ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 8, Issue 3, pp: (67-78), Month: July - September 2020, Available at: www.researchpublish.com

COMMUNITY MANAGEMENT AND SUSTAINABILITY OF GRAVITY WATER FLOW SCHEME IN UGANDA, A CASE OF RUBANDA DISTRICT

David Otika[1], Fabian Mwosi[2], Dr. Marus Eton[3], Dr. Bernard Patrick Ogwel[4], Dr. Godfrey Barigye[5]

[1,3,5] Kabale University –Kabale Uganda

[2]Bishop Barham University College

[4]Kampala International University-Kampala uganda

Corresponding Author: emarus@kab.ac.ug/eton.marus@gmail.com

Abstract: **The study investigated community management and sustainability of gravity water flow scheme in Rubanda district, Uganda. The study adopted a cross sectional survey and descriptive research design. A descriptive research design was helpful in establishing how community management is essential in ensuring sustainability of the gravity water flow schemes in Rubanda. Both quantitative and qualitative approaches were employed in collecting and analyzing data, which was collected in a snapshot interaction between the researcher and field respondents. The study applied convenient sampling technique to select water users and water committee members. The study established that Community management appeared very insignificant in contributing to sustainability of gravity flow schemes. Efforts to incorporate gender in sustainability have yielded almost nothing. The government does not have adequate staffing to provide repairs and maintenance of rural water , the communities are able to mobilize funds for repairs and maintenance of water facilities but are not good at attracting external funding. The study recommends that Government, through its water and sanitation department at the district level should consider employing technical staff in water management to provide standby services to rural water communities. Community leadership should consider involvement of women in water management, as they are the most important users of the water facilities. Government, NGOs and private sector should train communities in fundraising, proposal writing so as to attract external funding for supporting sustainability of water facilities.**

Keywords: **Community management, Gender role, Financial Function, Technical Function, Policy Making Function and Sustainability.**

1. INTRODUCTION

Decades ago, government and other development donors planned and constructed water supply schemes with little involvement of the beneficiary communities, which led to a lack of commitment by the beneficiaries to safeguard the facilities (Mayo & Nkiwane, 2013). In sub-Saharan Africa, 35% of all rural water supplies were not functioning by 2005 (Kilonzo & George, 2017). In the last two decades, (CARE, 2011) reports that about $1.2 to $1.5 billion was wasted in sub-Saharan Africa on installing hand water pumps of which 30% of these water pumps were non-functional by the time of the survey (CARE, 2011).They had broken down within two years of their implementation and not fixed. In most developing economies, water development policies are either inconsistent or do not exist (Asingwiire & Muhangi, 1997).

Where policies exist, however, government support to water and sanitation focuses more on designing and constructing systems based on prescribed needs and perceived health improvements than on demand for or sustainability of services. Similarly, (Khatiwada, 2015) observes that large sums of funds from bilateral and multilateral organizations, foundations, and the private sector flow into developing economies to improve the socioeconomic conditions of people within developing countries. He notes that more of these funds are spent on designing, planning, implementing, and evaluating projects, than on understanding how project components and results evolve and are sustained after projects end. In respect to the increasing the population's access to safe and improved drinking water, many water development projects have been undertaken in developing countries. Most of these projects have attained their targets (Macharia, Mbassana, & Oduor, 2015). However, there remains a challenge of ensuring projects' sustainability and continuous provision of clean water services to the communities without conceding future generation's ability to enjoy such benefits. As an answer to the failure of previous supply driven approaches to providing services, which did not meet the real needs of users, the Community Management Model came into play (Olajuigbe, 2016).Community water management is a new form of co-operation between support development agencies in the water sector and communities. It involves a common effort to identify problems with the local water supply system, and the possibilities for, and constraints on, management by communities, as well as possible solutions that may be tested (Lammerink, Bolt, Jong, & Schouten, 1999). Community water management is a participatory process that creates a sense of ownership for the water supply system; tailoring service levels to the demand of community people; and builds the capacities of community people to operate, maintain and manage their systems themselves (Amer, 2004). Community management works on the premise that community members instead of external agencies can drive development within the community, which removes the idea of the dependency and makes the people agents of their own change (Haneef, Pritchard, Hannan, Alam, & Rahman, 2014). By implication, community management in water system is all about positive and voluntary participation of the water users. Research by (Amer, 2004; Whaley & Cleaver, 2017; Harvey & Reed, 2007) recommend community management as a model for rural water supplies in many low and middle-income countries. However, endemic problems in the sustainability and scalability of this model lead to conclude that the model reached its limits, and is too reliant on voluntarism and informality (Hutching, Chan, Cuadrado, Ezbakhe, & Mesa, 2015; Mandara, Butijn, & Niehof, 2013; Tifow, 2013).

