanitation Programme (STWSSP) with intention of improving Water Supply and Sanitation in Nigeria's over 4,000 small towns (Federal Ministry of Water Resources [FMWR], 2018). This initiative focuses on community ownership and management of water supply and sanitation facilities with community selection of technologies in a participatory manner. Despite of such efforts community water supply and management in most of the Nigerian rural communities are still lacking. In the study area there is one of the two major dams in the state but water supply is facing a lot of setbacks due to insufficient community water management practices. This is attributed to the fact that Jigawa is one of the third generation states in Nigeria typified by rural settings; challenged by poor and emerging infrastructure and social facilities including water (Ministry of Water resources Jigawa State, 2017). Also Yakubu, Umar, and Shobowale, (2015) Reported that In the year 2000, STOWA was established as a government agency in Jigawa that is responsible for, among others, provision and delivery of water services in small towns with population of 5,000 to 20,000 in the state (STOWA law, 2000), but all in vain. Many researches were conducted on community water management but none of them was in the study area like that of Mimrose*et al* (2011) in Kandy District and established that according to the assessment of community water management, 14 outof 20 schemes were found to be sustainable whilst four and two schemes were found to be potentially sustainable and unsustainable respectively.

Rolston (2017) conducted a research I Ireland United Kingdom and revealed that a greater proportion of respondents from the Republic of Ireland identified themselves as Group Water Scheme members compared to the UK (18.1% and 1.8% respectively). These among other issues are the major reasons why the objective of the study was to assess the level of community water management for improvement.

DESCRIPTION OF THE STUDY AREA

The study area is Warwade town about 15kms south of Dutse Jigawa State. It is Located between latitude 11º43'30''N, 11º46'30''N and Longitude 9º11'30''E, 9º16'30''E (Figure 1). The relief of the area is flat with little undulation (Ahmed, 2003). The geology of the area is sedimentary formation of the Chad basin (Olofin, 1973). The soil of the area is generally sandy. In terms of groundwater the area is characterised by low surface water and high groundwater. The water table of the area is from 25m to 50m (Abdulhamid, 2014).

MATERIAL AND METHODS

Sampling Procedures

In this study availability sampling technique was used in whereby 10 respondents were selected from the five wards as *Unguwar-Sarki, Unguwar-gabas, Unguwar-yamma, Unguwar-kudu and Jarkuka* amounting to a total of 50 respondents. The respondents were selected at the point of water collection. Likewise seven people were selected for Focus Group Discussion (FGD) at village head gathering centre.

Methods of Data Collection

The data for the research was generated using check list, self-administered questionnaire in which fifty questionnaires were administered in order to obtained information on water supply situation, water availability and community water management. Field observation and FGD were also conducted in order generate data on community water management strategies.

Methods of Data Analysis

The data was analysed using simple mean, tables, percentages and Likert scale of analysis.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

Findings of the research shows that 46 (92%) are male while 4 (8%) are females. This indicated that people in charge of patching water in the area are male and even the four involved are widows. This result is contrary to the findings of (Leino, 2007) in Kenya that female participated more on water provision, maintenance and management. With regards to age most of the respondent involved in taking water to houses are between the ages of 30 to 59. The result shows that respondents of 30 -39 are 13 (26%), 40 – 49 12 (24%) and 50 – 59 (20%) while respondents of 70 years and above are just 4%. This shows that water patching and concern over is an affair of the youth group in the study area (table 1). In terms of educational status findings indicated that 44% of the respondents attended primary school, 24% attended Qur'anic schools and only 10% attended tertiary institutions (Table 1). This is one of the major problem affecting the development of water infrastructural facilities in the area.

Also research findings indicated that majority of the respondents who are patching the water at water points are

farmers 24 (48%), those involved in rearing animals like castles are 7 (14%), Eight (16%) are civil Servants and only 2% are fishermen in the area (table 1). This shows that most of the people are either famers of cattle breeders that needs a lot of water for different uses.

