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IMPACT OF RURAL WATER SUPPLY ON THE HEALTH OF PEOPLE IN PART OF GBAKO LOCAL GOVERNMENT AREA, NIGER STATE, NIGERIA

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Abstract

Access to safe drinking water is required by all communities, regardless of the area, average income, average level of education, geographical region or race, ethnic or cultural background. Therefore, this study examined the impact of rural water supply on the health of people in some part of Gbako Local Government Area, Niger State, Nigeria. This study employed both primary and secondary sources of data collection. The primary data were sourced from the administration of questionnaire to two groups, namely, selected agencies of government directly involved in water supply management and the general public located in the study area. Secondary data sources include journals, textbooks, newspapers, magazines, encyclopedia, library, etc. Secondary data sources were used to add value to this study. The methods of data analysis include frequency percentage, statistical mean and four-point likert scale. The study shows that high cost of drilling boreholes ranked the highest with 31.6% of the sampled population, climate change ranked second with 25.4%, high cost of storage facilities ranked third with 15.2%, shortages of aquifer ranked forth with 12.5%, pollution ranked fifth with 9% and corruption ranked the least with 7% of the sampled population. This revealed that the major cause of drinking water shortage was high cost of drilling boreholes in the study area and its one of the best drinking water source with less degradation. The impact of rural water supply on the health of the people in the study area include diarrhea, cholera, and typhoid. Patronage of hospitals and other health care facilities in Gbako Local Government Area is on the increase. The rapidly increasing population coupled with the deteriorating water quality are some of the factors responsible for this trend. Hospital records have confirmed high incidence of typhoid, cholera, dysentery, diarrhoea and guinea worm in the study area and some of these diseases are shown in the study. The study area is endowed with abundant

surface water resources which remain largely untapped. Planned development of available surface water resources in the study area through surface and underground storage and planned exploitations of ground resources through boreholes, would minimize the seasonality of water availability in most parts of the study area, promote year-round agricultural production and enhance the welfare of the people.

Keywords: Water supply, Health and Rural water supply

Introduction

Water is one of the world's most valuable resources. It is a necessity of life for both plants and animals (UN-Water, 2016). The earth is made of 97% saline water, contain in the ocean and 3% freshwater. The freshwater has 68.7% lock up in icebergs and glaciers, 30.1 % is stored in groundwater, 0.3% available as surface water and 0.9% others. Surface water is found as 87% lakes and 11% swamps and 2% rivers (Shiklomanov, 2013).

Access to safe drinking water is required by all communities, regardless of the area, average income, average level of education, geographical region or race, ethnic or cultural background. For many rural communities in developing countries, unreliable access to safe drinking water remains a large and growing concern (UN DESA, 2011). The 2015 WHO and UNICEF report indicated that many countries, especially in Sub-Saharan Africa (SSA), 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 (WHO, 2015). The report indicated that in six developing regions of the world, namely, Sub-Saharan Africa, Oceania, Latin America, South East Asia, Southern Asia, and Northern Asia, a vast proportion of the rural population still lacks adequate access to safe water supplies.

The significance of water to the existence of man cannot be overemphasized. This is because access to improved water and sanitation is a vital component for achieving the Sustainable Development Goals (SDGs) including good health, education, poverty and gender equality (Hutton and Varughese, 2016). Since the declaration of International Drinking Water Supply and Sanitation Decade in the 1980s and the Human Development Report (HDR) in 2016, access to water and sanitation has been recognized as the basic needs for human life and progress; therefore, the need for the eradication of inequality in access to water and decent sanitation across the globe has become a vital goal of the SDGs (Akande and Morardet, 2017).