In Uganda, rural water coverage in stood at 63% in 2007/2008 (African Ministers' Council on Water, 2011) and stagnated at 64% in 2012/2013 (Ministry of Water and Environment, 2013). The stagnation was due to poor maintenance that constrained the ability of Uganda's rural water supply subsector to sustain its existing infrastructure (African Ministers' Council on Water, 2011). In terms of functionality, rural water supplies stood at 81% as of June 2010, which was just 1% increase of the functionality rate reported in the past 7 years. Although this was within the stated objective of 80 – 90% functionality, it indicated stagnation, in addition to its non-uniformity across districts (Ministry of Water and Environment, 2013).In terms of the scope of the component, rural water supply in villages is typically via point sources (deep boreholes and shallow wells fitted with hand pumps, protected springs), gravity flow schemes with public taps, and rainwater harvesting tanks. The systems are community managed with support from the respective Local Governments (Ministry of Water and Environment, 2013). For piped water however, a number of gravity flow schemes are experiencing higher demands than their design capacities due to growing populations and the fact that connections are unmetered leading to uncontrolled use and wastage of water. Recent reports by (Ministry of Water and Environment, 2018) estimated national safe water coverage in rural areas at 70% (up from 67% in June 2016). However, the functionality for rural water supplies has on the other hand reduced to 85%, (from 86% in June 2016 and 88% in June 2015). In Rubanda district, rural water point sources functionality (gravity flow scheme) in the sub counties of Muko, Bubare,Nyamweru, Ikumba, Hamurwa and Bufundi stands at 95% (Rubanda District, 2016: 18), while access to safe water and equity stand at 65% and 51% respectively (Ministry of Water and Environment, 2017).Functionality of water and sanitation management committees remains at 42% due to lack of access to spare-parts, unwillingness of water users to contribute towards management of installed water facilities, voluntary nature of water and sanitation committees and inadequate support to communities extension staff (Ministry of Water and Environment, 2016).

Statement of the problem

Ministry of Water and Environment, and Rubanda district local government have made strides in ensuring rural water point sources functionality and access to safe water. Rural water point sources functionality (gravity flow schemes) in Rubanda district stands at 45%, access to safe water and equity remains at 49% and 51% respectively(Rubanda District,

2016: 18). However, the functionality of water and sanitation management committees remains at 42% due to lack of access to spare-parts, unwillingness of water users to contribute towards management of installed water facilities, voluntary nature of water and sanitation committees and inadequate support to communities extension staff (Ministry of Water and Environment, 2016). In a 2013, (Ministry of Water and Environment, 2013) revealed that the main causes of non-functionality of rural water facilities is lack of maintenance beyond the communities' capacity, corrosion of pump parts, lack of spare parts and vandalism of installations especially pump heads; and shortcomings in the Community Based Maintenance System Policy. If sustainable operations and maintenance of water and sanitation facilities are not promoted through good management and technological innovations, the challenges associated with functionality and access to safe rural water points are likely to continue.

Objectives of the study

To establish the role of community management in supporting the sustainability of gravity water flow schemes in Rubanda district.

2. LITERATURE REVIEW

Community Management

Community management is currently the default approach for rural water supply in many low and middle-income countries (Amer, 2004; Whaley & Cleaver, 2017; Harvey & Reed, 2007). Community management model operates under three basic principles: community participation, project ownership; and operations and maintenance(Harvey & Reed, 2007).Community water management is a participatory process that creates a sense of ownership for the water supply system; building the capacities of community people to operate, maintain and manage their systems themselves (Amer, 2004). It involves a common effort to identify problems with the local water supply system, and the possibilities for, and constraints on, management by communities, as well as possible solutions that may be tested (Lammerink, Bolt, Jong, & Schouten, 1999). The success of community water management is involving community from the initiation to implementation of the water system (Olajuigbe, 2016). Community members drive water developments in the community instead of external agencies. This removes the idea of the dependency, and makes the people owners their project (Haneef, Pritchard, Hannan, Alam, & Rahman, 2014). Despite efforts to transfer ownership of rural water supplies to beneficiary communities, and increasing participation of the communities in the operation and maintenance of these facilities, most rural water supplies collapse within three years after the development partners withdraw (Tifow, 2013). Challenges of post implementation relate to community participation, choice of technology, skills of water management committees and sustainability outcomes; in addition to weak local governance, and failing public service provision (Egloff, 2016). Different models continue to provide the management of water supply and sanitation facilities in rural and low-income sub-urban areas. According to (ACF-International Network, 2007), these models include:

a) The self-supply managed, where management is at household level.

b) The institution managed, which include toilet and sanitation facilities managed by an institution such as church, school or hospital.

c) The community based committee, where an informal or formal part of the community leadership structure oversees the operations and management of the water facility.

d) The small-scale water enterprise, where a small-scale private entrepreneur takes the role of supplying water and sanitation facilities in areas where piped water or sewerage systems are limited.

e) The community-based organization, which may manage the water facility on behalf of the community, charging a subsidized fee to users, and using the proceeds for other community activities (ACF-International Network, 2007).

Though different organizations propose slightly varying definitions of community management, many share common principles, which include participation, control, ownership and cost sharing. Macharia, Mbassana, & Oduor (2015) define these principles as follows:

a) Participation means that a cross-section of the community must participate in the development process and offer support for the implementation.

b) Control means that the community must be in direct or indirect control over the operation and management of its own water supply system, which includes the ability to make strategic decisions about the process, from the design phase to long-term operation.

c) Ownership means that a formal legal ownership of physical infrastructure is made explicit, though it is not always be possible in existing legal frameworks.

d) Cost sharing means clarifies the need for some element of contribution to the recurrent costs of running and maintaining the system depending on individual circumstances and contributions (Macharia, Mbassana, & Oduor, 2015).

