POST INTERVENTION ASSESSMENT OF THE VIABILITY OF DONOR SUPPORTED WATER PROJECTS IN DELTA STATE, NIGERIA

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Abstract
The study assessed the viability of donor supported water projects after intervention in Delta State, Nigeria. The study objectives were to determine the viability of water projects after they were handed over to the communities, evaluate the performance level of the water projects in the communities. It also examined the factors responsible for the viable water projects in the communities. The study adopted the survey research design. The sample size consisted of 349 individuals purposively sampled in communities with donor water funded projects as well as officials in water departments and related agencies of Delta State. The questionnaire was the main instrument used in collecting primary data. Charts, frequency tables, mean and standard deviation were used to analyse the data. The hypotheses were tested with the aid of 2-independent samples Z-test, and principal component analysis. Findings showed that two groups of factors were responsible for the functionality of water projects. These were the supply side factors- geological survey prior to water sitting, location not politically motivated, training and retraining of artisans. The demand side factors include -use of user-friendly fees, technical support by volunteer local artisans, involvement of water committees ($Z = 6.005$, $p < 0.05$). Community participation was significant to the viability of water projects after they were handed over to the communities. The results also indicate that the performance level of the water project in the community significantly affect viability of donor supported water projects ($r = 0.911$. $p < 0.05$). On the basis of these findings the study concludes that the functionality of water project was largely related to a proper mix of the supply and demand side factors. Thus, it was recommended that water projects should be community driven and that community members should be actively involved in the implementation and maintenance of the water project.

Key Words: Donor, water, Project, functionality.

1.1: Background of the Study
Humans, plants and animals require water for basic biological functions and survival. It is also an important resource for the economic life of Countries of the World. Regardless of its importance, water is not evenly available to people and Countries of the World. Even when available, the quality and quantity may not be sufficient. Based on the critical importance of water, national and regional governments, as well as international Organisations invest large amounts of money, efforts and other resources yearly especially in developing countries to tackle water deficit problem by means of community water supply projects (Prokopy, 2008).

In spite of these efforts available statistics show that over a third of the world's population is seriously affected by a water crisis. The crisis is a severe problem in developing countries especially in Africa, where 6 out of every 10 persons do not have access to water (World Health Organization, 2010). In Delta state, available statistics show that 75% of the population do not have access to potable water (MICS, 2017) Inadequacies in water supply, access and quality and use are associated water related diseases such as cholera, *schistosomiasis* and trachoma" (WHO, 2003). The recent outbreak of covid-19 calls for habitual hand washing with water. This calls for more efforts in the provision of water to citizens regardless of location and status.

However, constructing water supply systems only would not eliminate all problems, the functionality, utilization by intended beneficiaries, and durability of water projects are important characteristics needed to achieve maximum benefits (Harvey and Reed, 2004). The voices of the beneficiaries are important at every stage of the water project. This calls for synergy between beneficiaries and project suppliers in decisions and implementation of water projects.

Delta state is endowed with water sourced from dug out wells, streams, rivers and abundant rainfall but these sources are unwholesome for human consumption. Water from these sources in most parts of the State are polluted as a result of oil related or other human activities. To overcome the problems associated with drinking water from these unwholesome sources, some communities with the assistance of Government have approached donor agencies for assistance. Many communities in Delta State have benefited from the benevolence of international organizations in various forms. These include; the provision of hand pumps, as well as micro, medium and mega water projects. Some of the donor assisted water projects are powered by diesel engines or electricity from the public power supply grid or solar.

Available statistics show that in Delta State there were more than 333 rural water projects schemes and 236 urban water schemes as at 2013. In spite of these multiple water projects in the State, access to potable water remains a challenge. Many water projects cease to function not long after commissioning (Delta State digest of social statistics, 2014). Yet, others are simply abandoned. As at 2012, the sum of 15.5 billion naira was spent on water projects in Delta State by the State Government.

1.2. Statement of the Problem

Over the years several public water projects have been executed by various donor agencies and the State government in Delta state Nigeria. Given the importance of water in the daily economic and social lives of the people, the initiation and implementation of these water projects raised the expectations of benefiting urban, semi-urban and rural communities. The benefiting communities were happy that once they were provided with improved water sources through donor assistance or the state government, their water related problems would be over. However, the contrary is the situation on ground. Many Donor funded water projects undertaken by international development organizations in Delta State appeared like a mirage. The expected benefits associated with the water projects were not sustained after their commissioning. Yet new water projects are known to have been undertaken without recourse to establishing reasons for the malfunctioning or abandonments of the older community water projects. In some communities, additional water facilities have been provided, whilst in other communities, old facilities have been upgraded or rehabilitated. While the provision of these water facilities was expected to improve access to water to the target population groups, the outbreak of various water related diseases is evidence to show that the water problems of these communities remain. Thus, the need to examine the viability of donor supported water projects in Delta State.