In sub-Saharan Africa, the situation is more worrisome due to the high inequalities observed among the low-income groups, the rural and peri-urban dwellers (WHO and UNICEF, 2014). Access to improved water and sanitation has a strong relationship with a healthy and productive life as well as environmental sustainability (UNICEF, 2014). Worldwide, approximately 6.3% of the deaths recorded result from poor drinking water, sanitation facilities, and hygiene practices. In Nigeria, lack of access to clean water has gross implications on the socio-economic development, personal hygiene and consequently, places the health of about 40 million Nigerians at risk (Gbuyiro & Aisiokuebo, 2013). It is estimated that about 122,000 Nigerians including 87,000 children less than 5 years die annually due to diarrhoea. Most of these deaths have been linked to poor water, sanitation, and hygiene. Poor sanitation in Nigeria has resulted in huge losses running to almost US$ 3 billion annually. For Nigeria to achieve the sustainable development goal 6 by 2030 in the rural areas, about 8 million people would be required to be reached annually. Therefore, this study examined the impact of rural water supply on the health of people in some part of Gbako Local Government Area, Niger State, Nigeria.

Statement of the Research Problem

Research has shown that a greater proportion of the rural populations in developing countries are exposed to inadequate water supply and poor sanitary conditions (Shaban and Sharma, 2017; Ayeni and Soneye, 2015). In most parts of the rural settlements in Niger State, the problem of water, sanitation, and hygiene (WaSH) is worsened by the limited number of residents with access to potable water and sanitation. Also, the distance to water source increases the time required for income-generating activities, household chores, and childcare (Ilahi and Grimard, 2016). Few studies have worked poor rural water supply and its impact on human health in Niger State which has create paucity of knowledge. This study intend to fill the gap created by other studies in Niger State rural settlement. Therefore, this study seeks to fill this gap in knowledge by examining the impact of rural water supply on the health of people in some part of Gbako Local Government Area, Niger State, Nigeria.

Rowan (2011) reported that failure of water infrastructure and climate variability are major factors responsible for poor access to water and sanitation in Bushbuckridge, South Africa. Akpabio and Brown (2012) opined that the nature of the physical environment and socio-cultural status significantly affect daily water supply and sanitation practices among households in coastal settlements in Nigeria. In furtherance, Koskei *et al.* (2013) argued that the type of water supply source household has access to, is a function of their occupation

and educational status. The causes of poor rural water supply in the study area include poor funding, lack of clear policy direction, poor water infrastructural maintenance culture, poor community participation, lack of coordination and cooperation among the stakeholders and weak institutional framework significantly affect access to potable water supply and sanitation of rural settlements. Therefore, this study examined the impact of rural water supply on the health of people in part of Gbako Local Government Area, Niger State, Nigeria.

The Study Area

Gbako Local Government Area is to be found as parts of the greater middle section of the Niger basin. It is located in the south western part of Niger State with elevation in height between (300 meters) lying between latitude 9^0 24''30N to 10^0 15''60N of the equator and longitude 5^0 40''10E to 6^0 33''15E of the Greenwich meridian. It has area coverage of 1,753km^2 and a population of 127,466 people. The area geographically it transverses boundaries with Gbako Local Government, Lavun Local Government Area, and Katcha Local Government Areas (Gobo and Abam, 2011).