Functions of community management

Quoting (Brikke, 1997) on how to ensure sustainability of project services, (Mwakila, 2008) advices that water sources should not be overexploited, facilities for operation and maintenance be in place, and funds be readily available. He adds that both women and men be involved in the design, planning and management of the scheme, and technology choice corresponds to needs desires. The project needs to be culturally accepted, spare parts are available and affordable, and support system is in place. The functionality of local water committees or similar community management organizations is threatened by three major challenges: the relative neglect of the local institutional and socio-economic landscape; broader governance processes and power dynamics; and the socio-technical interface (Whaley & Cleaver, 2017).

Gender roles

Mwakila (2008) restates one of the principles of the 1992 Dublin Statement on water and environment: women play a central role in the provision, management and safeguarding water. Communities are complex social realities in which it is impossible to separate out the management of the water supply from other concerns. Management capacities build successfully when there is a spelt out and clear understanding of the social, economic and cultural characteristics of the community (Lammerink, Bolt, Jong, & Schouten, 1999). Water committees fail to take account of important contextual factors such as historical processes, livelihood constraints including the gendered divisions of labor and the extent to which water management and use socially embeds in a plural and gendered local institutional landscape (Whaley & Cleaver, 2017). The presence of women on rural water supply and sanitation projects improves the health and well-being of the rural population. Women hold a special position in rural water as water collectors, managers, and providers of health comes. Gender-specific assessments of health, socio-economic and environmental aspects are useful in preventing any negative ecological impacts on water resources and the environment and maximize the long-term benefits of the projects (Wijk-Sibjbesma, 1995). Without regard for the methods used, it is essential to seek the views of men and women in the different socio-economic and cultural categories of the area when selecting project priority areas and determining the socio-economic and cultural aspects that have to be taken into account in the general preparation of the project.

Financial function

One common feature of all village water schemes is the lack of regulation of those responsible for financial management (Mwangi, Wairimu, Riro, & Muchiri, 2015). Adequate understanding, identification and estimation of the operation and maintenance costs is critical for the sustainable delivery of water supply services. Financial management is a key issue in community management in water projects, which without water levies and fees charged for connection, and usage, sustainability of the project will not be possible. Whereas water management in the urban areas can be enforced through tariffs and other conservation tools, water management in the rural areas relies on institutional arrangements and willingness and ability of rural people to pay for water (Karuaihe, Mosimane, Nhemachena, & Kakujaha-Matundu, 2014). The committee Accountant, whose main responsibility is to keep accurate financial records and to advise the Operations Manager on overall cash flow issues and financial management reports to the Operations Manager (Castro, Msuya, & Makoye, 2009). Community involvement in contributing financially towards the maintenance of water facilities is key to ensuring sustainable rural water supply (Braimah, Amponsah, & Asibey, 2016). Irrespective of season however, households should contribute towards the management (repair and maintenance) of facilities. Literature indicates that all kinds of financing schemes have been tried, with more or less success; but usually the only way to get an improvement is to have the people pay at least part of the cost (Mwakila, 2008). If they are unwilling to contribute in labor, material, or cash, any free improvement will soon degenerate to its original state. Community management becomes a reality only if decision-making, including financial control, is devolved to community level (Ssentaba, 2009). This is a political decision, which requires political support. In any water committee, the operator is typically responsible for daily operation

of the water system, as well as for minor repairs. The water system operator shares the responsibility for major repairs and for maintaining the community's water source. The operator tends to be solely responsible for financial matters, including billing, collections and the purchase of spare parts (Davis, et al., 2008).

Technical function

The design and construction of water systems strictly adheres to technical parameters. Once technical problems are, the system works well. However, strengthening improved systems in the communities require sustained procedures and institutions created at the same time (Lammerink, Bolt, Jong, & Schouten, 1999). Operations and maintenance (O&M) refers to all the activities needed to run a water supply and sanitation scheme with the exception of constructing new facilities. The technical roles of operation and maintenance are to ensure efficiency, effectiveness and sustainability of water supply and sanitation facilities (Castro, Msuya, & Makoye, 2009). The introduction of private sector participation in the development and management of urban water and sanitation services has brought in excellent technical, financial and managerial expertise that has greatly improved on the performance of the sub-sector and made it more economically viable (World Water Assessment Programme, 2006). The introduction of private operators in the management of small town water supplies has not only attracted the necessary technical expertise, which was lacking, but has also significantly reduced the government burden in subsidizing these towns. Though boreholes and dams are also significant water sources, gravity flow systems are popular because they are cheap to run and the technology matches the technical skill of the community to operate and maintain the installed water infrastructure (Mwangi, Wairimu, Riro, & Muchiri, 2015).

Policy-making function

Beyond the management of the day-to-day operations of the water project, water committees have the role of ensuring the overall vision of the water project (ACF-International Network, 2007). It is a requirement that the water committee has the ability to look beyond individual projects or needs and assess wider relevancy and sustainability. Some water projects not only lack funds to proactively monitor conditions in villages, but also have instructions and policy guidelines do not allow them make or fund repairs themselves (Whittington, et al., 2009). This might be a tough situation for the community that demands a team entrusted with some authority to make a corresponding tough decision so that the water project remains functional and usable. In Tanzania for example, a lack of strategies to address sustainability on one hand and a free water policy on the other hand lowered the morale of people paying for water services (Mwakila, 2008). Rural people were unwilling to pay for the service because they feel the services are freely provided. The challenge the rural people had was due to the absence of a policy that spelt out that need for them to pay for the water service. Capacity building at all levels, involvement of women plus provision of services through demand driven approaches where users are fully involved and contribute to costs so as to promote ownership are some of the key issues that can be spelt out in a policy (Ssentaba, 2009). Water committees with weak tariffs require a tariff policy to lift the tariffs upwards to allow them meet the operations and maintenance costs of the water supply systems rather than depending on grants, loans and subsidies for investment and expansion (World Water Assessment Programme, 2006).