The issue of viability is critical to the urban, semi urban and rural communities where the projects are sited, given the resource scarcity and over ridding need for portable water for life.

1.3. Aim of the Study

The main aim of this study was to investigate the extent of the successes of water projects meeting the water needs of the supposed beneficiaries in Delta State.

1.4 Objectives of the Study

The specific objectives of the study were to:

(i) determine the viability of water projects in benefiting communities in Delta State after the projects were completed and handed over to the communities.

(ii) evaluate the performance level of the water projects in terms of meeting the water needs of the communities.

(iii) examine the factors responsible for the viability of the water projects in the communities.

1.5. Research Questions

In line with the research problem and objectives of the study, the study was guided by the following research questions:

(i) how viable are the water projects in Delta state after handing over to the communities?

(ii) to what extent are the water projects meeting the water needs of the communities?

(iii) what factors are responsible for the viability of the water projects after they are handed over to the communities?

1.6 Hypotheses of the Study

The following hypotheses were formulated to guide the investigation:

H_0: Water projects are not viable after they are handed over to the communities

H_0: The actual Performance level of the water projects in the community do not vary significantly from the expected performance level.

2.0: Theoretical Review

The theory considered relevant to the study on donor Support water Projects is the Stewardship theory.

2.1: The Stewardship Theory

According to Tempel (2003), "Stewardship is the careful and responsible management of something entrusted to one's care by others; the 'soul of stewardship' is found in the way this management for others is exercised". The secular meaning of stewardship states that organizations should "serve as good stewards of the gift resources granted to them by donors" (Kelly, 2001). To fund raisers, stewardship involves more than just using the donor's gifts wisely and responsibly, but also being aware of how an organization's behaviour affects the relationship with donors. "Well-managed stewardship practices provide opportunities for donors to deepen their interests and values" (Grace, and Wendroff,2006)). The act of stewardship, therefore, is "a critical function by which organizations develop lasting relationships with their donor investors". Stewardship according to Grace and Wendroff, 2006), can be divided into four segments namely: reciprocity, responsible gift use, reporting to donors, and relationship nurturing. Although many organizations may share the same general understanding of stewardship, how and the extent to which an organization practices stewardship and implements the four stewardship elements may vary depending on the organization's operational definition of stewardship within its culture, and its available resources.

2.2: Empirical literature

Keller (2008) studied donors' experiences with stewardship by surveying University of Toledo donors. He looked at the donors' overall experiences with stewardship at the University, the relationships between the donors' demographics and their perceptions of stewardship, and what the donors believe influenced their giving. This study's findings showed that over 50% of the participants recorded being mostly satisfied or very satisfied with their experience of stewardship. The majority of respondents noted, however, that of the 19 listed stewardship events, they only attended an average of 5 events, and of those who attended event, their highest level of satisfaction was with athletic events. The relationship between demographic and perceptions of stewardship showed that the donors most likely to attend stewardship events donors belonged to more than one club affiliation at the University. More new donors, opposed to donors of 10 years or more, noted they would attend to the progress of university programs they supported and interact with scholarship recipients. This shows the importance of stewarding new eager donors.

Andrew et al (2008) conducted a study on donor-centred fund raising to assess stewardship practices. This entailed how donors of the Boys & Girls Club of the Peninsula (BGCP), specifically major donors at annual giving at the levels between $25,000 -$50,000, viewed stewardship. This study specifically looked at what factors led donors to give to the BGCP, and what the donors thought the Club could do to nurture relationships with donors. The authors suggest opening board memberships up to younger donors, or those at lower giving levels. New philanthropists desire involvement in organizations and want organizations to use their suggestions in addition to their donations. They suggested engaging current board members in the acquisition of new members, in order to cultivate new organization-donor relationships.