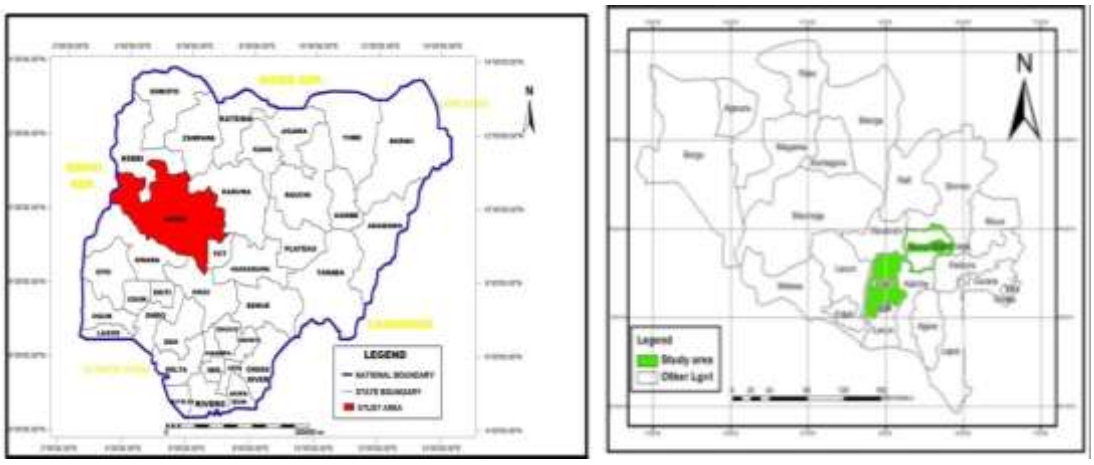

Figure 1: The Study Area (Gbako Local Government Area, Niger State Nigeria)
Source: Niger State Geographic Information System (2021)

Materials and Methods

This study employed both primary and secondary sources of data collection. The primary data were sourced from the administration of questionnaire to two groups, namely, selected agencies of government directly involved in water supply management and the general public located in the study area. Secondary data sources include journals, textbooks, newspapers, magazines, encyclopedia, library, etc. Secondary data sources were used to add value to this study.

Sample size was drawn using Taro Yamane (1967) statistical formula. This formula is concerned with applying a normal approximation with a confidence level of 95% and a limit of tolerance level (error level) of 5%. Sample points for this study include household heads and Niger State Water Board in charge of rural water supply in Gbako Local Government Area, Niger State, Nigeria.

To this extent the sample size is determined by $n = \frac{N}{1+Ne^2}$

Where: n = the sample size

N = population (population of the study area)

e = the limit of tolerance (0.05)

Therefore, $n = \frac{127{,}466}{1 + 127{,}466(0.05)^2} = \frac{127{,}466}{1 + 127{,}466(0.0025)} = \frac{127{,}466}{1+318.7} = \frac{127{,}466}{320}$

n = 398 respondents

The study respondents were 398 and simple random sampling was used to distribute the questionnaires among the respondents. Two hundred and fifty six (256) questionnaires were returned and used for data analysis.

Methods of data analysis include frequency percentage, four-point Likert rating scale analysis with numerical response options in descending order of Very High Adaptation Strategy (VHAS)-4 points, High Adaptation Strategy (HAS)-3 points, Low Adaptation Strategy (LAS)-2 points and Very Low Adaptation Strategy (VLAS)-1 point; and 3-point Likert scale with response options as Severe Challenges (SC) = 3, High Challenges (HC) = 2 and Low Challenges (LC) =1.

Results and Discussions

Causes of Drinking Water Shortage in the Study Area

The sources of water supply in the study area include unprotected dug well, rain water harvesting, boreholes, river/stream, protected dug well and public standpipe as indicated in Table 1 of the study. Boreholes ranked the highest with 30.9% of the sampled population, unprotected dug well ranked second with 25.4% of the sampled population, rain water harvesting ranked third with 16%, protected dug well ranked forth with 12.5% and public standpipe ranked the least with 7% of the sampled population. This revealed that the major source of water in the selected sample locations was boreholes.

Table 1: Sources of Rural Water Supply

Sources	Frequency	Percentage (%)
River/stream	21	8.2
Unprotected dug well	65	25.4

Rain water harvesting	41	16
Boreholes	79	30.9
Protected dug well	32	12.5
Public standpipe	18	7
Total	256	100

As shown in Table 2 of the study, the causes of drinking water shortages in the study area include climate change, high cost of drilling boreholes, high cost of storage facilities, shortages of aquifer in the study area, pollution and corruption. High cost of drilling boreholes ranked the highest with 31.6% of the sampled population, climate change ranked second with 25.4%, high cost of storage facilities ranked third with 15.2%, shortages of aquifer ranked forth with 12.5%, pollution ranked fifth with 9% and corruption ranked the least with 7% of the sampled population. This revealed that the major cause of drinking water shortage was high cost of drilling boreholes in the study area and its one of the best drinking water source with less degradation.

