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Sustainability of Borehole Water Schemes Through Community Participation in Ejigbo, Osun State

Toyobo Adigun Emmanuel[1*] Muili Akeem Bamidele[2]

1. Department of Urban and Regional PlanningLadoke Akintola University of Technology, PMB 4000, Ogbomoso, Oyo State, Nigeria.
2. Department of Urban and Regional Planning Ladoke Akintola University of Technology, PMB 4000, Ogbomoso, Oyo State, Nigeria.

*Email: toyoboadigun@yahoo.co.uk.

Abstract
The study evaluates the contributions of community efforts to the borehole water supply schemes in Ejigbo Local Government Area (LGA). It examines the socio-economic characteristics of the respondents, enumerates the number of boreholes and their functionality, identifies the Agency that sponsored the provision of water scheme(s) and suggests measure of sustainance of the boreholes in the area. Data were collected from both primary and secondary sources. The primary source involves the enumeration of the total number of boreholes in the area, 250 structured questionnaires were administered using systematic random sampling method to collect information on the number of boreholes, their functionality, Agencies involved in the provision and community contributions. Data gathered were analysed using both descriptive and regression statistics to affirm the degree of functionality of boreholes in the area.
The study revealed that 36 boreholes were in poor condition and needed repairs to function effectively. Communities were not much involved in the maintenance of boreholes in the area, hence, there was no sense of belonging by the people for repairs and maintenance. The study therefore recommends command approach in addition to the existing practice for sustainable water supply in the area.
Keywords: water, borehole, functionality and sustainability

1. Introduction

The term 'Community participation' is commonly understood as the collective involvement of local people in assessing their needs and organizing strategies to meet those needs. The importance of participation in community water scheme development is uncontested. Water scheme developments can only be viable if they will have a beneficial impact on communities and if this impact will be long – lasting or sustainable. Unless beneficial and sustained impact is likely, there is little point in community involvement in planning and implementation of a water scheme (WHO 1993, RSU 1999). In developing countries, a significant number of water schemes fail to deliver benefits to society over the long term. Part of the cause of this failure lies in poor understanding of the community involvement and sustainability. The rate at which water supply facilities are falling into disuse is alarming (Taylor and Mudege 1996; Glennie 1983; Narayan 1994 and Preston, et al). Almost half of all water supply facilities constructed in developing countries are not operational (RSU 1999; WHO 1993; Kimena 1998). In addition, most of these water facilities breakdown in the first three years of construction (Taylor &Mudege 1996 and Glennie, 1983). In pursuit to providing access to safe water for all its citizens, government is faced with the problems of constructing new water facilities and maintaining the existing ones. Maintaining the existing water schemes is very important in increasing access to safe water, without which sustainable community water supply will not be achieved. Again, people will not have access to safe water supply and will therefore be exposed to water related born diseases (WRI 1998; Abrams, 1998; Harvey and Skinner, 2002; Pretty, 1995 and Parry-Jones et al 2001).

Improving the sustainance of community water supply has a number of merits: It ensures the ongoing provision of a service that is fundamental to improving life and health, enables water users to live a life of dignity. Sustainability today depends upon communities taking financial responsibility for their schemes, which if achieved will enable scarce resources from government and donor agencies to be targeted specifically on areas where there is no improved water supply. The chances of achieving the Millennium Development Goal to half of the proportion of people without access to safe water by 2015 will be seriously lowered unless levels of sustainability can be greatly improved. (UNICEF & WHO 2000 and UNICEF 2002).

There are evidences of community participation that resulted in successful project outcomes which are related to achieving improvement of infrastructural development. Outcomes such as better access to health services (Adatuet al. 2003; Srivonget al. 2003; Braun et al. 2006; Jacobs and Price 2006; Bedeluet al. 2007; Kilpatrick et al. 2009), more relevant and culturally appropriate services (Wilson 2001; Kironde and Kahirimbanyi 2002; Kilpatrick et al. 2009), have been achieved through community participation. (Narayan 1994), reports of sustainability of handpumps through community participation (Renolds 1992; Parry Jones et al, 2001; Lockwood

2004; Evans and Appleton 1993). Clean water from borehole exists to substitute pipe-bore water supply in towns and cities in developing countries where population growth could not matched with the available provision of pipe-borne water supply services. The study therefore tries to evaluate community contributions towards sustainability of borehole water facility in Ejigbo local government. This is with a view to making suggestions towards improvement.

2. Methodology

The study was carried out in Ejigbo LGA, a major Yoruba settlement in Osun State, Nigeria. Ejigbo has a population of 132,641 (NPC, 2006) with an area of 373km^2. The people of Ejigbo enjoy borehole water to any other sources of water in the area, but the fundamental long term sustainability of the water supply systems cannot be over emphasised which is the focus of the study. Primary data were collected through visiting the study area by: enumerating the number of boreholes and identifying those that are functioning well, partially functioning and not functioning at all. Structured questionnaires were administered to 250 respondents using systematic random sampling method to solicit information on socio-economic characteristics and investigate those involved in the sponsoring of boreholes, community contributions for maintenance and functionality of the water schemes in the area. The secondary data involved review of related literature on community participation towards sustainability of water schemes and infrastructural development. Data gathered were analysed using descriptive statistics such as frequency count, tables and percentages, to affirm the degree of functionality of borehole water supply schemes to the people in the area. Stepwise regression analysis was used to show the effect of socio – economic characteristics on the sustainability of existing borehole water scheme in Ejigbo.