Ofuoku (2011) evaluated the effects of community participation on sustainability of rural water projects in Delta Central Agricultural Zone of Delta State, Nigeria. The study found that the community members were rarely often or always involved in the various stages of the projects as the community development committee executives represented the communities. In most communities, the water projects were funded by the respective communities and other bodies. According to him, water projects that received counterpart funding were highly sustainable than those solely funded by governments. The various communities were mostly organized through formation of community development committees, weekly meetings and formation of social groups. There was significantly relationship between participation and sustainability of water projects (r-cal = 0.652 and r-critical = 0.632). The study recommended that the level of participation in projects should be increased; and the communities should continue with their methods of organization with more emphasis on rewards to encourage citizens to participate in development projects

In a similar study, Oladipo (2000) attributed the failure of development projects to achieve their desired impact on the local people to the non-involvement of development partners and project beneficiaries in the assessment of the performance of the projects. Similar views were re-echoed by Okon (2012) who opined that current issues on development co-operation today are the increasing importance attributed to community level involvement. Since the 1990s, promoting partnerships in sustainable community development has likewise been an important element in development co-operation. In Nigeria, donor or partner organizations have vigorously pursued policies and programmes of community-led assistance, particularly infrastructure development, in both rural and semi-urban Local Government Areas (LGAs) since the 1990. He further indicated that since the emergence of modern development practice (Development Co-operation-Partnership) in the 1940s, the concept has undergone a number of reforms and readjustments to suit the peculiarities of both old and newly emerging societies. The notion of development co-operation, which until the 1950s and 1960s was perceived as merely a technical issue, has shifted to focus on a new range of cross-cutting themes such as governance, indigenous peoples, gender issues, community development, and so on.

Burke (2013) in his study titled 'The Viability of Water Privatization in Sub-Saharan Africa" opined that water privatization can be an effective tool to address urban water needs if the process is conducted correctly. He emphasised the need for community participation to ensure viability. Burke was of the view that while privatization could greatly improve the lives of citizens living in urban areas who suffer from water deficiencies, privatization will not greatly influence the water crisis due to the inability to implement the process in rural areas.

In terms of access to water in Sub Sahara Africa, (JMP 2010), looked at 35 countries in SSA and found that 84 percent of the total regional population had access to water. The urban population was also found to have more access than rural populations. However, access to water was disaggregated into quintiles based on wealth, a different story emerged. It was found that in urban areas, 94 percent of the richest quintile has access to an improved water source while the poorest quintile has only 64 percent coverage. What this breakdown shows is that while the global urban population does have a higher level of coverage compared to the global rural population, when the numbers are broken down based on region and income the urban population still has many issues that must still be addressed.

Mahama and Badu-Nyarko (2014), on the study "Community participation in water delivery services and sustainability in the Savelugu/Nanton Municipality, Ghana" found that programme planners involved community members from the planning to utilisation level. According to them; this resulted to the empowerment of the community members who took total control, ownership, maintenance and sustainability of the water facilities. The study further observed that Communities that participate in projects find out that, not only do they derive more satisfaction from the joy that comes from open community involvement, but they also achieve more results, more rapidly which benefit the community as a whole.

Mayo and Nkiwane (2013) on the study, "The role of community participation on cost recovery and sustainability of rural water supply projects in Hai District, Tanzania "Observed that in the past, the Government and other donor agencies planned and constructed water supply schemes with little involvement of the benefiting communities. The study emphases that such approach led to a lack of commitment by the beneficiaries to safeguard the facilities and concluded that the study also found out that people are more willing to safeguard their water sources and pay for water if they take part in the management of their water schemes.

In the study by Taylor (2009), nearly half (46%) of public improved water points in rural areas of Tanzania were not functioning, two years after installation, already 25% of public improved water points are non-functional and almost half of all investment in rural water supply is effectively wasted. Furthermore, up to 7.5 million rural Tanzanians lack access to clean and safe water due to functionality problems. According to Taylor (2009), there are the obvious technological factors, such as the durability of the hardware involved. But even with the most durable hardware and most reliable source, you can guarantee that it will break down at some point. What happens after it breaks down is absolutely critical for sustainability. Does anyone take responsibility for the repairs? Are there funds available for this? Can the right spare parts be found? Does anyone have the technical skills needed? These are management questions, looking at how rural water supply schemes are owned and managed after installation, and at how the planning and installation process is conducted.

Water-Aid (2011) in its publication, "Sustainability Framework" observed that it was not uncommon for technical problems to arise which exceed service users' ability to cope. Such hitches include: rapid corrosion of hand pump rising mains, damage to piped systems by landslides, inundation of latrines or exceeding the capacity of storm drains by floodwaters, and salt water intrusion into water supplies. As these were likely to severely challenge communities' abilities external technical assistance was therefore essential. Many national O&M policies recognise that there are distinctions between tasks which households and communities could and should manage and those which lie beyond their abilities. It is important, however, to define this boundary precisely and to establish a clear mandate setting out who will address the technical challenges which lie beyond the scope of community management. The dividing line between community responsibilities and those of external support organisations is context specific.