Sustainability of program activities

Sustainability refers to the process that creates a vision of community that respects the prudent use of natural resources to ensure that the present generation achieves a high degree of economic security while maintaining the integrity of the ecological systems and of life (Martens & Carvilho, 2016). The concept also refers to the development, which meets the needs of current generations without compromising the ability of future generations to meet their own needs (Macharia, Mbassana, & Oduor, 2015). Used this way, the definitions suggest that use of environment with a view of the present and future generation. Used in this study however, sustainability reflects continuity of community projects when the development donor exits. IFAD (2007) defines sustainability as ensuring maintenance of institutions supported through projects and the benefits realized continue after the end of the project. Similarly, (Khatiwada, 2015) defines sustainability as a set of evidences in terms of continued existence and/or emergence of new practices, goods, and services, beyond a conclusion of a project. From the above definitions, it can be observed that the essence of sustainability is to ensure that innovated projects continue after the funders officially handover the project to beneficiaries. Sustainability of water, sanitation and hygiene promotion has continued to challenge many governments and development partners. Sustainability is widely affected by a number of factors, including those internal to communities and their dynamics, those influenced by the project design and factors external to the particular context (ACF-International Network, 2007). Despite the importance of ensuring projects are sustainable, humanitarian actors should be honest with the donors, other sector actors

and communities, regarding the challenges faced in trying to support sustainable projects and the additional challenges that are faced in vulnerable contexts. In particular, communities should choose what works best around technical options and service levels. Similarly, (Kalulu, Hoko, Kumwenda, & Mayo, 2012) identified system reliability, human capacity development, local institutional capacity development and financing mechanisms as influential factors in sustainability of community based water management. Their findings indicated a low level of community contribution for operations and maintenance. Managing water resources requires building capacity of the users. Well-trained personnel in the areas of planning, development, and management can be effective in carrying forward a water project over a long period even after the exiting of the development donor (Kalulu, Hoko, Kumwenda, & Mayo, 2012). It is even better when the local community and trained personnel are empowered to make their own decisions and are able to claim their right to opportunities and services. Whereas many rural communities in developing countries suffer from lack of safe drinking water, perhaps due to failure of water projects shortly after construction, a study about rural water supply schemes in Nepal indicates the contrary. Kalyani (2014) investigated several water supply schemes and found them financially and technically sustainable and able to provide good quality water to users. This study acknowledged the regualr technical assistance provided by the Department of Water Supply and Sewerage in Nepal.

Evaluation of sustainability of program activities is more than a comparison between the past and present but a direction of how the project will fare given the exiting of the development donors (Khatiwada, 2015). From the actors' perspective of sustainability, actors provide relevant information on the how the project should flow to generate a continuous flow of services and outcomes. According to (Khatiwada, 2015), it is very important to identify and include various project stakeholders. Where possible, engaging representatives from those involved in the project initial stages to competition, such as project staff, local leaders, representatives from the donor community, members of the civil society and government is important. Including a number of social actors both internal and external, provides equal opportunities, encourages diversity, promotes connectivity within, and outside the community, ensure quality of life and provide democratic processes and responsible governance structures (Martens & Carvilho, 2016).Since most community based water projects depend on participation of all actors, there should be a harmonized environment where all categories of actors are satisfied in terms of power wielding (Kilonzo & George, 2017).

The amount of funding indicates the extent of sustainability of water projects. Social funding, though often described as demand-responsive allow eligible communities to choose between subproject options. However, most communities and households are not aware of these funds (Sara & Katz, 1997). Governments and donor agencies spent significant amounts of money annually on community-based improvement projects in developing countries with the goal of improving the socioeconomic conditions of people within developing countries. They invest huge resources on designing, planning, implementing, and evaluating projects, with very little reserved for understanding how project will remain sustainable in the end (Khatiwada, 2015). Training the management committee and the beneficiary community on ideas of how to generate funds reduces the financial barriers many committees face following the exiting of the development donor (Haneef, Pritchard, Hannan, Alam, & Rahman, 2014).Program sustainability has often remained a problem following the withdrawal of development agencies. Beneficiary communities fail to tap national expertise due to lack of financial resources. This is because development agencies often provide expatriate technical assistance rather than funding the engagement of national expertise (OECD, 2001). In some cases, funds to finance local strategy development can come from above either through higher-level government allocation, or from below through mobilization of local resources. While this may overcome short-term difficulties, it does not resolve the longer-term problem of financial self-sufficiency. The social dimensions of managing water projects involves village-level coordination, compromise, financial management and decision-making. The local people may be required to pay into a community fund for every liter of water they use (Macharia, Mbassana, & Oduor, 2015). This may be a user service fee to remunerate the maintenance workers and cover contributions to the operation and maintenance fund. More than often however, rural communities in low-income countries are usually not endowed with the financial resources to contribute meaningfully to the upkeep of water supply systems (Egloff, 2016). According to (ACF-International Network, 2007) however, financial mismanagement is one of the key risks to community solidarity with water and sanitation committees. Therefore, special attention should be made to ensure .an effective system of regulation, or a clear audit processes in place, which the whole community is aware of

