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Assessment of water supply facilities in Owo Local Government Area, Ondo State, Nigeria

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Abstract: *The current study was carryout to investigate the status of water supply facilities in 24 rural communities of Owo local government area of Ondo State, Nigeria. Former and informer interview, questionnaire and physical assessment conducted. Secondary data from Nigeria National Population Commission (NNPC) were used in this study. The major water supply facilities used by the communities were mostly hand dug well and boreholes which in most cases were fitted with either electric or hand pump. It was observed that all the boreholes fitted with hand pump were failed while 86 % of those fitted with electrics pump were also failed. In the case of the hand dug well more than 37 % of all the hand dug well were failed. Borehole failure was due to people ignorance, non availability of spare parts, constant water failure, poor maintenance skills and attitude of the communities. The failures of the hand dug well were mainly due to low water table or aquifer region. The survey assessment results revealed that sustainable water supply to the community could be enhancing through the use of hand pump boreholes. Hand pump boreholes appeared more reliable with low operational technology, their cost effectiveness affordability and available spare parts. The studies recommend the involvement of the community participation in the overall management of the water facility in other to enhance sustainability.*

Keywords: *Assessment, Communities, Questionnaire, Operational technology, Management, Affordability.*

I. Introduction

Human life, like all animal and plant life on the planet, depends upon water. Not only do we need water to grow our food, generate power and run industries but, also as a basic part of our daily lives. (Maguvu and Mutengu, 2008) emphasized that communities and individuals can exist without many things if they have to.

The authors argued that they can be deprived of comfort, shelter or food for a period but, they cannot be deprived of water and survive for more than a few weeks. Water supply to any community is therefore, crucial. It is the determining factor in dictating the healthy condition of any community. Globally, 1.1 billion people lack access to safe drinking water, with 84 % of this population living in rural areas. According to WHO, (2000) Africa has the lowest total water supply coverage in the world, with only 62 % of the population having access to improve water supply. This figure is based on estimates from countries that represented approximately 96 % of Africa's total population (WHO/UNICEF 2000).

Drinking water is a major source of microbial pathogens in developing regions, although poor sanitation and food sources are integral to enteric pathogen exposure. Poor water quality, sanitation and hygiene account for 1.7 million deaths a year world-wide, mainly through infectious diarrhoea (Ashbolt, 2004). Nine out of 10 such deaths are in children and virtually all of the deaths are in developing countries

In specific areas, such as the Sahara Desert in Africa, water is scarce, while in other cases, like the riverside area of Niger Delta in Nigeria, water is excess but, of poor quality. For example, (Orewole *et al.* 2006) stated that despite the abundance of water, a large percentage of the population in Nigeria and other parts of the world hardly have enough water to drink and meet the essential needs, as the provision of portable water has for long been a major problem, this is associated with poverty, a common stance in most developing nations of the world.

In Nigeria, the rural communities are neglected in the provision of portable water supply. Unfortunately, more than 68 % of the nation's population resides in these rural communities. In the recent past, several government agencies such as Directorate of Food, Roads and Rural Infrastructure (DEFRRI) and Oil Mineral Producing Area Development Commission (OMPADEC), and other non-governmental organizations attempted to ameliorate the water problems through provision of potable water supply through boreholes. The use of boreholes by the Federal Government was initiated following its huge success in the rural areas of the former Eastern Nigeria in the early 1980's. In fact, the first national borehole construction program aimed at providing safe water supply to rural settlements was initiated in 1981 (Bob-Duru 2001).

While these facilities have provided the needed succor initially, the sustenance of such facilities has often been short lived owing to the inability of government and its agencies to manage adequately such rural water schemes. Thus, it is imperative to periodically investigate or assess the state and conditions of the water supply facilities in the rural communities' vis-a-vis their sustainability.

II. Materials and Method

Description of the Study Areas

Owo local government area lies on the Northern senatorial district of Ondo States, Nigeria within latitude 7010^0 N and longitude 7010^0 E, it is 150 m above sea level and enjoys abundant rainfall of over 1,500 mm annually, Plate 1 shows Owo Local Government Area in Ondo State.

Plate 1: shows the map of Ondo State where Owo Local Government area is located.

III. Data Collection

The Research design employed involved the use of physical survey and interview of the dwellers of the communities. The data obtained from the survey based on the observation made and personal interviews with the local government Chairman, Counselors, Community Chiefs, and resident of the study area formed the primary data while those from the published material like annual report of the local government and population data from the Nigeria National Population Commission (NNPC) formed the secondary data. The survey was helpful in identifying the most appropriate and types of water supply facilities that is economically sustainable to the communities.

