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Title

SUSTAINABILITY OF RURAL WATER SUPPLY SCHEMES IN OKE-OGUN OF OYO STATE, NIGERIA

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ABSTRACT:

The study evaluates sustainability of rural water supply schemes in Oke-Ogun area of Oyo State, Nigeria. The objectives of the study covers examination of socio-economic characteristics of residents, identification of different types of water supply schemes, assessment of water supply schemes, evaluation of sustainability of water schemes, and factors affecting water scheme in the study area. Data were generated through random administration of questionnaires among 1,193 residents. It was further analyzed using descriptive method and sustainability index.

The study further revealed problems of finance, bad community leadership, lack of cooperation, frequent change in government, high cost of materials and equipment, and poor participation of people in the planning and implementation of water facilities.

It was recommended that in order to achieve sustainability of rural water supply projects, there is need to ensure effective organization, planning and implementation strategies through the active participation of rural community members. The study further recommends the partnership approach in addition to community approach in the planning and management of rural water supply facility in the study area.

KEYWORD: Sustainability, Water Scheme, Planning, Partnership and Management.

1.0 Introduction:

Sustainability is defined pragmatically as ‘’whether or not something continues to work over time‘’ (Abrams, 1998). More specifically for this paper, it implies the ability to recover from technical breakdown in the scheme. Built into common conceptions of the term are notions of minimal external support, village-level financing and the continuation of a beneficial service over time (Parry-Jones et al, 2001). It is estimated that 35% of all rural water supplies in sub-Saharan Africa are not functioning (Baumann, 2005), and despite the frequency with which it appears in development discourse, the reality of sustainability remains elusive.

Water and development are intrinsically linked together so that communities can achieve development and improve their living conditions. Convenient access to safe water leads to improvement in the health status of people and allows time to be available to them for education, and economic activities, which are the ultimate achievement of rural community (UNICEF, 2002). The link between water and development is explicitly stated in 1997 by the United Nations Water Conference, which declared that all people regardless of their stage in development or social and economic conditions have a right of access to drinking water in quantities and quality to meet their basic needs (WRI, 1998). Water is a basic need and is an essential ingredient for sustainable development (Mogane-Ramahotswa, 1995). Water is not just considered as a basic human right but also plays an important role in the lives of people and in the economic development of a country (UNDP , 1998). Water is critical to the improvement of living standards of societies. Improvements in water supply for those who lack water reduce the global burden of water related diseases and improve the quality of life.

Improvement in water supply coverage can reduce the incidences of Diarrhea, Scoliosis, Guinea worm, and other related diseases. Roughly one billion people lack access to clean water worldwide. Diarrhea diseases caused by contaminated water represent one sixth of the world's disease burden. Lack of adequate water, sanitation and hygiene is responsible for an estimated 70% of all deaths globally (WorldBank/UNDP, 2000). Sustainability could not fully be realized if community are not able to operate and maintain their own water supply facilities because operating and maintaining of water supply system on the day-to-day basis ensures continuity for a long time.(Davis et. al. 1993).

The study aims to examine the functionality of rural water supply schemes and problems in the study area. The specific objectives of the study are to: (i) examine the socio-economic characteristics of residents in the study area, (ii) identify the different types of water schemes in the study area, (iii) assess the functionality of water schemes (iv) evaluate the sustainability of water schemes in the study area (v) examine some factors affecting the sustainability of other schemes in the area.

2.0 Materials and Methods:

The study area

The study was conducted in ten local governments in Oke-Ogun zone in Oyo State. Oyo state is located in the southwestern geo-political zone of Nigeria. It is bounded in the west by Republic of Benin, to the east by Osun state, to the north by Kwara state.

The study area focuses on Oke-Ogun rural settlements in Oyo State. Oke-Ogun is located on latitude 6^0 08^1 North of the equator and 3^0 00^1 East of Greenwich Meridian. Oke-Ogun area consists of ten local government areas namely: Oorelope, Irepo, Olorunsogo, Saki East and West, Itesiwaju, Atisbo, Iwajowa, Kajola and Iseyin. The people in the study area are mostly Yorubas. For the purpose of this study the Yoruba who formed majority of the rural community were interviewed with some few ethnic groups such as Hausa, Igbo and Ibariba.