Although central government must be involved in providing leadership, shaping incentive structures and allocating financial resources;(OECD, 2001) multi-stakeholder processes are also required. If the community leadership is committed and receptive to change, the change process is likely to proceed smoothly. However, if the community local leaders are too dominant and want to pull all the strings of community life, they are likely to be counterproductive

(Lammerink, Bolt, Jong, & Schouten, 1999). Water projects, which do not have water committees often, rely on traditional leaders to manage the water system. In many cases, traditional leaders locate the water system on their property, which excludes some residents from using the service (Asingwiire & Muhangi, 1997). This study also reveals a strong relationship between community representatives and sustainability. Placing community members on the leadership committee ensures that community representatives truly stand for all members of the community including women and other traditionally marginalized groups. This suggests that leadership issues are essential and must be approached with maximum care and understanding.

The involvement decentralized authorities, the private sector and civil society, as well as marginalized groups is very critical in management of water projects. Promoting country-leadership is the key tool for coordination and harmonization of external partner's intervention (Egloff, 2016). In a related view, (Macharia, Mbassana, & Oduor, 2015) stress that leadership of community based organizations in many sub Saharan African countries tend to divert resources meant for the poor for their selfish interests. This is common among elected politicians who develop strong patronage linkages to maintain their power positions, which raises a danger to service provision and exploitation of the powerless categories of the community. Water schemes face similar difficulties in a few years' time, coinciding with the period in which the water schemes are in need of more substantial repair works. The weak institutional capacity of user committees to enforce operation and maintenance policies poses another obstacle in reaching long-term sustainability (Egloff, 2016).

3. METHODOLOGY

The study adopted a cross sectional survey and descriptive research design, aimed at describing the current state of gravity water flow schemes in Rubanda district. A descriptive research design was helpful in establishing how community management is essential in ensuring sustainability of the gravity water flow schemes in the sub counties of Muko, Bubare, Nyamweru, Ikumba, Hamurwa and Bufundi. Both quantitative and qualitative approaches were employed in collecting and analyzing data, which was collected in a snapshot interaction between the researcher and field respondents. The study was conducted in Rubanda district in western Uganda. This is a mountainous district with many gravity water flow schemes. The gravity water flow schemes have attracted the attention of the researcher because of the rate at which many of them are getting non-functional within a few years of their implementation. Rubanda District is bordered by Kabale District to the east and north, Kanungu District to the north-west, Kisoro District to the west, and Rwanda to the south. The town of Rubanda is approximately 35 kilometres (22 mi), by road, west of Kabale, the largest city in the Kigezi sub-region. This is approximately 173 kilometres (107 mi), by road, south-west of Mbarara, the largest city in the Western Region. Rubanda is about 442 kilometers (275 mi), by road, south-west of Kampala, the capital and largest city of Uganda. The study targeted a population of 212 participants selected from water users, water committee members, civil society members and officials from the district. This population was representative of the water users, who were infinite and unknown to the researcher. The study applied convenient sampling technique to select water users and water committee members.

The study collected both primary and secondary data. Primary data was collected through interviews and questionnaires. Data analysis was quantitative and qualitative. Quantitatively, inferential techniques (correlation and regression) were run to establish the relationship between community management and sustainability of gravity water flow schemes. Software package for social sciences (SPSS 20.0) enhanced quantitative analysis.

4. RESULTS

Gender distribution indicates that 66.2% were female while 33.8% were male, which suggests that women are the great users of water facilities than men. Most of the respondents 35.4% belonged to (20 – 29) years' age bracket, followed by 33.3% who belonged to (30 - 39)years' age bracket, followed by 20.2% who belonged to (50 years and above). The least representation of respondents in terms of age were those who belonged to (40 - 49) years' age group. In view of their marital status, 79.8% were married and constituted the majority, followed by the single who constituted 15.7% and lastly those who indicated the 'others' option who constituted 4.5%. Membership on the water committee revealed that 33.8% had never assumed positions on their water committee, 33.3% were currently members while 22.2% were previously members on their water committees. The item on years of membership on the research committee was highly misinterpreted and therefore eliminated from analysis. Most of the participants indicated to have been members of the water committee for not more than 5 years, an aspect that was not valid according to practice.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 8, Issue 3, pp: (67-78), Month: July - September 2020, Available at: www.researchpublish.com

Role of community management in supporting the sustainability of gravity water flow schemes.

The study adopted regression analysis to understand the role of community management in supporting sustainability of gravity flow schemes in Rubanda district.

Table 1: Regression test

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	3.240	0.278		11.649	0.000
Gender Roles	-0.060	0.062	-0.074	-0.967	0.335
Financial Function	0.133	0.053	0.198	2.501	0.013
Technical Function	0.061	0.060	0.086	1.016	0.311
Policy Making	-0.083	0.069	-0.102	-1.210	0.228
R	0.204				
R Square	0.042				
Adjusted R Square	0.022				
Std. Error of the Estimate	0.535				

Predictors: (Constant), Policy Making, Gender Roles, Financial Function, Technical Function

Dependent Variable: Sustainability

The overall effect of community management on sustainability of gravity water flow schemes in Rubanda district stands at 4% as provided by (R Square =.042). This means that community management explains just a miniature of the sustainability of gravity water flow schemes. Implicitly, much of the factors that explain sustainability of gravity water flow schemes are beyond the current study. The indicators of community management (gender roles, financial function, technical function and policy-making) contribute such a small component in sustainability of gravity water flow schemes.