The responsibility of communities to manage their water and sanitation services forms a central component of much WASH sector policy and strategy. However, subscription to this principle has not delivered the results expected in case of Delta State. In some cases, this is due to poor implementation, in other cases the principle is simply inadequate.

According to the study of World Bank (2004), "In 1968, a community of 2000 people in Malawi started work on a novel water supply system. Community members began the planning, construction and operation of their own water supply and distribution. Field staff for the project was recruited locally, traditional community groups formed the basis for water communities, and government support was limited. Virtually, all of the more than 6000 standpipes installed nationwide are still in working order. More than one million Malawians have high quality, reliable and convenient water through systems that they themselves built, own and maintain.

In another study of evaluation carried by the World Bank (2004), it was found out that during a ten years period in the Philippines, the National Irrigation Administration shifted from a top-down government approach to heavy reliance on the local farmers in the design, operation and maintenance of local irrigation systems. It was discovered that the canals and structures worked better, rice yields were 20% higher and the irrigated area 35% greater than in control groups without participation (World Bank, 2004). In another report by the Research Observer on the evaluation of community development projects funded by the Agha Khan Rural Support Programme in Northern Pakistan, it was found out that community managed projects are better maintained than projects managed by the local government.

In a related manner, the study of Musa (2000), suggested that for projects to be sustainable there must be community participation. This is because, through participation, the community develop skills for collective action, maintenance and sustainability.

According to Olukotun (2008), one of the most significant events that took place in major urban and rural areas in Nigeria has been the citizens' participation in the physical, societal and political development of their areas and this participation actually started from time immemorial. A study in Pategi Emirate in Kwara State (Nigeria) revealed that the number of primary schools' projects in the Emirate were executed through self-help increased from 11 in 1975 to 50 in 1984 and the average population of pupils rose from 2,634 in 1975 to 12,113 in 1984 (an increase of about 437%). Also in Kano state, there were self-help projects activities including (a) dispensaries and clinics (b) wells, boreholes, earth dams and pipe borne water (c) feeder roads, bridges and culverts (d) schools and adult education centres (e) market stalls and cemeteries.

The community management model has sometimes been presented as a panacea for achievement of lasting services but in the absence of external support, there is extensive evidence of its weaknesses. The evolution of community management as a pragmatic response to weaknesses in public service provision, and its subsequent promotion as the ideal model of service delivery was a triumph of hope over realism (Haysom, 2006).

3.0: Research Design

This study adopted the survey research design. The survey design was chosen because it allowed some stakeholders in donor supported water projects in Delta State to make their input into the study.

3.1: Study Area

The study area is Delta State. Delta State is one of the 36 states in Nigeria. The State lies between latitude50^0 and 60^0North and Longitudes 60^0 and 60.45^0 East (Delta State Statistical year Book, 2018). The State comprises of 25 local government areas with a projected population of 5,594,465 persons (Delta State Statistical year Book, 2018). In terms of male, females' compositions there are 2,815,035 and 2,779,430 respectively. It is divided into three senatorial districts (Delta South, Delta Central and Delta North). The state is characterised by wet equatorial climate with average rainfall exceeding 200mmm annually. Temperature ranges from 24.2 ^{0}C to 32.4^0C. It is one of the oil producing states in Nigeria. Although the State is richly blessed with rivers and other water bodies, drinking water is yet a major problem owing to oil and other human activities related pollution. Available statistics show that Delta State was among the few states in Nigeria were a sizeable percentage of the population (75%) do not source water from their premises (MICS, 2017).

3.2: Population of the Study

According to the Delta State Government's Digest of Social Statistics (2014), there were five hundred and sixty-nine (569) water projects in Delta as at the time of the survey. In terms of spread, there are three hundred and thirty-three (333) water projects in the rural areas while two hundred and thirty-six (236) are in the urban areas. Therefore, the population of this study comprised of the beneficiaries and other stakeholders on the 569 water projects in Delta State. According to the Federal Ministry of Water Resources-FMWR (2013), this population is spread across 869,400 households out of which 502,513 households have access to water.

Table 1: Estimated Number of Household with Access to water in Delta State

Senatorial District	Population	Households	Households with access to water
Delta Central	1,570,858	337,154	194,875
Delta North	1,236,840	261,120	150,927
Delta South	1,304,747	271,126	156,711
Total	**4,112,445**	***869,400***	***502,513***

Source: Federal Ministry of Water Resources, 2013

3.3: Sample Size

As this study focused on the viability of water projects in Delta State, all the water projects (569) were eligible to be studied. However, twenty (20) water projects (10 functional and 10 non-functional) were studied from each senatorial districts, giving a total of 60 water projects.

