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SUSTAINABILITY OF BOREHOLE WATER SCHEMES IN OGBOMOSO SOUTH LOCAL GOVERNMENT, OYO STATE, NIGERIA

Toyobo Adiguns Emmanuel
Department of Urban and Regional Planning, Ladoke Akintola University of Technology, Oyo State, Nigeria.

ABSTRACT: *The study assessed the sustainability of borehole water supply schemes in Ogbomoso Township. The specific objectives are to examine the socio-economic characteristics of respondents, enumerate the number of boreholes in the area, identify the stakeholders of borehole maintenance and investigate the functionality of boreholes and examine the management strategies employed.*
Data were collected through personal observation and focus group discussion. A total of 380questionnaires were administered it was further analysed using both descriptive and inferential statistics such as ANOVA. The study revealed that majority of the respondents was females (63.16%) and married (43.68%) with diverse occupations. The study shows that (47) of the boreholes were functioning well, while (21) were in a state of disrepair and did not function as at the time of data collection. The result shows that the amount of boreholes water could not meet the demand of the population in the area. The study therefore recommended the partnership approach in addition to community approach in the maintenance of borehole water supply schemes in the study area. Again, government should offer financial support in the maintenance of boreholes and community participation should be encouraged through public enlightenment.

KEYWORDS: Borehole, Sustainability, Participation, Community and Water Scheme.

INTRODUCTION

Water is crucial for sustainable development. However, limited access to clean and safe water associated with poor water supply, hygiene and sanitation at household level is widening the poverty gap, gender inequalities and the prevalence of water borne diseases (Gender and Water Alliance (GWA), 2006). This has contributed 3.7% of the total global disease burden and 2.2million death each year with women and children in the developing countries being the most affected (WHO/UNICEF 2008). Although the Millennium Development goals (MDGs) target 7(c) seeks to "have by 2015 the proportion of people without access to safe drinking water and sanitation" (UNDP, 2005), it is anticipated that Africa will only reach the MDGs water target by 2040. However, 400 million of the people living in Africa will be left without access to safe water with a majority of them being women and children that lives in both rural and urban areas. (Sutton, 2008).

Although water is seen as a source of life and a valuable natural resource that sustains the environment and supports livelihoods, it is increasingly being seen as a source of risk and vulnerability especially to the women (UNEP, 2004; UNDP, 2006). Women are the most vulnerable because in most societies, it is women's responsibility to ensure that there is enough clean and safe water for their households for domestic usage and other purposes. (Olokesusi 1990; Alao 1991; Buckingham 2000 and WHO & UN 2000)

Borehole equipped with hand-pumps or taps are relatively low cost technology options for domestic water supply in developing countries and generally considered as 'safe sources' of drinking water. When properly constructed and maintained, they provide consistent supply of clean and wholesome water with low or no microbial load and there is need for treatment of the drinking water. Apart from providing clean water for drinking, it also sustain livestock and crops in difficult conditions and even micro industries such as brick making (Carter Richards and Howsam1999; Hophe Fortune 2005 and Bhandari and Grant 2007). This is the technology that assisted the country to increase the proportion of people having access to safe drinking water for some decades, Ogbomoso South local government inclusive.

The focus of this research was the residential areas of Ogbomoso South Local Government where the water woes culminated. The aim therefore is to examine the sustainability of borehole water schemes in Ogbomoso South Local Government. The specific of objectives of the study are to:(i) examine the socio-economic characteristics of the respondents, (ii) enumerate the number of borehole water schemes in the area, (iii) identify stakeholders in the provision of boreholes and their maintenance, (iv) examine the functionality and (v)management strategies employed for borehole water supply schemes in the area. The paper also carried out a test of research hypothesis to determine the significant difference between socio-economic characteristics of respondents and maintenance of boreholes by stakeholders. The study offers some suggestions towards the improvement of borehole water schemes in the study area.

MATERIALS AND METHODS

Ogbomoso region has five local governments namely, Ogbomoso South, Ogbomoso North, Orire, OgoOluwa and Surulere. The study is focused on Ogbomoso South with 10 political wards and total population of 190.681.The study area lies appropriately on latitude $8^0$10' N of the equator and longitude $4^0$10' E of the Greenwich Meridian. It is situated in the derived savannah region and Yoruba ethnic group predominates the area.

Primary and secondary sources of data were collected for the study. A detailed literature review of the related documents on water supply schemes and sustainability was carried out. While the primary sources were collected through the administration of 380structured questionnaire on socio-economic characteristics of respondents, enumeration of boreholes for each political wards to determine the number of water facilities that function well and those that were not functioning. It also identifies the stakeholders in the provision and their involvement in the maintenance and management of borehole facility generally in the study area.