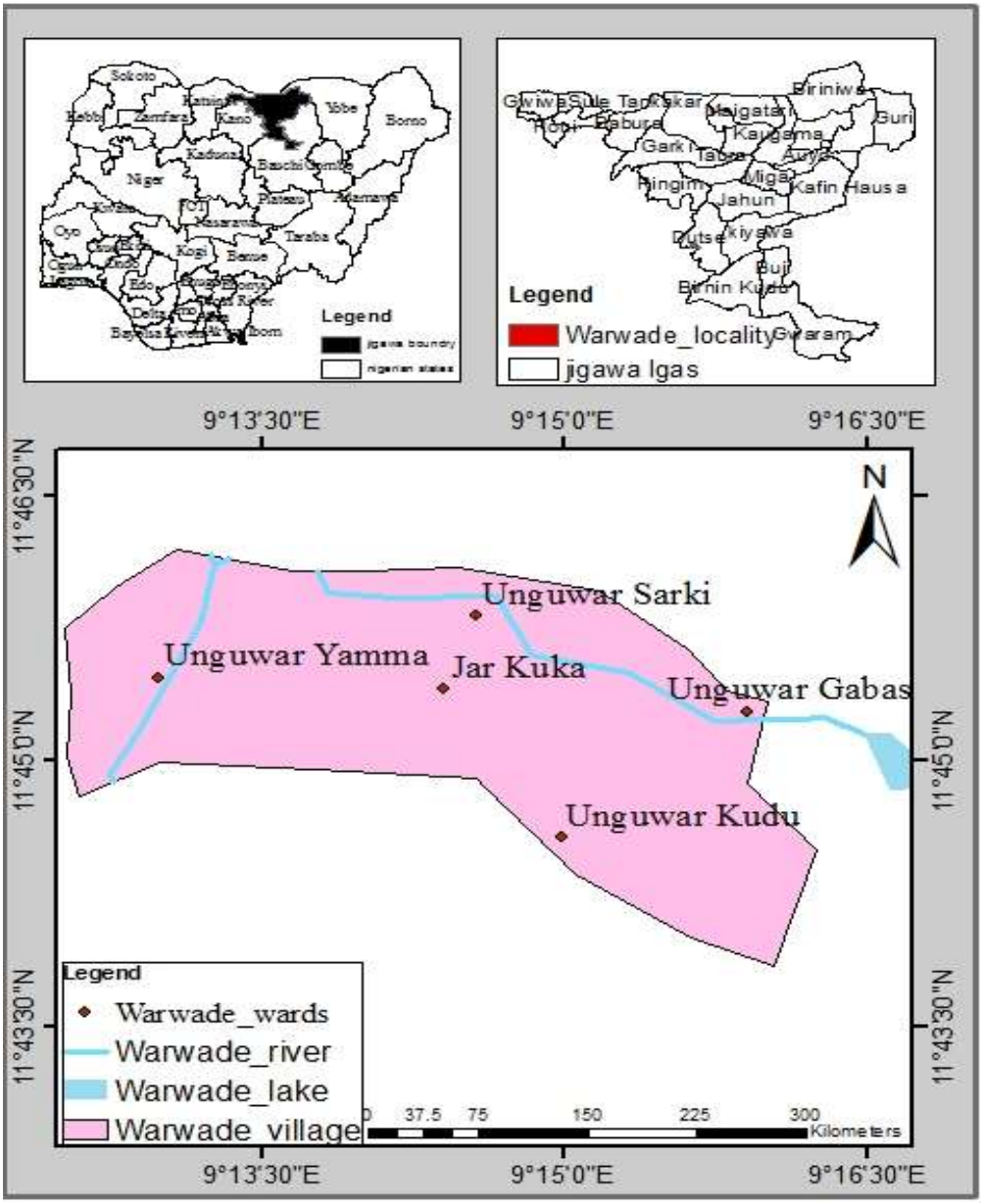

Fig 1. The Study Area
Source: Cartography and GIS Lab, Bayero University, Kano

Table 1 Demographic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	46	92
Female	4	8
Total	50	100
Age		
<20 years	3	6
20-29	6	12
30- 39	13	26
40 – 49	12	24
50 – 59	10	20
60 – 69	4	8
70 and above	2	4
Total	50	100
Educational status		
Primary	22	44
Secondary	11	22
Tertiary	5	10
Qur'anic	12	24
Total	50	100
Occupation		
Farming	24	48
Rearing	7	14
Fishing	1	2
Trading	4	8
Business	6	12
Civil servant	8	16
Total	50	100

Source: Field Survey, 2017

The status of major water infrastructure in the study area

Findings of the research from check list indicated that out of 20 open well only 6 are functioning, solar boreholes, there are 2 solar bore holes 1 is functioning. Solar borehole with wearing only one and there is one dam in the area that contain water but not fully utilised (Table 2).