Borehole with Hand Pumps

The boreholes with hand pump visited were 87 (Plate 2-4) in numbers; some were operational while some were not operational. The numbers of functioning were 38 while the rest were not functioning.

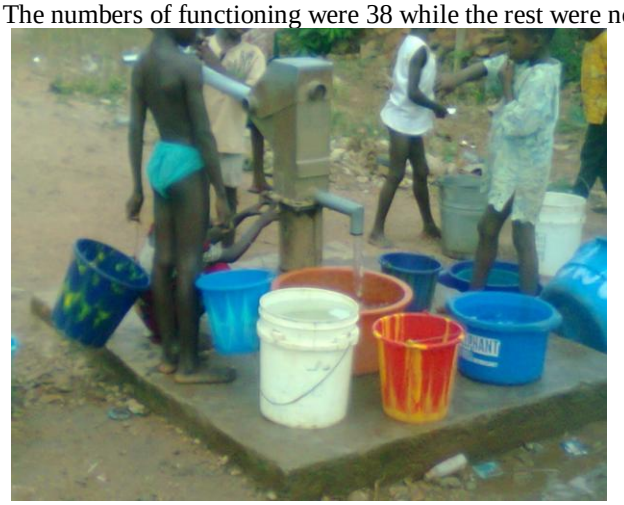

Plate 2: Hand pump borehole at Emure-Ile

Plate 3: Hand Pump Borehole at Ipele Owo.

Plate 4: Hand Pump Borehole at Amurin

Borehole with Electric Pump

The boreholes with electric pump visited were 24 (Plates 5-7) in numbers, some were operational while some were not operational. The numbers of functioning were 12 while the rest were not functioning.

Plate 5: Electric Pump borehole at Idasen Owo

Plate 6: Electric Pump borehole in residential house at Ipemen Owo

Plate 7: Solar Electric Pump Borehole at Uso Owo.

Hand Dug Well

The hand dug well visited were 882 (Plate 8-10) in numbers some were operational while some were not operational. The numbers of functioning were 237 while the rest were not functioning

Plate 8: Hand Dug Well at Okedogbon Owo

Plate 9: Hand Dug Well at Iyere Owo

Plate 10: Hand Dug Well at Isuada

Rivers/Streams

Rivers and Streams were also visited during the course of this assessment, most of the streams and rivers visited were polluted and not good for drinking. However, Rivers and Streams (Plates 11-13) were mostly used for domestic purpose particularly in most of the rural communities visited, but were not considered as source of water in this assessment

Plate 11: A Stream at Molege Owo

Plate 12: Water used as domestic purpose from Isun Stream at Ago-Ibira Owo

Plate 13: Water used as domestic purpose from Omituntun Stream at Ago-Panu Owo

IV. Results and Discussion

Table 1-3 present the three types of water supply facilities available in the 24 communities investigated, the numbers of each of the facilities in each communities, current state of facilities as at the time of investigation, the nature of the problems facing the facilities and quality of water.

S/N	Community	Population	Quantity	Function	Non-function	Reason for non-function
1	Emure ile	3,000	10	10	0	
2	uso	15,000	12	12	0	
3	Isuada	8,000	8	6	2	coloured water
4	Iyere	10,000	15	12	3	dried up
5	Ipeme	10,000	10	9	1	dried up
6	Igoroko	3,000	14	12	2	coloured water
7	Ipele	10,000	20	18	2	coloured water
8	Agopanu	1,500	5	3	2	coloured water
9	Melege	1,500	5	3	2	coloured water
10	Oriohin	1,400	4	2	2	dried up
11	Eporo	500	6	3	2	dried up
12	Agemo	400	7	6	1	coloured water
13	Usaipin	800	6	5	1	coloured water
14	otapete	1,000	8	7	1	dried up
15	Ajebamidele	1,500	4	3	1	dried up
16	Agoibira	1,000	8	6	2	dried up
17	Iloro	13,000	10	8	2	dried up
18	Amurin	1,500	6	4	2	coloured water
19	Usijogun	800	6	4	2	coloured water
20	Oke Ogun	20,000	30	29	1	coloured water

21	Ijebu	25,000	25	20	5	coloured water
22	Eyiogbe	12,000	21	20	1	coloured water
23	Idasin	10,000	30	22	8	coloured water
24	Iselu	12,000	22	15	7	coloured water