Table 2: Causes of Drinking Water Shortages

Sources	Frequency	Percentage (%)
Pollution	23	9
Climate change	65	25.4
High cost of storage facilities	39	15.2
High cost of drilling boreholes	81	31.6
Shortages of aquifer	32	12.5
Corruption	16	7
Total	256	100

Socio-Economic Challenges of Water Supply in the Study Area

As revealed in Figure 2, water supply is severe between the months of March and April which has 85.2% while between September to October ranked the least with 2.4%. This coincides with the pick period of dry season, when the water table is very low.

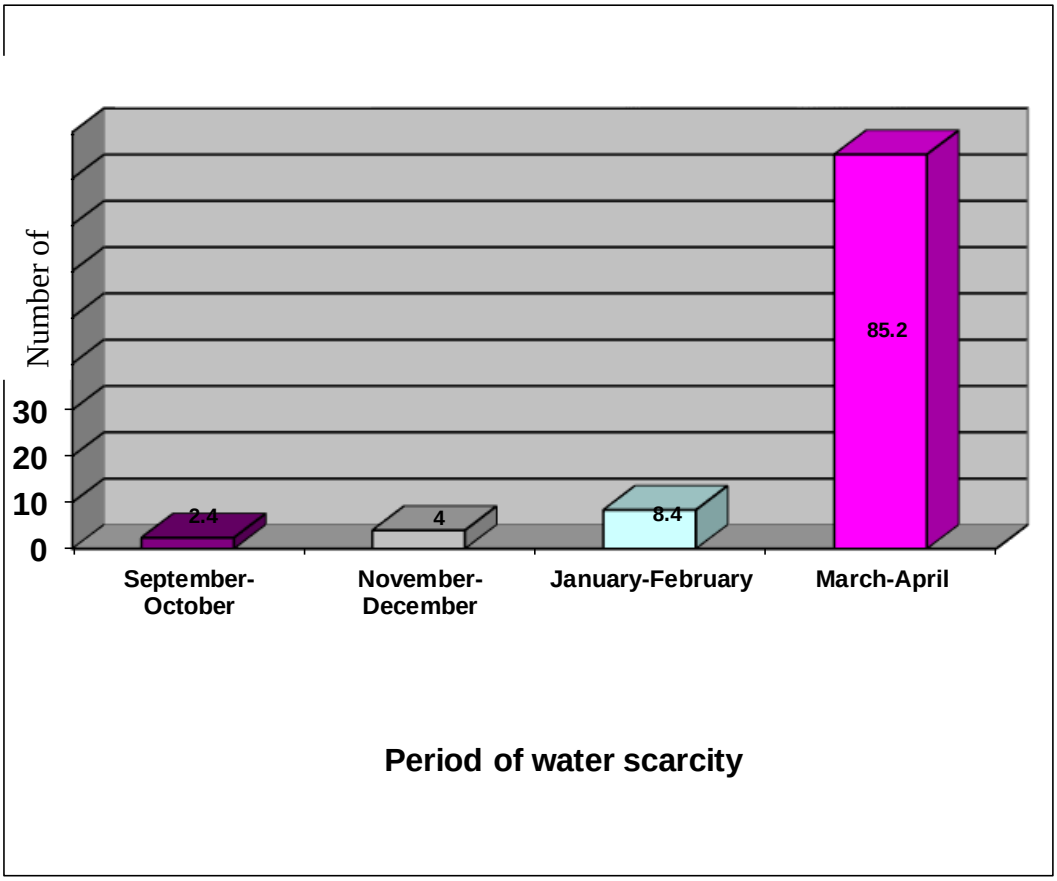

Figure 2: Period of water scarcity

Water supply in the study area has faced various socio-economic challenges and these challenges include poor maintenance of the available water supply sources, inadequate maintenance distribution lines of water supply, poor funding from government, inferior solar power supply, lack of holistic approach by the State and Local Government Authorities as indicated in Figure 3. Lack of holistic approach by the State and Local Government Authorities ranked the highest with 82 sampled population, poor maintenance of the available water supply sources ranked second with 63 sampled population, poor funding from government ranked third with 47 sampled population and inadequate maintenance of distribution lines of water supply ranked the least with 26 sampled population as indicated in Figure 3. This revealed that the major socio-economic challenge of rural water supply was lack of holistic approach by the State and Local Government Authorities in the study area.