Table 2 Functioning and Non Functioning water Sources

S/N	Water Sources	Total	Functioning	Non Functioning
1	Dam (Reservoir)	1	1	0
2	Open wells	20	6	14
3	Hand pumps	6	4	2
4	Solar borehole	2	1	1
5	Solar with wearing	1	1	0
	Total	30	13	17

Source: Field observation, 2017

People reliance on the water sources

Research findings from questionnaire shows that street open wells are the major sources of water used by the people of the community are street open wells with 46% responses and solar borehole taps with 24% (Table 3). This indicated that people of the area rely mostly on local water sources to satisfy their daily water needs. This is in connection with the occupation of the respondents whereby most of the respondents are farmers that rely on open wells which are easily constructed and maintained locally. The scarcity of tube wells for Fulani may be attributed to their lease number 7 (14%) with only one tube well in the area at unguwar arewa. The solar bore hole wearing which supply water to some houses is mostly being utilised by the civil servants and businessmen in the area who can shoulder the responsibility of undertaken the wearing to their respective houses.

Table 3 Responses on water Sources use

	Water sources	Frequency	Percentage
1	Solar borehole	6	12
2	Hand pump	3	6
3	Open well Street	23	46
4	Solar wearing	12	24
5	Dam	2	4
6	River	3	6
7	Tube well for Fulani	1	2
	TOTAL	50	100

Source: Field Survey, 2017

Indigenous water management practices

The result on water management practice shows that *Kwari* (Shallow depression) in river beds is the leading one in the area with 60% responses followed by *Tafki* (Big depression) with 22% responses. The lease is *Kankare* with 4% responses (Table 4). This indicated that traditional water management practice in the area predominate even with the presence of Warwade dam.

Table 4 Indigenous water management Strategies

	Management	Frequency	Percentage
1	Rijiyar Yashi	4	8
2	Kwari (Shallow depression)	30	60
3	Tafki	11	22
4	Kankare	2	4
5	Water Harvesting	3	6
	Total	50	100

Source: Field Survey, 2017

Evaluation of stakeholder's participation in water infrastructural development.

Findings of the research also indicated that the major stake holders that undertook water provision and management are local government and community with responses 60% and 22% respectively (Table 5). This is a clear indication that community participation in water management in the study area is very limited and even the projects undertook by government and NGOs are not adequate. This is in line with assertion of Lukas, (2016) That Over the last decades, community management has become the default approach for rural water supply in many low and middle income countries

Table 5 Stakeholders for water management

S/N	Stake Holder	Frequency	Percentage
1	State Government	4	8
2	Local Government	30	60
3	Community	11	22
4	NGOs	2	4
5	Individuals	3	6
	Total	50	100

Source: Field Survey, 2017

The result from Likert scale of analysis shows that the computed means of the performance of stakeholders in the provision of water infrastructural facilities in the study area are below non satisfactory range of (0.50-1.27) and satisfactory range of (2.80-3.42). This indicated clearly that the stake holder's performance in the provision of water infrastructural facilities is far below expected (Table 6). This finding coincided with that of Rilwanu (2016) in Kumbotso Kano state that the performance of stakeholders in the maintenance of solar boreholes is below average.

Table 6 Stakeholders performance in the provision of water infrastructural facilities

		Scale						
S/N	Stake holders	1	2	3	4	∑f	∑fx	Mean
1	State Government	0	1	1	2	4	13	0.31
2	Local Government	1	2	3	24	30	110	0.27
3	Community	1	2	2	6	11	35	0.31
4	NGOs	0	0	1	1	2	7	0.29
5	Individuals	0	0	1	2	3	11	0.27

1=Very unsatisfactory, 2= Un satisfactory, 3= satisfactory, 4= Very satisfactory

Source: Data Analysis, 2017.

Results on FGD

Results from FGD indicated that *''Pipe born water was provided to the village in 2003 which is no longer functioning and prior to that time there was only one single borehole powered by electricity at Zobiya which was converted to solar''.* Findings also revealed that *''people leaving around Unguwar sarki, unguwar yamma are having more access to water while people at kofar gabas and Jarkuka suffer much with regards to water supply.* This is because such areas have more water sources and unguwar gabas is closer to the dam.

CONCLUSION AND RECOMMENDATIONS

It is concluded from the result that water supply in the area is inadequate and the area is backward in terms of community water management and provision of water infrastructural facilities since most of management practices are traditional based. Reference to the findings it was recommended that the dam should be fully utilise by constructing a treatment plant and developing other sources through community water Management practices for effective development in the area.

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