From the viewpoint of gender roles (Beta =-.074; p-value >.05) and policy-making (Beta =-.102; p-value >.05), the statistics indicate that paying attention to gender issues in the management of gravity water flow schemes is likely to affect their sustainability by approximately 7%. Similarly, changes in policies that govern gravity water flows are likely to reduce their sustainability by approximately 10%. The statistics suggest that community management is lacking in its social and governance roles towards sustainability of gravity water flow schemes. Changing the way communities handle technical issues related to gravity flow water schemes seems to influence their sustainability by 8% (Beta =.086; p-value >.05), however, the statistics do not show its significance in Rubanda district. The study isolated financial function (Beta =.198; p-value <.05) as the only significant role of community management in sustainability of gravity water flow schemes. The statistics indicate that a variation in the financial functions of gravity water flow schemes is likely to extend their sustainability by approximately 20%.

The study adopted ANOVA (Analysis of Variation) to determine how good community management can explain the variations in sustainability of gravity water flow schemes in Rubanda district. ANOVA uses regression and residual sum of squares to explain whether the independent variable accounts for a greater portion of changes in the dependent variable.

Test 2: ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	2.407	4	.602	2.104	.082(a)
	Residual	55.205	193	.286		
	Total	57.612	197			

a Predictors: (Constant), Policy Making, Gender Roles, Financial Function, Technical Function

b Dependent Variable: Sustainability

Analysis of variation (ANOVA) shows that regression sum of squares (2.407)is less than the residual sum of squares (55.612). These statistics imply that the independent variable (community management) is not adequate in explaining the variations in sustainability of gravity water flow schemes in Rubanda district. Many factors beyond (gender, finances,

technology and policy) explain issues of sustainability. The F-statistic in this model is not significant (p-value >.05), which is a confirmation of the inadequacy of community management in explaining sustainability of gravity water flow schemes in Rubanda district.

5. DISCUSSION

The study showed that community management is not significant in accounting for the variations in sustainability of gravity water flow schemes in Rubanda district. The portion that community management accounts for in sustainability of water schemes is very small. The findings support (Tifow, 2013) established that while government and development partners transfer ownership of water supplies to beneficiary communities, most of these projects collapse within three years after the development partners withdraw. Most of the beneficiaries are not prepared enough to assume the responsibility of overseeing the operations of these projects. The findings further agree with (CARE, 2011) who reported that most of the water projects in Uganda and Ethiopia had broken down within two years after their implementation. Findings broken water pumps in Uganda is very common. Many of water pumps are neglected in bushes, broken down and rusty. The study established that community management of gravity water flow schemes in Rubanda district are lacking in relation to policy-making. Most of the policy dilemmas in water management relate to incompetence of members who sit on water committees. Much as most of them are voted out of influence and popularity, many of them lack the ability and knowledge to influence important decisions in the governance of rural water projects. Some of the rural water projects have guidelines and procedures drawn and left behind by the development partners(Whittington, et al., 2009). Rural water committee members tend to follow these policy guidelines rigidly, which results into the collapse of many. Most of the policies left behind by development partners rarely spell out issues related to community members paying for water services. Any introduction of such policies is interpreted negatively, resulting into withdraw of community support and collapse of the projects. The study also shows that gender roles do not contribute to sustainability of rural water projects. Statistics shows that women and children are the greatest users of water. However, efforts to incorporate them on water committees have yielded very little. Most of the women have little education and rarely contribute to meaningful decision on water projects. The more educated women in rural areas have have water in their compounds and therefore, their input in the operations and sustainability are missed out. Most of the water projects lack clear guidelines on the social, economic and cultural characteristics of the community(Lammerink, Bolt, Jong, & Schouten, 1999; Whaley & Cleaver, 2017). The study shows that rural communities cannot manage the technical aspects of gravity water flows. The findings disagree with (Mwangi, Wairimu, Riro, & Muchiri, 2015) who established that gravity water flow systems are cheap to run since their technology matches the technical skills of the community in terms of operation, and infrastructural maintenance. The problem in Rubanda might relate to the mountainous environment, which makes transmission of water pipes uphill expensive. The ground uphill is rocky leaving water pipes on the surface and prone to destruction by thieves. In addition, the district is still new, with very little water engineers to rectify water problems in the shortest time possible. The study shows that rural communities can manage well the finances geared towards sustaining water systems. The findings support (Karuaihe, Mosimane, Nhemachena, & Kakujaha-Matundu, 2014) who observed that sustainability of rural water systems relies on institutional arrangements, willingness and ability of rural people to pay for water services. While research establishes that urban population, find it easy to pay for water services and conservation of the environment, this study offers that rural people in Rubanda find it easy to pay for water services. The results are in harmony with (Mwakila, 2008) who shows that having people contribute to the cost of water services is the only financial scheme that has shown success in sustainability of water projects, especially in rural areas. The findings further support (Ssentaba, 2009) who showed that devolving financial control to community level is one way the community feels responsible for the sustainability of their water system.