Table 1: Showing the Data for Hand Dug Well

S/N	Community	Population	Quantity	Function	Non-function	Reason for non-function
1	Emure ile	3,000	5	3	2	Fauty pump
2	uso	15,000	7	4	3	Fauty pump
3	Isuada	8,000	4	2	2	Fauty pump
4	Iyere	10,000	6	2	4	Fauty pump
5	Ipeme	10,000	3	1	2	Fauty pump
6	Igboroko	3,000	6	2	4	Fauty pump
7	Ipele	10,000	8	4	4	Fauty pump
8	Agopanu	1,500	3	0	3	Fauty pump
9	Melege	1,500	3	0	3	Fauty pump
10	Oriohin	1,400	2	0	2	Fauty pump
11	Eporo	500	2	0	2	Fauty pump
12	Agemo	400	3	2	1	coloured water
13	Usaipin	800	4	3	1	coloured water
14	otapete	1,000	3	1	2	coloured water
15	Ajebamidele	1,500	4	2	2	coloured water
16	Agoibira	1,000	2	0	2	coloured water
17	Iloro	13,000	4	2	2	coloured water
18	Amurin	1,500	4	0	4	Fauty pump
19	Usijogun	800	4	0	4	Fauty pump
20	Oke Ogun	20,000	6	3	3	Fauty pump
21	Ijebu	25,000	7	2	5	Fauty pump
22	Eyiogbe	12,000	6	2	4	Fauty pump
23	Idasin	10,000	6	2	4	Fauty pump
24	Iselu	12,000	7	3	4	Fauty pump

Table 2: Showing Data for Borehole with Hand Pump

S/N	Community	Population	Quantity	Function	Non-function	Reason for non-function
1	Emure ile	3,000	2	1	1	Fauty pump
2	uso	15,000	2	1	1	Uncompleted
3	Isuada	8,000	1	0	1	Fauty pump and over head tank
4	Iyere	10,000	0	0	0	
5	Ipeme	10,000	1	1	0	
6	Igoroko	3,000	0	0	0	
7	Ipele	10,000	1	1	0	
8	Agopanu	1,500	3	2	1	Fauty pump
9	Melege	1,500	0	0	0	
10	Oriohin	1,400	0	0	0	
11	Eporo	500	0	0	0	
12	Agemo	400	0	0	0	
13	Usaipin	800	0	0	0	
14	otapete	1,000	0	0	0	
15	Ajebamidele	1,500	1	0	1	coloured water
16	Agoibira	1,000	0	0	0	
17	Iloro	13,000	2	1	1	pump stolen
18	Amurin	1,500	0	0	0	
19	Usijogun	800	0	0	0	
20	Oke Ogun	20,000	3	1	2	Uncompleted

21	Ijebu	25,000	3	1	2	Fauty pump
22	Eyiogbe	12,000	2	1	1	Fauty pump
23	Idasin	10,000	2	1	1	Fauty pump
24	Iselu	12,000	1	1	1	Fauty pump

Table 3: Showing Data for Borehole with Electric Pump

Table 1-3 also present the population distribution among the communities investigated. It could be observed that the population ranged between 500 to 1500 and this is due to the low rate of economic activities especially at Agemo, Eporo, Ago-Ibira Usijogun, Amurin, Eporo Oriohin and Ajebamidele. However, the population of Idasen, Iyere, Ipele, Igboroko, Uso, ranged between 3000 to 10000. The noted increase in population is mostly due to high rate of commercial activities taken place in those communities, thereby attracting settlers. Aside from these Okedogbon, Iloro, Igboroko, Ijebu, Ehinogbe, Oke-ogun, attract a high level of commercial activities. The overall population of the entire 24 communities investigated was 141,900 representing 9.5% of the entire population of Ondo state.

Type and state of water supply facilities

The communities depended on boreholes mostly fitted with hand pump, electrical pump and hand dug well. There were 993 of such facilities in the entire 24 communities. Hand dug well were 882 in number, while boreholes fitted with hand pumps and the one fitted with electrical pump are 87 and 24 respectively as shown in Fig 1.