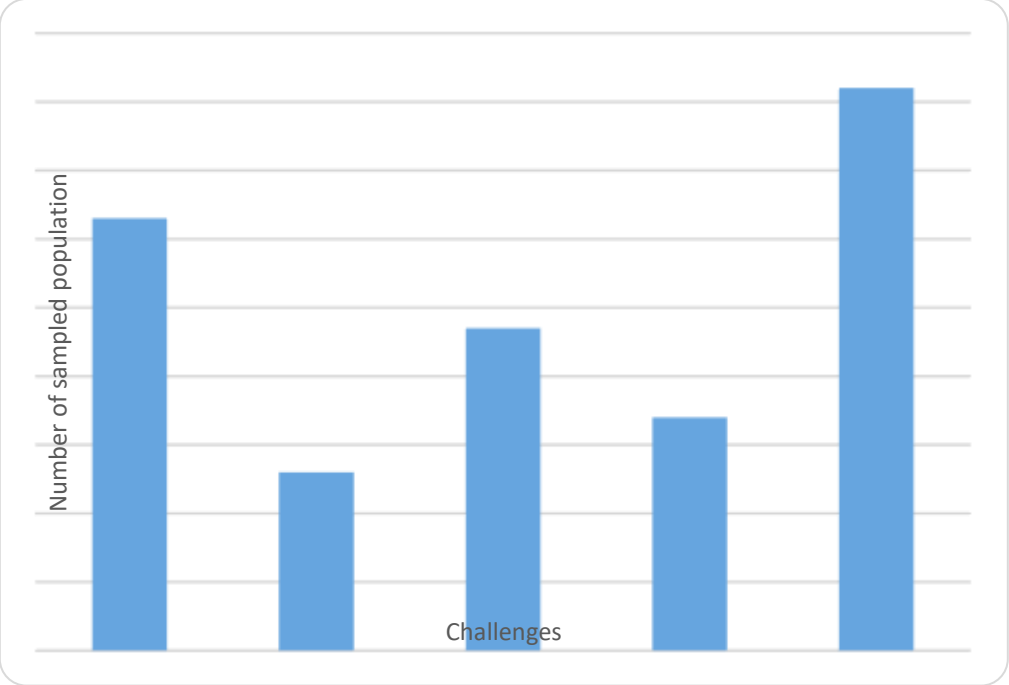

Figure 3: Socio-economic Challenges of Rural Water Supply in the Study Area

Impact of Rural Water Supply on the Health of People in the Study Area

The impact of rural water supply on the health of the people in the study area include diarrhea, cholera, and typhoid. Patronage of hospitals and other health care facilities in Gbako Local Government Area is on the increase. The rapidly increasing population coupled with the deteriorating water quality are some of the factors responsible for this trend. Hospital records have confirmed high incidence of typhoid, cholera, dysentery, diarrhoea and guinea worm in the study area and some of these diseases are shown in Table 3. There is a direct link between rural water degradation and public health in terms of water related diseases such as diarrhea, cholera and typhoid in the study area.