To determine the sample size of for the study who were beneficiaries of the water project, the researcher conducted a pilot survey in which 28 copies of the questionnaire were administered on identified respondents that benefitted from donor-supported water projects in Edo State. Out of the number, 21 copies were correctly filled and returned, giving 75% response.

This response rates were applied to calculate sample size at 95% confidence level and 5% standard error (StatTrex.com, 2013).

The formula is;

$$n = \frac{Z^2pq + ME^2}{ME^2 + \frac{Z^2pq}{N}}$$

Where: n = sample Size

p = proportion of positive response

q = proportion of negative response

ME = error margin
Z = critical z-value
N = population size

$$n = \frac{1.96^2(0.75x0.25) + 0.05^2}{0.05^2 + \frac{1.96^2 + (0.75x0.25)}{502513}}$$

n = 288.95, approximately 289 beneficiaries.

Based on this, the sample of 289 beneficiaries was selected from the communities. From the supply side -ODA department of the ministry of Economic Planning, Rural water sanitation agency, water practitioners, experts and authority in water projects in Delta State 60 key informants were also purposively selected. Thus, the combined total sample was 349.

Using the formula for calculating the proportionate sample size for clusters, the sample size for the various clusters is determined. The formula is;

$$n_h = \frac{N_h}{N} \times n$$ (StatTrex.com, 2013)

where;
N_h = cluster sample size
N_h = cluster population size
N = total population size
n = population sample size

To select adequate sample size from the senatorial districts, households with access to water in the zone were grouped (Table 2).

Table 2: Sample Size of selected Households with access to Water

Senatorial District	Household with access to water	Sample size	Key Informants	Total Sample
Delta Central	194,875	112	20	132
Delta North	150,927	87	20	107
Delta South	156,711	90	20	110
Total	***502,513***	***289***	***60***	***349***

Source: Adapted from Federal Ministry of Water Resources, 2013

3.4: Sampling Technique

The sampling technique adopted for this study was the Cluster/Area sampling technique. This method is deemed suitable for this study because the population of the study is distributed within clusters (Onwumere, 2009). As at the time of the study there were Out of the 569 water projects in Delta State. The list of the communities with the water projects was obtained from the Ministry of water resources. Out of the 569 water project communities, 60 water projects were sampled purposively sampled. Effort was made to select functional and non-functional water projects from the lot. This was distributed evenly 20 each ,10 functional and 10 non-functional in the three senatorial zones of North, central and south. Therefore, the sample was distributed according the three senatorial zones, with Delta central having 132 respondents distributed in 20 communities on the average of 6, Delta North 107 on average of 5 in 20 communities and Delta South 110 respondents on the average of 5 in 20 communities.

3.5: Types and Sources of Data

Among the data collected in the field which were the primary data include location of the water project, size of the water project, date of installation and commissioning, the functionality status of the water project, management of the water project, number of households benefiting from the water project, availability of technical skill for the water project, current status of the services. These were collected from the Overseas Development Assistance (ODA) Department of the Ministry of Economic Planning, Asaba, and Delta State.

Secondary data such as names of community water projects, donor, and amount involved and geological formation was be obtained from ODA, Rural water supply and Sanitation agency (RUWASAN), water practitioners, experts and authority in the water projects.

3.6: Instruments for Data Collection

The instrument used for data collection was a structured questionnaire. The questionnaire consisted of four sections. Section A consists of the demographic information of the respondents. Section B captured the viability issues about the water projects; Section C the performance level of the project; Section D focused on the factors that affect the viability of the water project. The questionnaire comprised of open and closed ended question.

3.7: Validity of the Research Instrument

This was achieved by sending the prepared research instrument to experts for vetting in terms of relevance to the subject matter, coverage of the content areas, appropriateness of language usage and clarity of purpose.

3.8: Reliability of the Research Instrument

The Cronbach's Alpha (α) was used to test the reliability of the research instrument. From the pilot study α value of 0.87 was obtained. Thus, the research instrument was deemed reliable.

3.9: Data Collection

Data for this study was collected from 25th September to 1st November, 2015.

3.10: Data Analysis

Data collected was analysed using simple frequency and percentage distribution, mean and standard deviation, while inferential statistics was used in testing the various hypotheses. Hypothesis one was tested using 2-Independent Samples Z-test; hypothesis two was tested using regression analysis while hypothesis three was tested with principal component analysis (PCA).