3. Results and discussions

3.1 Socio-economic characteristics of respondents in the study area

Table 1: shows the socio-economic characteristics of respondents such as: gender, religion, marital status, educational attainment, occupational status and monthly income. Female respondents were(56.7%), then males 43.3%. However, those married among them were (54.8%), single (43.8%), divorced (0.9%) and widowed 0.5%. Majority of the respondents had primary education (59.9%) and least with non-formal education 2.3%. The level of education of respondents motivated them to engage in various occupational activities such as petty trading (47.4%), civil servant (39.6%), artisan (8.8%), farming (1.8%) and unemployed 2.3%. Although, income between ₦21,000-₦30,000 (47.5%) ranked the highest (47.59%), while (12.4%) earn between ₦11,000-₦20,000 and above ₦30,000. Water is needed for household use because of the nature of their occupation and gender characteristics in the study area. Married respondents were (54.8%), single (43.8%), divorced (0.9%) and widow 0.5%. This implies that married women utilises much water to carry of household activities compare to others.

3.2 Enumeration of borehole water facility in the study area

Table 2: revealed that there were a total of 64 boreholes in the area. Ward 5 had the highest number of boreholes (17) and ward 1 and 3 which recorded 10 boreholes each. However, oral interview with opinion leaders in the area suggested the expected number of boreholes for each political ward as indicated in table 2. The implies that there would be short fall in borehole water facility in order to augument the available number of borehole on ground for each political ward in the area.

3.3 Borehole water facility provided by Donor Agencies

Table 3: shows agencies that sponsored the provision of borehole water facility in the area. Ejigbo community ranked the highest with 52.5%. This is followed by government (34.5%) and Non-Governmental Organization (NGO) 13.0%. Most private individuals in the community that provided borehole water facility in the area were commercialised while that of government and NGO are free. Despite all these efforts, some of the borehole water systems were in the state of disrepair. This implies that there were no follow-up in repairs and maintenance by sponsored agencies after the boreholes were delivered to the beneficiary communities.

3.4 Contributions of community towards sustainability of borehole water schemes in Ejigbo

The commitment of the community is very significant in any successful project performance. This is reflected in Table 4 which reveals the contributions of community members towards the sustainability of borehole water facility in the area. Majority of members contributed little or no monetary, material, advisory, labour and repairs for the maintenance of borehole of water facility in Ejigbo as indicated in Table 4. About (47.4%) and 39.6% of the respondents are petty trader and civil servants respectively. These category of people are not interested in contributions towards the maintenance of borehole water facility because of government attitude of negligence of water facility after delivery to the community. People therefore seek for alternative source of water when the available boreholes fail to function and has resulted to spread of epidemic diseases such as cholera, dysentery, guinea worm among others .

3.5 Functionality of borehole water facility in the study area.

Table 4 shows the functionality of borehole water systems in the area. Out of a total number of 64 boreholes, 28 were functioning well as at the time of data collection, 9 boreholes partially functioned and 27 boreholes did not function at all. Ironically, 36 boreholes were not in good condition and this has affected Ejigbo community water supply. Government boreholes dug in the area were left under the mercy of the community for repair and maintenance. Oral interview with respondents shows that there were no Water Committees in-charge of repair and maintenances of boreholes in the area. However, private individuals in the community manage their own boreholes which are used for commercial purposes. Oral interview with respondents further shows that, government did not involve community members in the planning and implementation of the boreholes in the area. Some communities were even marginalized in the distribution of the borehole water facilities by the government. There is therefore no sense of belonging by the community and this is a major problem which has resulted to negligence of borehole water facility in terms of repairs and maintenances by the people.

3.6 Test of Research Hypothesis

Ho: That the socio economic characteristics of the respondents do not have effects on the sustainability of borehole water schemes.

Table 6: shows a multiple regression analysis which indicates the effect of socio – economic characteristics on the sustainability of borehole water schemes in the study area.

a = Predictors (constant): educational status
b = Predictor (constant): educational status and monthly income
c = Predictor (constant): educational status, monthly income and gender
d = Dependent variable: sustainability of borehole water scheme

The method of calibration used for the test of research hypothesis is Stepwise regression analysis. This method is employed because it has ability to accommodate only the significant variables in the model. It could be reported that out of six variable of socio – economic characteristics of respondents use for the analysis (Gender, religion, marital status, educational status, occupational status and monthly income), only three (gender, education and income)in table 6 explained in the multiple regression analysis are significant. It is observed that with the f-value of 46.482, 36.539, 28.126 and p – value of 0.000 indicated that there is significant relationship between socio – economic characteristics of respondents and sustainability of borehole water schemes in Ejigbo. In other words close to 30%, 40% and 50% of the variability were observed in education, income and gender of respondents which determine sustainability of existing borehole water schemes. The remaining 70%, 60% and 50% as observed may be due to other factors such as poor attitude of donors, lack of partnership, non – participation of users among others. The level of education, monthly income and gender status of respondents can affect the repairs and maintenance of existing borehole water scheme in Ejigbo.