Table 3: Incidence of Waterborne Diseases in the Study Area

Year	Cholera	Diarrhea	Typhoid
2011	9	465	39
2012	2	523	55
2013	1	483	53
2014	5	546	161
2015	8	467	63
2016	16	397	55
2017	3	1,285	92

2018	1	533	45
2019	26	655	201
2020	188	572	107
Total	259	5626	871

Source: Niger State Ministry of Health, 2022

Incidence of waterborne diseases in the study area shows cholera, diarrhea and typhoid are on the increase and this is attributed to poor drinking water quality that has a E.Coli of 75cfu which is greater than the accepted level. Year 2017 has the highest Diarrhea occurrence in the study area with 1,285 occurrence and year 2016 ranked the least with 397 occurrence; 2020 has the highest Cholera occurrence with 188 while 2013 ranked the least with one cholera case; and 2019 has the highest Typhoid occurrence with 201 cases while 2011 ranked the least with 39 cases of typhoid in the study area.

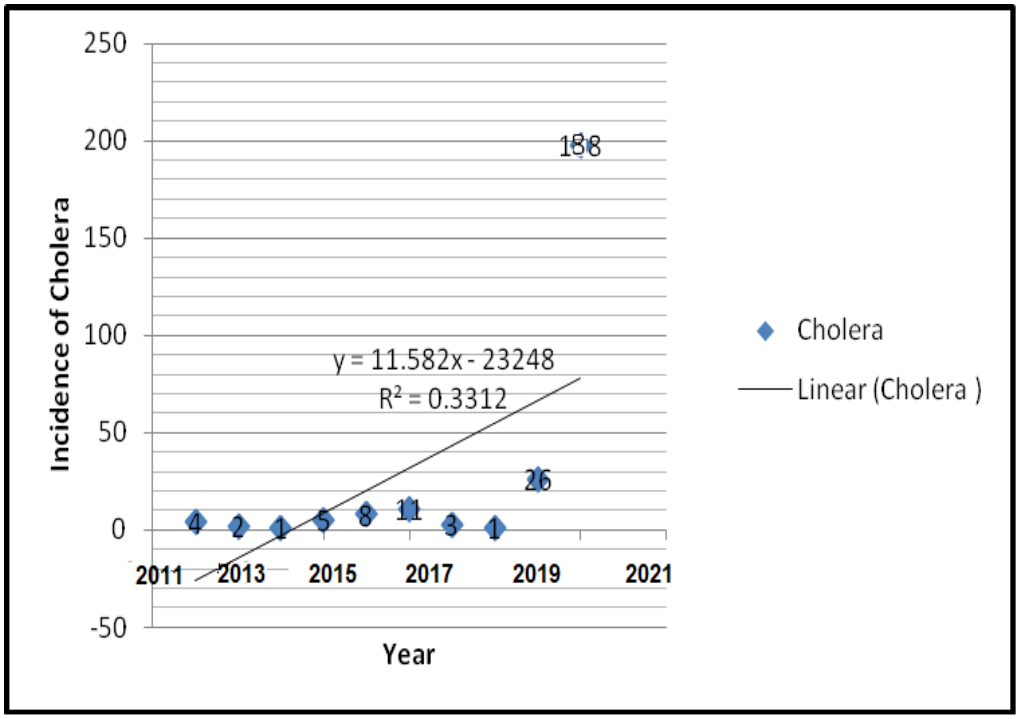

Figure 4: Incidence of Cholera cases in the Study Area

As shown in Figure 4 of the study, incidence of cholera occurrence in the study area shows sharp increase with the highest incidence recorded in 2019 with 188 cases of cholera while the least was recoded in the year 2013 with one case of cholera.