The study area was grouped into four contiguous zones. Within each zone, a random sampling technique was adopted to select five villages. The samples consist of the following rural settlements namely: Dogo, Kondoro, Ajegunle, Sooro, Alaguntan, Igbope, Ogbooro, Agbonle, Ago-Amodu, Ekokan, Imua, Igbojaye, Aba-Are, Baasi, Agunrege, Sabe, Iwereile Ijio, Gbenkele, Ipapo and Baba-Ode. Respondents were mainly household heads. A 2.5% sample size of the household heads was chosen for the purpose of questionnaire administration, and respondents were selected using systematic sampling technique. One household was selected from every five housing units. This was based on the estimate of the estimate of four households commonly discovered in each housing unit during the reconnaissance survey. Where the respondents was not available at the first visit, a return visit was made to get in touch with him or her. In the process, a total of 1,193 respondents were interviewed for the study.

Data on the socio-economic characteristics covers gender, age, marital status, ethnicity, educational qualifications, occupation and income of respondents in the study area used.

Information on the sources and characteristics of water supply was obtained from respondents and confirmed through direct observations and frequency counts of the water sources and schemes in the communities sampled. The sources were mainly natural such as rivers, streams, and ponds and those provided by government, non-governmental organizations, community efforts and inter-aids. The latter focused upon are the one regarded as schemes.

Available water supply facilities in each community was exhaustively enumerated and recorded during the research survey. The water supply sources were not the same in quality. Therefore, a reconnaissance study was undertaken to examine the importance attached to each water supply scheme to obtain a rating scale. This was attempted to quantify the number of water supply facilities to each community in the area. Also, the water supply schemes and facilities enumerated and quantified were used in rating the communities sampled.

On the issue of analysis of sustainability of water schemes, number of years each scheme had existed was used as figure for sustainability index. Where a project is still functioning well, it earns a whole digit number per year, where it is functioning partly , it earns half for each number of years of existence. And, where a scheme has stopped functioning, the number of years it had functioned was counted for it but generally the number of years it has not functioned was used as its discounting sustainability. The scores by the years of functioning were used as numerator with total number of existence of all schemes in a community used as denominator. This gives the survival rate and the rate of survival was regarded as the sustainability index. The formula being:

$$\text{Project Survival Rate in years} = \frac{y(f)+1/2\ y(pf)+0(nf)}{Y(f)+y(pf)+y(nf)} = \textit{Sustainability Index}$$

Where:

y= number of years of existence of water schemes

f= perfect condition of functioning of water schemes at the time of data collection

pf=water scheme established but was partially functioning at the time of data collection

nf= water project that was established at an identifiable year but not functioning at all as at the time of data collection=0

On the level of community participation, responses on participation were tabulated mainly on binary scale of yes or no. The positive responses were counted and summed up for each respondent and each of the 20 communities sampled. These were tabulated and analyzed using descriptive statistics.

3.0 Results and Discussion:

1. Socio-economic characteristics of community members:

The findings revealed that of the respondents were adult and married. Female respondents (52.9%) was higher than male respondents (47.1%). Literacy rate was average among the respondents with only 49.1% respondents having one form of formal education or the other.

59.0% of the respondents were Christians, Muslims (36.7%), traditional herbalist 4.7%, and other type of religions account for (2.6%). Most of the respondents engaged in farming, trading, and other types of occupations. For instance 53.4% were Farmers, 12.9% Artisans, 18.7% Civil servants, 13.9% Traders and others (1.1%). The income level of respondents was very low for them to contribute in community development programme in the study area. For instance about 42.1% respondents income fell between #6,000 - #10,000 with the highest being #21,000 and above (11.7%). A greater proportion of the population in the study area are Yoruba (79.6%0 and subsistence farmers cultivating maize, yams, cassava and millet. Production is low because most farmers are using traditional tools of hand hoe. Hausa constituted about 14.8% and are businessmen and women, the Igbos 4.9% mostly businessmen and women and other tribes such as Ibariba, Idoma, Igala, Fulani and Ghanaians most of who are artisan, craft men and other informal jobs account for 1.3%.