The formula for 2-Independent Samples Z-test is:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\frac{\sigma}{\sqrt{n}}} \quad \text{... (1)}$$

where; $\bar{X}_1$ = mean for group 1
$\bar{X}_2$= mean for group 2
σ = standard deviation
n = sample size

The calculated Z value is then compared to the critical Z value from the Z distribution table based on a chosen confidence level. If the calculated Z value > critical Z value, reject the null hypothesis.

The general formula for the Regression Analysis is:

$$Y = a + \beta X + e \quad \text{... (2)}$$

Where; Y = Dependent Variable (*Viability of water project*)
X = Independent Variable (*performance level of water project*)
a = constant
β = coefficient of X
e = error margin

The basic equation of PCA is, in matrix notation, given by:

$$Y = W'X \quad \text{... (3)}$$

Where W is a matrix of coefficients that is determined by PCA.

4.0 Results

4.1: Age Distribution of Respondents

While every member of the household needs and uses water, the study however interviewed adults who could offer answers pertaining to the study. The age distribution of the respondents is presented in Table 3. The average age of the respondents was forty-four years.

Table 3: Age Distribution of Respondents N=301

Age Group	Frequency	Percent (%)
20 – 29 years	28	9.3
30 – 39 years	63	20.9
40 – 49 years	108	35.9
50 years and above	102	33.9
Total	301	100.0
Mean ± Std.	43.94±0.59	

Source: Field Survey, 2015

4.3: Highest Educational Qualification

The distribution of the respondents based on their highest educational qualification is presented in Table 4.

Table 4: Distribution by Highest Educational Qualification

Highest Educational Qualification	Frequency	Percent (%)
No formal education	0	0.0
Primary	0	0.0
Secondary	99	32.9
Tertiary	188	62.5
Others	14	4.7
Total	301	100.0

Source: Field Survey, 2015

Among communities with functioning water projects, respondents were asked to state the various uses that the water is put to. Results are summarised in table 5.

Table 5: Water Use in communities with functioning donor supported water

Items	Mean ± Std. Dev.	
	Functional	Not Functional
It is used for domestic purposes (cooking, drinking, bathing)	3.48 ± 1.02	2.55 ± 1.27
Used for household enterprises (washing, cleaning, dry cleaning)	4.41 ± 0.49	4.00 ± 0.95
Used for commercial business (e.g. local canteen, sachet water production, etc.)	2.40 ± 1.08	2.84 ± 1.14
Location of the water project is accessible	4.10 ± 1.29	2.55 ± 1.31
Satisfied with the current charges for the water use	3.96 ± 0.95	2.48 ± 1.29
Satisfied with the present water management committee	3.76 ± 0.97	2.29 ± 1.22
There have been no incidences of sickness diseases or death	4.04 ± 0.96	3.47 ± 1.10

Source: Field Survey, 2015

Test of hypothesis

Ho: Performance level of the water project in the community does not significantly affect viability of donor supported water projects. The regression analysis is used in testing this hypothesis.

Table 6: Regression Results for Hypothesis

Variable	Coefficient	t-value	p-value
Constant	-0.625	-6.451	0.000
Performance Level (PL)	1.100	38.075	0.000

r = 0.911; r^2 = 0.829; Reg SS = 431.43; Res SS = 88.98; F-value = 1449.719; sig. = 0.00

The result of the regression analysis summarized in Table 7 shows that the model for the relationship between performance level (PL) and Viability of water project (V) is:

$$V = -0.625 + 1.100PL$$

This reveals that performance level has positive impact on viability of water project. Furthermore, as t-value > 1.96 (t-critical) and p-value < 0.05, this impact is significant.

Also, the regression coefficient (r) of 0.911 indicates a strong relationship between the independent variable (performance level) and the dependent variable (viability). The coefficient of determination (r^2) of 0.829 reveals that 82.9% of the variation observed the dependent variable is caused by the independent variable. Having a regression sum of square of 431.43> the residual sum of squares of 88.98, this variation is not due to chance. The F-value and corresponding significance value of 1449.719 (0.000) shows that these results are significant.

Based on this, the results indicate the performance level of the water project in the community significantly affects viability of donor supported water projects.

Viability of Water Project

Mean responses was used in determining the general responses of the respondents. The decision rule below was used in discussing the mean results.

Decision Rule

If Mean ≥ 3.5, the respondents agree
If Mean < 3.5, the respondents do not agree

The respondents view on the viability of the water projects in their communities is presented in Table 7. As presented in Table 7, water projects in the communities had mean values > 3.5, as against communities with non-functional water projects. Factors important in ensuring viability of water projects include the use of local artisans during the project implementation, paid skill technical skilled workers and volunteer skilled workers in maintaining the water projects as well as charging fees for the use of water and having a committee that manages the water projects.