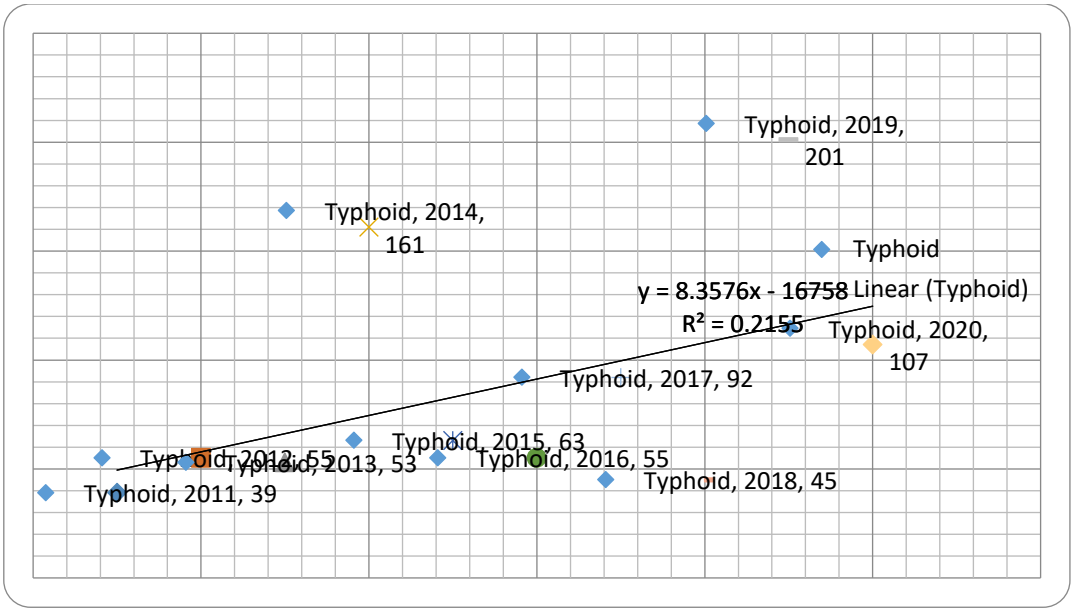

Figure 5: Incidence of Typhoid cases in the study area

Incidence of typhoid cases in the study area shows that typhoid occurrence is on the increase and year 2019 ranked the highest with 201 typhoid cases while 2011 has the least typhoid occurrence with 39 cases in the study area.

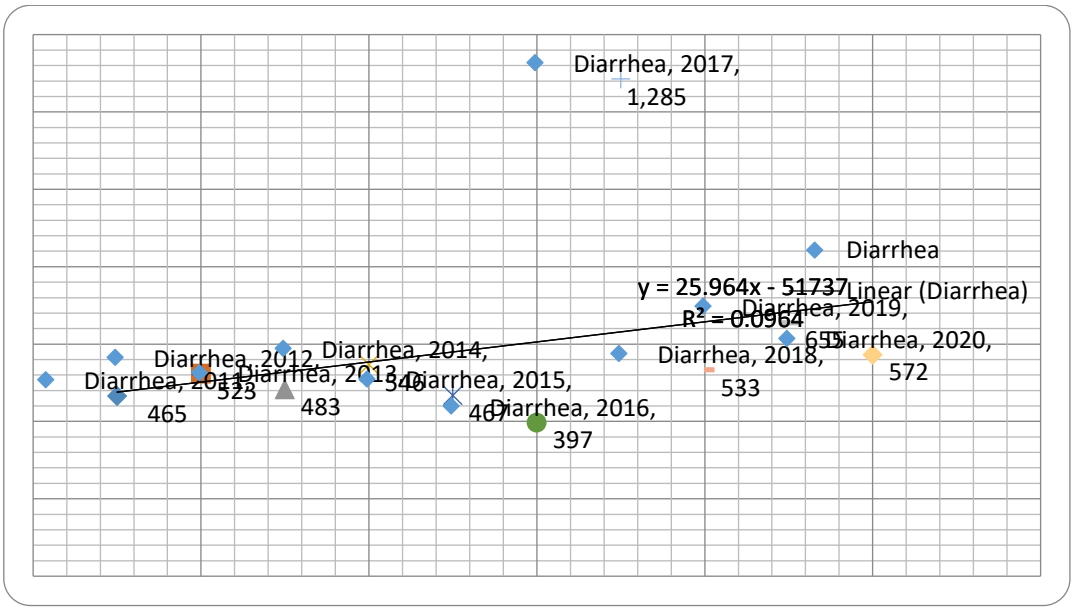

Figure 6: Incidence of Diarrhea cases in the study area

Incidence of diarrhea cases in the study area shows that diarrhea occurrence is on the increase despite the fluctuation in some years. Year 2017 ranked the highest with 1285 diarrhea cases while 2016 has the least diarrhea occurrence with 397 cases in the study area.