6. CONCLUSION

The study investigated community management and sustainability of gravity flow schemes in Rubanda district, Uganda. The study assessment of community management in terms of its gender, financial, technical and governance roles in sustainability of rural water gravity flow schemes. Community management appeared very insignificant in contributing to sustainability of gravity flow schemes in Rubanda district, which opens up room for future research in this important field that touches biodiversity. Efforts to incorporate gender in sustainability have yielded almost nothing. While women are the greatest users of water systems, they are not informed enough to give direction to water committees in promoting sustainability of water systems. The educated women, who would offer sound guidance, have the capacity to own and manage water systems in their compounds. A greater part of the rural communities in Rubanda district lacks the technical

knowledge to manage gravity water flows. This comes to the worst when technicians are needed in the mountainous areas of the district. The study generally shows poor governance of gravity flows, backed by self-imposed leaders and politics. Most of the communities investigated reported abilities to collect and mobilize funds for maintenance of the water facilities alongside clear auditing mechanisms for these funds however; most of these communities lack the capacity to attract external funding. While community leaders would be applauded for, providing transparency in the use of funds intended for repairs and maintenance of the water facility, there is no clarity as to whether community leaders sometimes take advantage and use these funds. This study contributes current information to ministry of water and environment in Uganda regarding water functionality.

7. RECOMMENDATION

The study revealed that government does not have adequate staffing to provide repairs and maintenance of rural water facilities in Rubanda district. Government, through its water and sanitation department at the district level should consider employing technical staff in water management to provide standby services to rural water communities. The role of gender came into light in contributing to sustainability of rural water facilities. Community leadership in Rubanda district should consider involvement of women in water management, as they are the most important users of the water facilities. Women should be sensitized and encouraged in participating in making decisions that affect the longevity of water facilities. Women participation can be enhanced through ensuring clear rules of using the water facilities. The study indicated that communities are able to mobilize funds for repairs and maintenance of water facilities but are not good at attracting external funding. Government, NGOs and private sector should train communities in fundraising, proposal writing so as to attract external funding for supporting sustainability of water facilities.

REFERENCES

[1] ACF-International Network. (2007). *How to make WASH projects sustainable and successfully disengage in vulnerable contexts: A practical manual of recommendations and good practices based on a case study of five ACF-in water, sanitation and hygiene projects.* Paris, France: ACF-International Network.

[2] African Ministers' Council on Water. (2011). *Water supply and sanitation in Uganda: Turning finances into services for 2015 and beyond.* Nairobi, Kenya: Water and Sanitation Program.

[3] Amer, M. I. (2004). Community management of rural water supplies system for sustainability of the service. *Eighth International Water Technology Conference* (pp. 83-89). Alexandria, Egypt: IWTC.

[4] Angmor, E. N., Tettey, C., & Amoah, T. (2016). Management of community water projects: Assessing the challenges of indigenous arrangements. *Journal of Geography and Regional Planning, 9*(6), 122-127.

[5] Asingwiire, N., & Muhangi, D. (1997). *An analysis of the impact of insitutional rules on rural water sustainability: Uganda country report.* Kampala: UNDP-World Bank and Sanitation Program.

[6] Braimah, I., Amponsah, O., & Asibey, M. O. (2016). The effectiveness of the local management systems of rural water facilities for sustainable service delivery: a case study of the Sekyere East District, Ghana. *Sustainable water resource management*, 405-418.

[7] Broek, M. v., & Brown, J. (n.d). *Blueprint for beakdown? community based management of rural groundwater in Uganda.* Portsmouth: University of Portsmouth.

[8] CARE. (2011). *Assessing water point sustainability through community governance in Ethiopia, Uganda and Mozambique.* Atlanta, GA: Cooperative for Assistance and Relief Everywhere, Inc. (CARE).

[9] Castro, V., Msuya, N., & Makoye, C. (2009). *Sustainable Community Management of Urban Water and Sanitation Schemes (A Training Manual).* Nairobi, Kenya: Water and Sanitiation Program-Africa: World Bank.

[10] Chowns, E. (2015). Is community management an efficient and effective model of pyblic service deliverry? Lessons from the rural water supply sector in Malawi. *Public Administration and Development, 35*, 263-276.

[11] Davis, J., Lukacs, H., Jeuland, M., Alvestegui, A., Soto, B., Lizarraga, G., . . . Wakeman, W. (2008). Sustaining the benefits of rural water supply investments: Experience from Cochabamba and Chuquisaca, Bolivia. *Water Resources Research, Vol. 44*, 1-14.

[12] Egloff, L. (2016). *Operations and maintenance in community managed rural drinking water supply system.* Swiss Federal Institute of Technology & Center for Development and Cooperation.

[13] Haneef, C., Pritchard, M., Hannan, M., Alam, Z., & Rahman, M. (2014). *A study into the effectiveness and sustainability of village development committees.* Chars Livelihood Programmes.

[14] Harvey, P. A., & Reed, R. A. (2007). Community-managed water supplies in Africa: sustainable or dispensable? *Community Development Journal, 42*(3), 365-378.

[15] Hutching, P., Chan, M. Y., Cuadrado, L., Ezbakhe, F., & Mesa, B. (2015). A systematic review of success factors in the community management of rural water supplies over the past 30 years. *Water Policy 2015, 17*(5), 963-983.

[16] IFAD. (2007). *Strategic framework.* Rome: IFAD.

[17] Kalulu, K., Hoko, Z., Kumwenda, S., & Mayo, A. (2012). Sustainability of community based water management in Mulanje district, Malawi. *Journal of Basic and Applied Scientific research, 2*(3), 2481-2488.