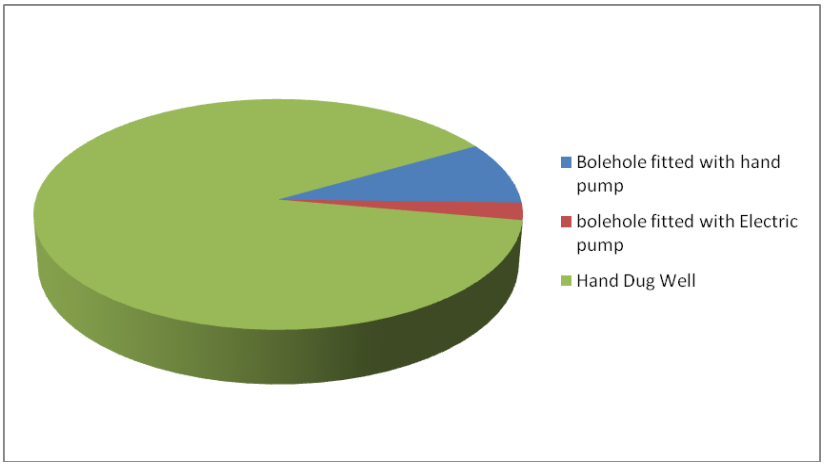

Fig 1: Showing the entire water facilities in all the communities

From observation, all the 87 boreholes fitted with hand pump available in the communities 49 were functioning while, 38 were none functioning as shown in Fig 2 and Plate 3.

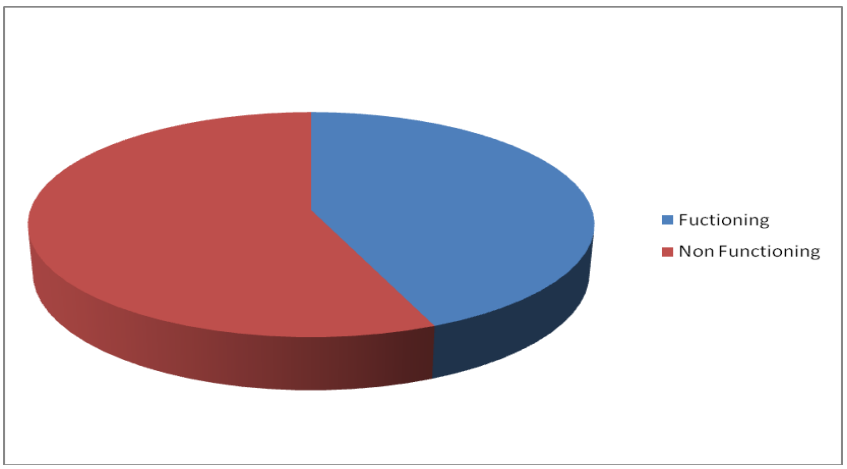

Fig 2: Showing Functing and none Functioning of Hand Pump Well

However, boreholes failure could also be attributed to corrosion of hand pump and misuse. Out of 24 boreholes fitted with electrical pump, only 12 were functioning, while 12 were out of order. The Fig 3 shows the mode of failure of borehole fitted with electrical pumps.

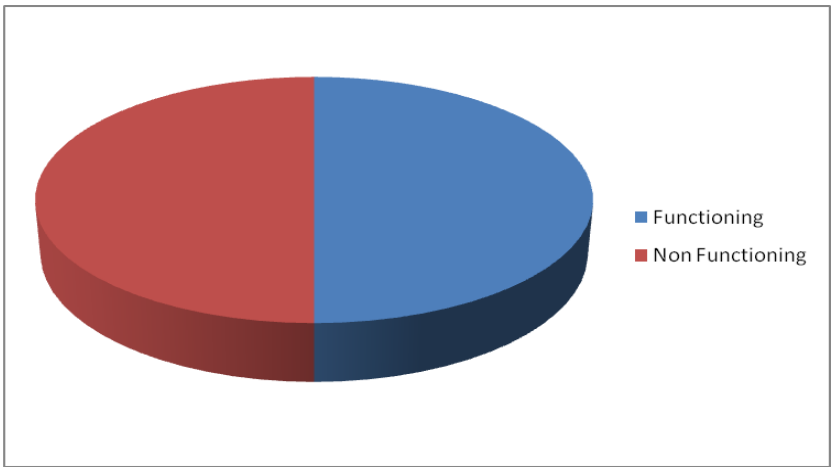

Fig 3: **Showing Functioning and non Functioning of Electric Pump Borehole**

Common reason for failure include faulty pumps, no source of power, absence of pumping machine, uncompleted and abandoned as shown in plate 5.

In Fig 4, 37 % of hand dug well were not functioning due to low water table or aquifer region which created a dug well situation while 63 % were functioning, it was also observed that the people resulted to hand dug wells due to failure of government and water supply scheme through boreholes.