From the mean responses ($\bar{x}$< 3.5) of the respondents from communities whose water projects are not functional, the viable of their water project could not be guaranteed as they did not focus on effectively managing the water projects in their communities.

Table 7: Factors in the Viability of Water Project

factor	Mean ± Std. Dev.	
	Functional	Not Functional
Local artisans are used to maintain the water project	3.95 ± 0.97	2.20 ± 0.96
Paid technical skilled workers are used to maintaining the project	4.18 ± 0.70	2.85 ± 1.19
Volunteers technical skilled workers are involved in its maintenance	3.99 ± 0.72	2.55 ± 1.19
Fee is charged for use of water	4.39 ± 1.06	2.20 ± 1.26
Committee manages water project	4.17 ± 0.88	1.73 ± 0.89
Other measures are put in place to keep the water project on-going	4.34 ± 0.79	1.99 ± 1.16

Source: Field Survey, 2015

Test of Hypothesis:

Water projects are not viable after they are handed over to the communities

Table 8: Z-Test Result for Hypothesis

Functionality	N	Mean	Std. Deviation	df	Z	Sig. (2-tailed)
Yes	96	4.1684	.75877	299	6.005	0.000
No	205	2.2528	1.05210			

Based on the results presented in Table 9, the respondents that indicated that the water projects in their communities are functional rated its viability high ($\bar{x}$ = 4.17 $\pm$ 0.76), the other respondents did not. With a Z-value of 6.005 and $p < 0.05$, this result is significant. Hence, the null hypothesis is rejected. Therefore, water projects are viable after they are handed over to the communities.

Supply side factors responsible for the viability of water projects in the communities

Table 9: Supply Factors in Water Project Viability

Factors	Mean $\pm$ Std. Dev.	
	Functional	Not Functional
Water test is periodically carried out	3.98 $\pm$ 0.97	1.98 $\pm$ 1.14
Proper geological/soil survey was conducted	4.03 $\pm$ 1.03	1.92 $\pm$ 1.17
Sustainable water treatment practices are implemented	3.91 $\pm$ 0.93	1.69 $\pm$ 1.13
Project was not politically motivated	4.11 $\pm$ 0.97	1.85 $\pm$ 1.19
Project is community-driven	4.07 $\pm$ 1.00	1.79 $\pm$ 1.10
Community-involvement in maintenance of project	4.13 $\pm$ 0.92	1.68 $\pm$ 1.09
There are post-commission sustainable programmes	4.03 $\pm$ 1.04	1.74 $\pm$ 1.06
Periodic training, re-training, orientation and awareness on critical skills to operate and maintain the project	4.00 $\pm$ 1.03	1.70 $\pm$ 1.03
Memorandum of Understanding is respected by all parties concerned	4.15 $\pm$ 1.08	1.74 $\pm$ 1.00
Good institutional and sustainability framework in place	4.21 $\pm$ 0.93	1.74 $\pm$ 1.07
Genuine machinery components	4.09 $\pm$ 1.04	1.70 $\pm$ 0.98
Good maintenance culture	4.01 $\pm$ 1.05	1.78 $\pm$ 1.03

Source: Field Survey, 2015

From the responses presented in Table 4.8, the respondents from the communities that their water project was functional, noted that the factors that contributed to the viability of water projects are the periodic testing of the water ($\bar{x}$ = 3.98 ± 0.97), proper soil survey ($\bar{x}$ = 4.03 ± 1.03), implementation of sustainable water project ($\bar{x}$ = 3.91 ± 0.93), not being politically motivated ($\bar{x}$ = 4.11 ± 0.97), being community-driven ($\bar{x}$ = 4.07 ± 1.00), community involvement in the project maintenance ($\bar{x}$ = 4.13 ± 0.92), periodic training on project operation and maintenance ($\bar{x}$ = 4.00 ± 1.03), respect for MOU ($\bar{x}$ = 4.15 ± 1.08), good institutional and sustainability framework ($\bar{x}$ = 4.21 ± 0.93), genuine machinery components ($\bar{x}$ = 4.09 ± 1.04) and good maintenance culture ($\bar{x}$ = 4.01 ± 1.05).

Test of Hypothesis Three

There are significant factors that cause the water projects to be viable after they are handed over to the communities

The Principal Component Analysis (PCA) was used to test this hypothesis. The result is presented thus.