[18] Kalyani, R. (2014). *Sustainability of community water supply systems managed by water user committee. A case study of rural water supply system in Nepal.* Norwegian University of Life Sciences.

[19] Karuaihe, S., Mosimane, A., Nhemachena, C., & Kakujaha-Matundu, O. (2014). Rural Water Access and Management Approaches in Southern Africa: Lessons from Namibia and South Africa. *Journal of Environmental Science and Engineering, 3*(2014), 332-344.

[20] Khatiwada, L. K. (2015). Implementing a post-project sustainability study of a development project: Lessons learned from Indonesia. *Reconsidering Development*.

[21] Kilonzo, R., & George, V. (2017). Sustainability of Community Based Water Projects: Dynamics of Actors' Power Relations. *Journal of Sustainable Development, Vol. 10* (No. 6), 79-86.

[22] Kivuva, B. K. (2014). *Influence of training waters users' committees on sustainability of community water projects in Tseikuru ward, Kitui subcounty.* Nairobi: University of Nairobi.

[23] Kothari, C. R. (2004). *Research Methodology: Methods and Techniques.* New Delhi: New Age Publishers.

[24] Lammerink, M. P., Bolt, E., Jong, D. d., & Schouten, T. (1999). Strengthening community water management. *PLA Notes, 1999*(Issue 35), 21-28.

[25] Macharia, E. W., Mbassana, M., & Oduor, J. (2015). Assessing sustainability of rural water projects in Naivasha, Kenya. Case study of Maraigushu water project. *European Journal of Business and Social Sciences, Vol. 4*(No. 07), 52-83.

[26] Mandara, C. G., Butijn, C., & Niehof, A. (2013). Community management and sustainability of rural water facilities in Tanzania. *Water Policy, 15*(2013), 79-100.

[27] Martens, M. L., & Carvilho, M. M. (2016). Key factors of sustainability in project management context: A survey exploring the project managers' perspective. *International journal of project management*.

[28] Mayo, A. W., & Nkiwane, L. (2013). The role of community participation on cost recovery and sustainability of rural water supply projects in Hai District, Tanzania. *Journal of Environmental Science and Water Resources, Vol. 2*(No. 11), 388-395.

[29] Ministry of Water and Environment. (2013). *Preparation of the Joint water and Environment Sector Support Programme (JWESSP, 2013-2018).* Kampala, Uganda: Government of Uganda, Ministry of Water and Environment.

[30] Ministry of Water and Environment. (2016). *Rural water supply and sanitation: Handbook for extension workers, 2nd edition.* Kampala: Ministry of Water and Environment.

[31] Ministry of Water and Environment. (2017). *Water and Environment Sector Performance Report 2017: Annex 5.* Kampala: Ministry of Water and Environment.

[32] Ministry of Water and Environment. (2018). *Water and Environment Sector Performance Report 2018.* Kampala, Uganda: Ministry of Water and Environment .

[33] Mwakila, W. (2008). *An assessment of community participation in water supply and sanitation services; the case of Yombo Dovya and Barabara ya Mwinyi, Water community projects, Temeke, Tanzania.* Hague, Netherlands: Institute of Social Studies.

[34] Mwangi, M. k., Wairimu, a. M., Riro, G. K., & Muchiri, P. (2015). Financial management aspect on sustainability of community managed water projects in Kien west district, Kenya. *European Journal of Business and Social Sciences, Vol. 4*(No. 4), 123-141.

[35] OECD. (2001). *The DAC Guidelines : Strategies for sustainable development.* Paris: France.

[36] Olajuigbe, E. (2016). Community Participation and Sustainability Issue: An Evaluation of a Donor-Driven Water Sector in Ikaram Millennium Village Project, Nigeria. *Open Journal of Social Sciences, 2016*(4), 90-103.

[37] Rubanda District. (2016: 18). *Local Government Workplan.* Rubanda: Rubanda District.

[38] Sara, J., & Katz, T. (1997). *Making rural water supply sustainable: Report on the impact of Project rules.* Washington, DC: UNDP-World Bank.

[39] Shayo, D. (2013). *Community participation and sustainability of national water projects. The case of Chalinze water supply project in Bagamoyo district.* Bagamoyo: Mzumbe University.

[40] Ssentaba, S. J. (2009). *The performance of the current Community Based Management Systems (CBMS) in maintenance of rural water facilities in Rakai district.* Kampala, Uganda: Makerere University.

[41] Tifow, A. A. (2013). *Factors influencing sustainability of rural water supplies in Kenya: Case of UNICEF supported rural water project in lake Victoria South and lake Victoria North Water Services board region.* Kenyatta University.

[42] Whaley, L., & Cleaver, F. (2017). Can 'functionality' save the community management model of rural water supply:. *Water Resources and Rural Development, 9*(2017), 56-66.

[43] Whittington, D., Davis, J., Prokopy, L., Komives, K., Thorsten, R., Lukacs, H., . . . Wakeman, W. (2009). How well is the demand-driven, community management model for rural water supply systems doing? Evidence from Bolivia, Peru and Ghana. *Water Policy, 11*(2009), 696-718.

[44] Wijk-Sibjbesma, C. V. (1995). *Gender in Community Water Supply, Sanitation and Water Resource Protection: A guide to methods and techniques.* Delft, Netherland: IRC International Water and Sanitation Center.

[45] World Water Assessment Programme. (2006). *National Water Development Report - 2005.* . Kampala: World Water Assessment Programme.