Data collected were subjected to both descriptive and inferential statistical analysis. The descriptive statistics include frequency count, tables and percentages to affirm the sustainability of borehole water supply systems in the study area. Analysis of Variance (ANOVA) was run to test for the significant difference between the socio-economic characteristics of respondent and maintenance of borehole water schemes by stake holders.

RESULTS

Socio economic characteristics of respondents in the study area

Table 1 reveals that majority of the respondents were females (63.16) and males (36.84). Married respondents were (43.68%), single (40%), widow (10.53%) and separated (5.79%). Their religion were christianity (55.26%), islam (41.5%) and traditional (3.68%). Those that practiced farming were (24.21%), artisan (30%), trading (28.95%) and civil servants (16.84%). Their educational level were primary (36.84%), secondary (28.42%), tertiary 12.12% and those with non-formal education 22.63%.This implies that irrespective of the status of respondents, gender, age marital status and occupational attainment, borehole water was needed for their day–to-day domestic usage and other purposes.

Table 1: Socio – Economic characteristics of respondents in the study area

Variables		**Frequency**	**Percentage**
Sex distribution	Male	70	36.84
	Female	120	63.16
Age of Respondents	16 – 30	90	47.37
	31 – 45	70	36.84
	46 – above	30	15.79
Marital Status of Respondents	Single	76	40.00
	Married	83	43.68
	Separated	11	5.76
	Widow	20	10.53
Religion of Respondents	Christianity	105	55.26
	Islam	78	41.5
	Traditional	7	3.68
Occupational status of the respondents	Farming	46	24.21
	Trading	55	28.95
	Civil servant	32	16.84
	Artisan	57	30.00
Educational status	Non – formal education	43	22.63
	Primary school	70	36.84
	Secondary school	54	28.42

Source: Field work 2011

Enumeration of borehole in the study area.

Table 2 reveals the enumeration of borehole water supply system for each of the ten political wards in the study area. Boreholes that use hand-pump device were 18, electric motorized (22) and solar motorized energy (28). With these total number of boreholes in the area, the rate of functionality were not encouraging. Some of the boreholes were in the state of disrepairs because of inadequate maintenance.

Table 2: Enumeration of boreholes in the study area.

S/No	Political wards	Hand-pumps	Electric-motorized	Solar-motorized
1.	Akata	2	3	3
2.	Alapata	1	2	2
3.	Arowomole	2	2	4
4.	Ibapon	2	2	3
5.	Ijeru I	-	2	3
6.	Ijeru II	1	3	3
7.	Ilogbo	2	2	3
8.	Isoko	2	2	3
9	Lagbedu/Isapa	3	2	3
10	Oke-Ola/farm settlement	3	2	3
	Total	18	22	28

Source: field work, 2011

Stakeholders and maintenance of boreholes water supply schemes in the study area

As indicated in table 3, majority of the boreholes were provided by Non-Governmental Organization (58.95%), Government (35.79%) and Community (5.26%). As reported by the respondents, the community were not involved in the planning and implementation of the boreholes in the area. However, the contributions made for maintenance from community were (63.16%) and individual contribution as a supportive measure (36.84%). Despite this, respondents complained of insufficient water supply from the boreholes in the study area.

Table 3: Stakeholders and maintenance of boreholes water supply schemes in the study area

Variables		Frequency	Percentage
If it is generator who fuels it	Government	40	2.105
	Community	70	36.84
	Individual contribution	30	15.79
	Non-governmental organisation (NGOs)	50	26.32
Who maintain the generator if spoils through contribution	Government	0	0
	Community	120	63.16
	Individual	70	36.84
	Non-governmental organization (NGOs)	0	0
Who owns the borehole	Government assisted	68	35.79
	Community	10	5.26
	Non-governmental	112	58.95
	Individual	0	0.00
Did the present borehole water supply sufficient?	Yes	117	61.58
	No	73	38.42

Source: field work 2011

Functionality of boreholes water supply schemes in the study area

Table 4 shows the number of boreholes that were in good condition and functioning well as per the time of data collection against those that were not functioning in the 10 political wards. A total of 68 boreholes were recorded out of which 47 were in good condition and functioned well, while 21 were in a state of disrepair and were not functioning at all. Oral interview with opinion leaders in the area revealed that some political wards were marginalized in the distribution of borehole water system in the area. They further stated that community members were not informed in the planning and implementation of majority of the boreholes in the area. The question who to maintain the water facility remains untold. The type of boreholes in the area ranged from hand- pump, electric motorized and solar energy motorized as indicated in the table 4.