Adaptation Strategies Put in Place to Reduce the Challenges of Water Supply in the Study Area

Adaptation strategies adopted to reduce water shortage in the study area include effective distribution of water via water tankers, more hand-held/motorise boreholes, proper rainwater harvesting, effective community governance and partnership, zoning of the distribution system of water supply, construction of mini dams and repair of visible and reported challenges of boreholes as indicated in Figure 7.

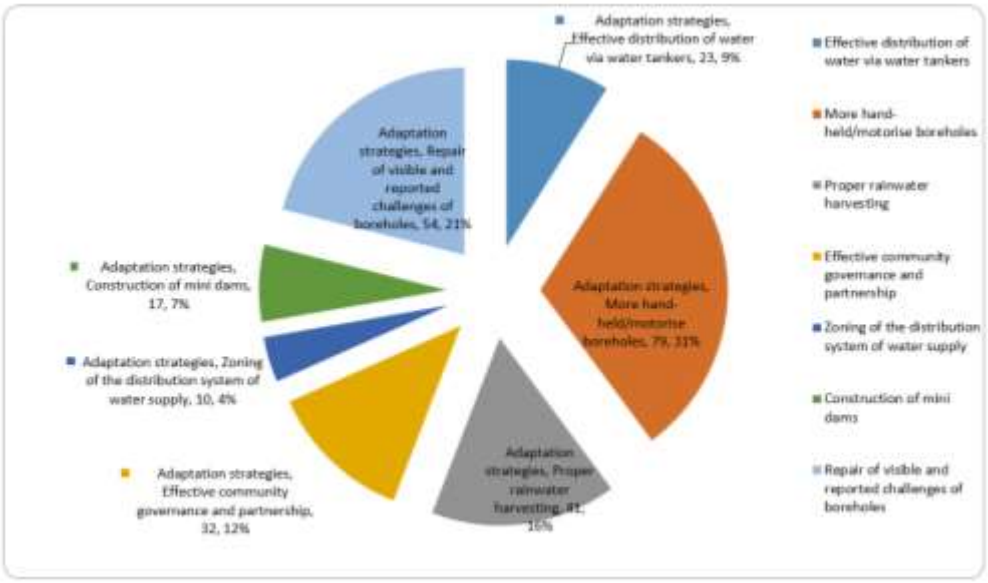

Figure 7: Adaptation strategies adopted during rural water supply shortage

As shown in Figure 7, more hand-held/motorise boreholes ranked the highest with 31% of the sampled population, repair of visible and reported challenges of boreholes ranked second with 21%, proper rainwater harvesting rank third with 16%, effective community governance and partnership ranked forth with 12% and zoning of the distribution system of water supply ranked the least with 4% of the sampled population. This revealed that major adaptation strategy to rural water supply challenges was more hand-held/motorise boreholes. This also shows that, the respondents' highly depends on borehole water when compared with other adaptation strategies in the study area.

Conclusion

A major problem facing the rural dwellers in study area is the inadequate availability of potable drinking water on a timely basis and in the quantity

required. The study concluded that three major sources of water, namely unprotected dug well, rain water harvesting and boreholes, are the major factors affecting household access to water supply in the study area. The study also revealed that households in the low-income residential area rely more on unimproved water sources and have poor access to a safe water supply.

Climate change precisely change in rainfall pattern has affected the availability and quantity of rural water supply in the study area and the evidence suggests that the causes of climate change are complex, involving both natural forces and anthropogenic activities. The study area is endowed with abundant surface water resources which remain largely untapped. Planned development of available surface water resources in the study area through surface and underground storage and planned exploitations of ground resources through boreholes, would minimize the seasonality of water availability in most parts of the study area, promote year-round agricultural production and enhance the welfare of the people.

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