II Types of Water supply schemes in the study area

TABLE 3.1 Enumeration and types of water supply schemes in the sampled villages in the study area

Villages	Borehole	Hand Pump	Dam	Pipe borne	Deep Well
Aba-Are	-	1	-	-	1
Agbonle	-	2	-	-	3
Ago-Amadu	4	4	1	9	-
Agunrege	1	-	-	-	-
Alaguntan	2	-	-	-	-
Baasi	2	-	-	-	-
Baba-Ode	-	1	-	-	1
Dogo	-	1	-	-	1
Eko-Kan	1	2	-	-	-
Gbenleke	2	1			-
Igbojaye	5	2	-	-	-
Igbope	3	10	1	-	-
Ijio	5	2	-		-
Imua	2	1	-	-	6
Ipapo	8	6	-	-	-
Iwere-Ile	3	5	-	-	7
Kondoro-Ajegunle	-	1	-	-	-
Ogbooro	2	3	4	12	8
Sabe	1	2	-	-	2
Sooro	1	1	-	-	1
Total	42	45	6	21	30
Percentage	29.1%	31.2%	4.1%	14.5%	20.8%

Source : Authors' field survey (2010).

III. FUNCTIONALITY OF WATER SUPPLY SCHEMES IN THE STUDY AREA

Table 3.2 Functionality of water supply schemes in the study area

S/N	VILLAGES	FUNCTIONING WELL					FUNCTIONING PARTLY					EXISTING BUT NOT FUNCTIONING					TOTAL
		BH	HP	DAM	P	DW	BH	HP	DAM	P	DW	BH	HP	DAM	P	DW	
1	Aba-Are	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	2
2	Agbonle	-	1	-	-	-	-	-	-	-	3	-	1	-	-	-	5
3	Ago-Amadu	1	1	1	5	-	1	2	-	-	-	2	1	-	4	-	18
4	Agunrege	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
5	Alaguntan	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2
6	Baasi	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2
7	Baba-Oke	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2
8	Dogo	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	2
9	Eko-Kan	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	3
10	Gbenleke	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-	3
11	Igbojaye	1	1	-	-	-	2	-	-	-	-	2	1	-	-	-	7
12	Igbope	1	2	1	-	-	1	1	-	-	-	1	7	-	-	-	14
13	Ijio	2	-	-	-	-	1	1	-	-	-	2	1	-	-	-	7
14	Imua	1	-	-	-	-	-	-	-	-	4	1	1	-	-	2	9
15	Ipapo	2	4	-	-	-	-	-	-	-	-	6	2	-	-	-	14
16	Iwereile	2	1	-	-	2	-	1	-	-	1	1	3	-	-	4	15
17	Kondoro-Ajegunle	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
18	Ogbooro	1	2	4	3	3	-	-	-	2	-	1	1	-	7	5	29
19	Sabe	-	1	-	-	-	-	1	-	-	2	1	-	-	-	-	3
20	Sooro	-	-	-	-	-	1	-	-	-	-	-	1	-	-	1	3
	Total	14	15	6	8	5	8	8	-	2	10	20	22	-	11	15	144
%	48(33.33%)						28(19.44%)					68(47.22%)					

SOURCE : Authors' field survey (2010).

BH = Bore-hole HP = Hand-pump DA = Dam P = Pipe-born DW = Deep-well

IV Sustainability of water supply schemes in the study area

Table 3.3 Years of scheme existence in the study area

Villages	SUSTAINABILITY	
	TOTAL SCORE	SUSTAINABILITY INDEX
Abaare	3.5/14	0.25
Agbonle	28.5/51	0.55
Ago Amodu	60.5/86	0.70
Agunrege	0.00/1	0.00
Alaguntan	2.5/4	0.625
Baasi	3/4	0.75
Babaode	0.00/11	0.00
Dogo	1/12	0.08
Eko Kan	4/8	0.5
Gbenleke	4.5/8	0.56
Igbojaye	15/29	0.51
Igbope	68.5/133	0.51
Ijio	6/14	0.42
Imua	21/53	0.39
Ipapo	38/65	0.58
Iwereile	48.5/88	0.55
Kondoro Ajegunle	0.00/5	0.00
Ogbooro	217.5/310	0.70
Sabe	6.5/13	0.5
Sooro	0.25/8.5	0.02
Total		

Source : Authors' field survey (2010).

BH- Borehole, HP- Hand pump, PB- Pipe-borne, DW- Deep Well, SI- Sustainability Index- Total

As observed in Table 3.2, three classes of water supply facilities exist in the study area and these are:(1). Water scheme functioning well, (ii) water scheme functioning partly and (iii) those that exist but did not produce water for the communities. However Table 3.3 further reveals the number of years of existence of water facilities as a measure of sustainability of the schemes. As shown in the table, the numbers of years vary from six months to thirty-eight years. The features of survival of the water supply facilities and those functioning partly as well as total demise of the same vary widely from community to community. The survival or failure was not limited to a type of facility but was observed in all facilities.