Table 4: Functionality of borehole water supply schemes in the study area

S/No	Political wards	Hand-pumps		Electric-motorized		Solar-motorized	
		Function well	Not function	Function well	Not function	Function well	Not function
1.	Akata	1	1	1	2	2	1
2.	Alapata	1	-	-	2	2	-
3.	Arowomole	2	-	2	-	3	1
4.	Ibapon	-	2	1	1	2	1
5.	Ijeru 1	1	-	2	-	2	-
6.	Ijeru 11	-	-	1	2	2	1
7.	Ilogbo	1	1	2	-	2	-
8.	Isoko	2	-	1	1	2	-
9.	Lagbedu/Isapa	2	1	1	1	2	1
10.	Oke-olla/farm	2	1	1	1	3	-
	Total	12	6	12	10	23	5

Source: field work, 2011.

Plate 1: Public borehole located at OkeAlapata, Ogbomoso

Source: field survey 2011.

Plate 2: Non-functioning public borehole with hand pump devise in the study area

Source: Field survey 2011

Management of boreholes water supply schemes in the study area

Table 5 shows the various strategies employed in borehole water maintenance in the study area. Majority of the respondents (91.58%) indicated "Yes" that repairs were carried out by agencies involved in boreholes water supply in the area. While (8.42%) indicated "No" for the same. About (60.63%) of the respondents were given water guide, (26.32%) were taught how to filter their water before usage and (13.13%) boil their water before domestic usage. This implies that some of the respondents do not have access to boreholes water supply; hence, they depend on alternative sources which may not be hygienic. Among the respondents suggested some measures of improving water supply through drilling of more boreholes were (50.00%), those that were in support of existing borehole maintenance were (30%) and (19.47%) advised that unclean water be well treated before consumption.

Table5: Management of boreholes water supply schemes in the study area.

Variables		**Frequency**	**Percentage**
Did any of the agencies repair the borehole when it spoil	Yes	174	91.58
	No	16	8.42
Responsibility agencies	Local government	102	53.68
	RBDA`S	78	41.10
	Ministry of water resources	10	5.26

Treatment	Yes	89	46.84
	No	101	53.16
Types of treatment	Water guide	115	60.63
	Filtration	50	26.32
	Boiling of the water	25	13.13
Suggestion on the improvement	Water treatment	37	19.47
	Maintenance of existence boreholes	57	30.00
	Drilling of more borehole	96	50.00

Source: Field work 2011.

Test of Research Hypothesis

H^O: There is no significant difference between socio – economic characteristics of respondents and maintenance of borehole water schemes by stakeholders.

H^1: The reverse is the alternate hypothesis.

Table 6: shows ANOVA statistical test of significant difference between socio – economic characteristics of respondents and maintenance of borehole water schemes by stakeholders.

Variables		**Sun of squares**	**df**	**Mean square**	**F**	**Sig**
Maintenance of boreholes water schemes by stakeholders	Between groups	31.026	5	6.205	4.608	0.00
	within	500.625	375	1.335		
	Total	531.651	380			

Source: Data Analysis 2011.

Table 6 reveals the maintenance of borehole water schemes by stakeholders as analysed with ANOVA statistical test. It was recorded that there is significant difference in the maintenance of boreholes by stakeholders and socio – economic characteristics of respondents in the area. The f-value recorded is 4.608 and p – value is 0.00. The result ($p<0.05$) implies that the maintenance of the existing borehole has nothing to do with the socio – economic characteristics of respondents. It was observed in the study area that most boreholes were not properly maintained. The respondents depend on alternative water sources to meet their domestic uses which are not hygienic.

RECOMMENDATIONS

The following recommendations are advanced towards boreholes water shemes sustainability in the study area.

- Government should seriously embark on enlightenment campaign on the importance of community participation on infrastructural maintenance and development with water schemes inclusive.
- Community members should be encouraged to see the water supply facilities as their own projects, so as to ensure adequate maintenance and repairs, and to guarantee the sustainability of the water-supply schemes in the study area.
- Government and other donor agencies in the area should train selected community members to improve their skills and technical know-how to provide local expertise for repairs and maintenance of water supply facilities in the study area.
- There is need to appoint a borehole caretaker who after proper training and the supply of the tool kits to carry out daily, weekly or monthly maintenance.
- The study recommends the partnership approach in addition to community approach in the planning, implementation and management of water supply schemes in the study area.

In conclusion, the capacity building for those responsible for operation and maintenance is essential. They need training in proper management of supplies, spare parts and finances. Community planning and support need to match local people's willingness to contribute for repairs and maintenance of borehole water schemes in the area.

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