4. Conclusions and recommendations

The study shows the poor maintenance of existing borehole water schemes in Ejigbo was due to poor socio – economic characteristics of respondents and monitoring group by donor agencies. Therefore, appropriate policy measures are suggested for improvement of existing water schemes in the area.

- Government should take citizen's participation into consideration if the management of borehole water sources is to thrive in the community and also government should provide adequate and maintenance of water facility.
- Sensitization programmes should be done by the NGOs on issues relating to borehole water management and its safety in the study area.
- Government should help in the provision of potable water supply and more funds should be allocated to water resources development in the study area.
- Individuals should be concerned on all actions aimed towards providing a safe and convenient water supply and they should also see the effort of water provision as a joint effort between them and government.
- Community should table their requests before government on issues like borehole water supply, because government is mainly responsible for city growth and development.
- Adequate maintenance of water supply facility should be the concern of the entire community.
- Partnership in addition to community approach to water supply delivery should be adopted in planning and implementation of water supply systems in the study area. However, it is believed that if all the stated measures are adopted, the sustainability of borehole water schemes in Ejigbo would be ensured.

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Table 1: Socio-economic characteristic of respondents

VARIABLES	FREQUENCY	PERCENTAGE(%)
(a) Gender		
i. Male	94	43.3
ii. Female	123	56.7
(b) Religion		
i. Christianity	135	62.3
ii. Islam	75	34.6
iii. Traditional	7	3.2
(c) Marital status		
i. Single	95	43.8
ii. Married	119	54.8
iii. Divorced	2	.9
iv. Widowed	1	.5
(d) Educational status		
i. Non-formal education	34	2.3
ii. Primary	4	22.1
iii. Secondary	48	59.9
iv. Tertiary	130	5.5
(e) Occupational status		
i. Petty Trading	103	47.4
ii. Civil Servant	86	39.6
iii. Artisan	19	8.8
iv. Farming	4	1.8
v. Unemployed	5	2.3
(f) Monthly Income		
i. <₦5,000	60	27.6
ii. ₦11,000-20,000	27	12.4
iii. ₦21,000-30,000	103	47.5
iv. Above ₦30,000	27	12.4

Source: field work, 2012.

Table 2: Enumeration of borehole water facility in the study area

Political wards	Number available	Number expected	Short fall
1	10	15	5
2	13	16	3
3	10	22	12
4	14	18	4
5	17	25	8
TOTAL	**64**	**96**	**32**

Sources: field word, 2012.

Table 3: Sponsor of borehole water facility in the area

Agents	Frequency	Percentage(%)
Community	114	52.5
Government	75	34.5
NGO	29	13.0
Total	217	100.0

Source: field work, 2012.

Table 4: Contributions of community towards sustainability of borehole water schemes in Ejigbo

Political Wards	N	Attending Meetings		Advisory		Money		Labour		Materials		Repairs of Water Facility	
		f	%	f	%	f	%	f	%	f	%	f	%
1	n=40	22	**55**	08	**20**	05	12.5	04	**10**	01	**2.5**	-	**-**
2	n=45	31	**69**	09	**20**	03	**7**	01	**2**	01	**2**	**-**	-
3	n=55	34	**61.8**	12	**21.8**	04	**7.3**	03	**5.5**	01	**1.8**	01	**1.8**
4	n=60	30	**50**	24	**40**	02	**3.3**	01	**1.7**	01	**1.7**	02	**3.3**
5	n=50	32	**64**	14	**28**	01	**2**	01	**2**	01	**2**	01	**2**
Total	250												

Source: field work, 2012. (*n) indicates number of respondents

Table 5:Functionality of borehole water facility in the study area.

Political wards	Numbers of Boreholes	Functioning	Partial Functioning	Not Functioning at all
1	10	5	1	4
2	13	6	2	5
3	10	6	1	3
4	14	4	3	7
5	17	7	2	8
Total	64	28	9	27

Source: field work 2012.

Table 6: Test of Research Hypothesis

Ho: Socio-economic characteristics of the respondents do not have effects on the sustainability of borehole water schemes.

Model	R	R^2	Adjusted R^2	Standard error of estimate	F	Significant	Remarks
1	.159[a]	0.025	0.025	0.989	46.482	0.000	Significant
2	.198[a]	0.039	0.038	0.982	36.539	0.000	Significant
3	.212[a]	0.045	0.043	0.979	28.126	0.000	Significant

Source: Data Analysis, 2012.

Predictor variables: Gender, Education and Income.