For example as shown in Table 3.3, to determine the sustainability index of water facility for Agbonle village:

$$= \frac{10 + 18\frac{1}{2} + 0}{10 + 37 + 4}$$

$$= \frac{28.5}{51}$$

Therefore, sustainability index of water facility for Agbonle village is = 0.55 for Agbonle village. Maximum sustainability index being 1.0.

The formula stated in the methodology was used for calculating the sustainability for all the villages as shown in Table 3.3 to obtain sustainability index of water schemes for the study ranges from 0.02 to 0.75. Communities that fell within 0.02 to 0.49 were categorized as settlements whose water facilities were not sustainable. Communities in this category are: Aba-Are, Agunrege, Baba-Ode, Dogo, Ijio, Imua, Kondoro-Ajegunle and Sooro. By contrast, settlements that had above sustainability index were Agbonle, Ago-Amodu, Alaguntan, Baasi, Eko-kan, Gbenleke, Igbojaye, Igbope, Ipapo, Iwereile, Ogbooro, and Sabe. These were communities whose water facilities were sustainable. However, sustainability of these facilities could only be achieved where there is back-up support for repairs and maintenance from water providers.

4.0 Recommendations:

On the basis of the findings and conclusion of this study, the following recommendations are advanced for necessary actions and policy formulation towards improving rural water supply schemes in the study area in particular and rural communities in Nigeria in general.

The local government councils and inter-aid agencies such as RUWATSAN, UNDP, should carry out community assessment situations of the needs of each community and the socio-economic characteristic of the rural community members before deciding the type of rural water supply scheme for each community in the area.

Community should be given opportunity to visit other water schemes so that they can learn from their experiences to create sustainable water supply. Efforts should be made to introduce effective financial regulation of village water schemes. Managers and service providers must be made accountable and transparent to community members.

There should be a standing local management committee for prompt repairs and maintenance of rural water scheme in each community, there should be a strong-link between the chairmen of local management committee and director of works in all local governments councils in Oke-Ogun so as to create a proper link with the necessary organs that can assist in the repairs and maintenance of boreholes and hand-pump wells.

The government should subsidize the cost of materials for repairs and maintenance of rural water projects in view of low disposable income of rural community members in the study area. The local government councils should embark on empowerment and capacity building workshop for rural community members to ensure sustainability of the rural water supply projects in the study area.

The community members should be encouraged to pay little amount for the consumption of water, and be assisted to open a saving accounts in commercial banks where daily lodgement of money from sales of water could be lodged for eventual repairs and maintenance of rural water supply schemes. Local fabrication of major parts spare parts of materials used for rural water supply schemes should be encouraged so as to ease the repairs and maintenance of water projects by local people and trained by the local fabricators. This will ensure the sustainability of rural water supply schemes in the study area.

The types of rural water schemes to be cited in a particular community should be determined by the socio-economic characters of the people and availability of trained personnel to handle the major repairs of the projects, local community members should be engaged to actively participate in all phases of rural water supply schemes so as to develop a sense of ownership and responsibility in local community members.

In view of the low literacy level of the people and the existing shortage of water supply in the study area, the partnership approach should be pursued with relevant stakeholders in the delivery of water supply.

REFERENCES:

- Abrams, (1998). Understanding sustainability of local water services. http://www.africanwater.org/sustainability. htm (accessed: 25th August 2006.
- Davis, J., Garvey, G. & Wood, M. (1993). Developing and Managing Community water supplies UK: Oxfam. Pg. 145-146.
- Mogane – Ramahotswa, S.B. (1995). A community based approach to rural water supply and sanitation: Three case studies. Pretoria: Unisa. Pg. 175.
- Parry-Jones, S. Reed, R. And Skinner, B.H. (2001). Sustainable handpump projects in Africa: A literature review WEDC, Loughborough University, UK
- UNDP, (1998). Development cooperation, Zambra Report, Lusaka: UNDP. Pg 43.
- World Bank/UNDP, (2000); Community water supply and sanitation. Proceedings of the meeting of the operation and maintenance working Group, Geneva. Pg 1-16
- WRI, (1998). World Resources 1998-1999. New York: Oxford University Press. Pg 78-79.