Table 10: Total Variance Explained

Component	Initial values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.659	97.162	97.162	11.659	97.162	97.162
2	.116	.963	98.125			
3	.070	.582	98.707			
4	.039	.328	99.035			
5	.027	.224	99.259			
6	.024	.197	99.456			
7	.019	.157	99.613			
8	.014	.114	99.727			
9	.013	.108	99.836			
10	.010	.081	99.917			
11	.006	.048	99.965			
12	.004	.035	100.000			

Extraction Method: Principal Component Analysis.

As presented in Table 11, out of the twelve (12) factors listed in Table 4.8, only one is extracted. The extracted component has an initial value of 11.659 and accounts for a total cumulative percentage of 97.162% in the variance observed in the viability of the water projects.

Table 11: Component Matrix

	Communalities Extraction	Component 1
Water test is periodically carried out	.953	.976
Proper geological/soil survey was conducted	.968	.984
Sustainable water treatment practices are implemented	.947	.973
Project was not politically motivated	.975	.987
Project is community-driven	.987	.993
Community-involvement in maintenance of project	.975	.987
There are post-commission sustainable programmes	.987	.993
Periodic training, re-training, orientation and awareness on critical skills to operate and maintain the project	.976	.988
Memorandum of Understanding is respected by all parties concerned	.972	.986
Good institutional and sustainability framework in place	.975	.988
Genuine machinery components	.973	.986
Good maintenance culture	.972	.986

Extraction Method: Principal Component Analysis. a. 1 components extracted.

Table 11 shows that only one factor extraction was the principal component. The extracted factor, which is the principal component (factor) is the project being community-driven. This factor has the highest communalities of 0.987 and component extraction value of 0.993. Hence, this factor accounts for the 97.162% total variance in the viability of water project in Delta state. Based on this, the water project being community-driven is the significant factor that causes the water projects to be viable after they are handed over to the communities.

Discussion

5.1 Viability of Water Project

The study showed that the functional water projects in some communities are viable while the others are not. The viability of these water projects was accounted for by the involvement of local artisans, paid technical skilled workers and volunteer technical skilled workers in the maintenance of the water project. This was so, because like in communities where the water projects were not functional, there was little or no involvement of these skilled workers in maintaining the water project. Also, the payment of certain fees for the water as well as the management of the project by a project committee was instrumental to the success of the project.

5.2Functionality of Water Projects

The functionality level is measured by the use of the water. When water provided meet the water need of the beneficiaries for domestic and commercial purposes across seasons, then that water project is termed functional. Water use is encouraged by its proximity to the community members, affordable charges and availability at all times. These were the major features of the projects in communities where their water projects were still functional. This was not the case in communities in Delta state with non-functioning water projects. None of the water projects was provided with treatment facility, hence the large percentage of households in Delta State that use untreated water 92percent (MICS, 2017).

These findings accord with Oladipo's (2000) Mahama and Badu-Nyarko (2014), position on the failure of development projects inability to achieve their desired impact on the local people to the non-involvement of development partners and project beneficiaries in the projects.

It also agrees with Ofuoku (2011) findings with regards to water projects in Delta Central Agricultural Zone of Delta State. He found that water projects that received counterpart funding were highly sustainable than those solely funded by governments. This also aligns with Mahama and Badu-Nyarko (2014), on the study "Community participation in water delivery services and sustainability in the Savelugu/Nanton Municipality, Ghana" who found that programme planners involved community members from the planning to utilisation level. According to them; this resulted to the empowerment of the community members who took total control, ownership, maintenance and sustainability of the water facilities. The study further observed that Communities that participate in projects find out that, not only do they derive more satisfaction from the joy that comes from open community involvement, but they also achieve more results, more rapidly which benefit the community as a whole.

5.3 Factors responsible for the Viability of Water Project

While several factors were found to be important for the viability of water projects, they were simply classified into two groups: the supply and demand side factors. On the demand side, community-drive was the most important. The supply side factors include: ample use of geological/soil survey prior to location choice, periodic water testing of water quality, training of local artisans. Similar finding was obtained by Taylor (2009), who noted the place of technological and management factors in projects viability. That even with the most durable hardware and most reliable source, you can guarantee that it will break down at some point.

Conclusions

The study has found that many donor supported water projects in Delta State could not meet the goal of providing potable water to the community. Some of the non-functioning water projects had some semblance of community involvement. It is therefore concluded that the community management model though often presented as a panacea for achievement of lasting community services, this study has shown that most times the communities technical and financial capabilities are overwhelmed in some instances thus the need for external support. There is thus the need for communities to still maintain some levels of corroboration with the relevant agencies for assistance in the form of continuous capacity improvement, finance, and technical support among others.

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