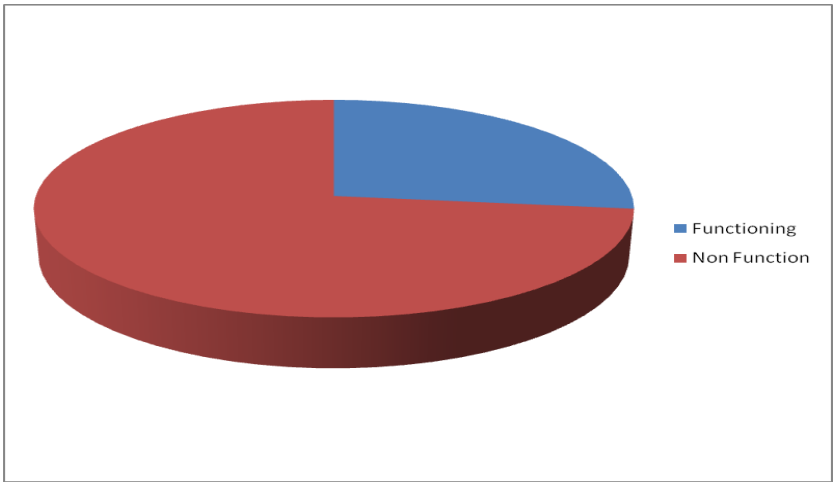

Fig 4: **Showing Functioning and non Functioning of Hand Dug Well**

In addition, noted was the deteriorating water quality from boreholes mostly due to high ions concentration with inadequate treatments measure.

V. Management of Existing Facilities.

Good management and maintenance enhances sustainability of any infrastructure, poor and non-existence of administrative, technical support and lack of funds are usually associated with causes of failures of many rural water supply facilities in Nigeria. Investigation was made on the factors responsible for the failure of some of the facilities, especially the boreholes fitted with hand pumps, where none of the 38 numbers available were functioning.

Table 4: factor prevailing maintenance of water facility in the project area

Factor	Percentages
Not responsible	65.2
No spare part	9.1
Too damaged to repair	8.3
Government responsibility	6.1
Expensive	4.1
Other reason	7.2

From the table 4 above 65.2 % of the users stated that they were not responsible for maintenance of the facility, 9.1 % cited lack of spare parts, 8.3 % stated that they were too damaged for repair, 6.1 % of the response indicated that it was the government that was responsible while 4.1 % submitted that the facilities were too expensive to maintain and other 7.2 % were indifferent. It therefore indicated that the total collapse of the facilities was due to total neglect and in concerned attitudes of the community.

Adequacy of the facilities

As stated earlier, there are total numbers of 993 water supply facilities in the 24 communities with a total population of 141,900. This indicates that if all the facilities were to function properly, 142 people would depend on only one water supply facility. This is, however, not the case as more than 100 people depended on just one facility.

Sustainability Water Supply to the Communities

Sustainability of water supply depends on the adequate availability of the resources with little or no treatment costly affordable and inexpensive cost of development. This has to bears in selecting the preferable sources of water. Choices for sources of water supply should depend on the quality of raw water, as well as the adequacy of reliability of the sources from a quantitative point of view together with the potentialities for expansion in future (WHO,UNICEF,2000). Rainwater is not a reliable source of water supply for this community due to weak carbonic acid that usually form during rainfall, surface water sources can serves as alternative sources of water supply, but is polluted and requires expensive and extensive treatment technology.

However, the only option that can meet the requirement for a sustainability water supply is groundwater. This is due to its abundance, availability, conveniences and cost effectiveness in harnessing it.

Hang dug well are the most widely available facilities among other facilities. Although this is simple and cheap, high risk to groundwater pollution does exist. Water table aquifer is equally prone to drying during dry season as noted in Ago-Ibira, Idasen, Emure-Ile, Uso, Otapete and Igboroko communities though, electric pump operated boreholes in these communities are not functioning, hand pump remain the best option to improved rural water supply. When the hand pump boreholes is operating well, it can easily penetrates deeply into the water bearing strata, extract water easily from a greater vertical depth is affordable in cost and requires low maintenance skill. It is the only one that can be adopted to provide sustainable water supply from the aquifer for the communities both in short and long time.

VI. Conclusion and Recommendation

Water supply facilities in 24 communities were assessed and investigated in the rural area of Owo local government of Ondo State, Nigeria. The people in the 24 communities made the use of boreholes fitted hand pump, electric pump and hand dug well for harnessing their water supply. The hand dug well fails mainly due to low water table or aquifer while the boreholes with hand pump and electric pump failed due to people ignorance, non-availability of spare parts, constant water failure, poor maintenance skill and attitude of communities.

It is recommended that hand pump boreholes should be provided since it is the only facilities that can be sustained by the people due to its reliability, cost effectiveness, low operational technology and affordability and it can only be made feasible with provision of adequate spare parts, trained personnel and community participation.

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