

Section: Medical Science

Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri Division, Garissa District, Kenya

Dr. Githae N.M.¹, Farah M.A.², Masese D. M.²

¹Catholic University of Eastern Africa, Health Sciences Department

²Great Lakes University of Kisumu

Corresponding Author: Dr. M.N.Githae

Received: 2018-09-20; Accepted 2018-10-21.

Abstract:

Water is the most important natural resource, indispensable for life and at the same time the backbone of growth and prosperity for humankind. More than 1.1 billion people lack access to safe water and 2.6-billion lack access to basic sanitation in the world today. Water is not like other commodities in the sense that it is essential to human life. It is also essential to economic growth and poverty reduction. About 18% of the world's population lacks access to improved water supply, According to WHO, 1.6 million deaths per year can be attributed to unsafe water and lack of sanitation (Pérard, 2007:42). Major threats to the sustainability of rural water supplies include high poverty levels in communities, weak institutional framework and inability of communities to handle breakdowns.

The purpose of the research was to determine the factors that affect the sustainability of rural water supply facilities in Sankuri Division, Garissa District. To explore the causes of non-functionality of the water supply, a purposive survey was undertaken covering five (5) locations situated within the proximity of the Tana Rive with a sample of 384 households for quantitative data. Qualitative data was collected through focused group discussions and key informant interviews.

The study established demographic characteristics of the study population, majority of the respondents (73.8%) that fetched water for the household were women, and 4.4% were female children. As concerns their level of education and ability to pay for the services, those with higher levels of education were more likely to pay for the water services. Economic factor had a bearing on the households' ability to pay for the services and therefore the need to consider the cost implication for sustainability of the WSS. Aspects of the operations and management of the WSS elicited components of sustainability and the study's findings whereby Water management Committee accounted for 48.6%, however components of management contributing to unsustainability among others were poor management skills 18%, corruption among the office bearers 8.4% and lack of accountability 8%.

The study concluded that involvement of women in the management of the water systems since they are mostly involved in accessing this valuable commodity for their households is of utter importance, given their key role in this vital commodity for the members of their households. Cost has played a crucial role in the sustainability of the WSS, and lastly, Governance issues were not articulated to promote active community participation by the government policy, hence influence of the Operation and Management of the WSS.

The study made recommendations at two levels: To the Government to incorporate basic Operations and Management skills for the WSS teams and enhance the capacity building in the initiation of the projects. Water Service Providers to be aware of the consumers' preference in the management of the WSS. The committee members' capacity building is crucial for the attainment of sustainability of the WSS. Water tariffs to be affordable in order to support the communities' ability to pay for the services, and to facilitate maintenance of the systems. Lastly, planning of annual stakeholders and management meetings to promote trust and ownership of the water facility should be emphasized.

Introduction and Background Information:

Kenya faces serious challenges with regard to water services. Despite the efforts of investments provided in the past years by the Government and development partners, existing facilities have continued to deteriorate and fail to meet the water demand of the increasing population, particularly in rural areas. Safe water and basic sanitation is regarded as a basic human right and should therefore be accessible and affordable to all. This is important in order to achieve the Millennium Development Goals (MDGs) and the national targets in the Economic Recovery Strategy for Wealth and Employment Creation (MOW&I, 2007).

The Ministry of Water and Irrigation established rural water supply systems in order to serve communities living along the banks of River Tana in the mid 90's and early 2000. The government through the local District Water Office carried out the operation and maintenance of these systems. Funds under the Recurrent Vote were used to purchase all the necessary spare parts and logistics required. With dwindling financial resources and inadequate qualified personnel to manage these water supplies, the government was faced with an enormous task of continued support. The sustainability of these water supplies was no longer a government priority and the responsibility left to the project beneficiaries eventually. The local Water User Associations (WUA) were not adequately trained and ill prepared to take over the management of these water supplies could not maintain the systems. As a result, almost all the Rural water supplies were rendered in operational for some; a minor repair and for others requiring complete rehabilitation.

In 1999, the government developed major policy changes and reforms in the water sector. The key element in this strategy was the community management of the water supplies strategy and invitation by other development partners in the provision of water. The Poverty Reduction Strategy Paper (PRSP) and the Economic Recovery Strategy immediately followed this for Wealth and Employment Creation (ERSWEC) calling for the implementation of structural reforms to make water and sewerage services autonomous, efficient and effective.

To further strengthen and enhance these reforms the government through the Ministry of Water and Irrigation enacted the new Water Act 2002, in which far-reaching reforms were adopted. The ACT introduced the formation of Water Supply Service Providers (WSSP) and replacement of the Water User Associations.

Generally, these water supplies involves the extraction by pumping of raw water from the river using pumping equipment, into a small treatment plant and thereafter distributed to the community through overhead reservoirs and pipelines. The water is then gravitated to communal water points in the form of water kiosks where individual households can draw water at a minimal charge. Revenue collected is then utilized to pay the pump attendants, operate and maintain the system.

Statement of the Problem:

“Water is not like other commodity in the sense that it is essential to human life. It is also essential to economic growth and poverty reduction. 18% of the world's population lacks access to improved water supply, According to WHO, 1.6 million deaths per year can be attributed to unsafe water and lack of sanitation” (Pérard, 2007). “We shall not finally defeat AIDS, tuberculosis, malaria, or any of the other

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri infectious diseases that plague the developing world until we have also won the battle for safe drinking-water, sanitation and basic health care”(Kofi Annan, Former UN Secretary-General, Geneva, 2002). Poor water supply and sanitation services continue to be a critical problem in rural areas despite the considerable effort to improve and expand its access. Mounting evidence indicates that the centrally managed schemes, among others, are difficult to implement and operate when the communities served are disperse, remote, and relatively small and lack the financial resources and physical social infrastructure needed to support development or to maintain new systems. This does affect most of the rural communities living in Sankuri division faced with water problems due to frequent breakdown of the water supply systems serving them.

However, these water supplies operate intermittently due to frequent breakdowns of the pumping equipment. The equipment needs to be maintained and serviced regularly so that optimum performance is obtained. In most cases, spare parts or the funds to procure them are not available making the water facility unreliable.

The local District Water Office (DWO) who provides technical support blames the Water Service Providers (WSPs) for poor management. On the other hand the WSPs cite inadequate funds to maintain the system. The consumers are not able to pay their water bills and the much-needed revenue is not collected.

The WSPs resort to external support in order to run the water supplies. Where financial or technical support is not forthcoming, the water supply is rendered non-operational. Consequently, communities resort to drawing water from contaminated sources, hence increasing the risk of water related diseases among vulnerable groups that is, women, children and the elderly.

According to the DWO's annual report (2008), all the communal water supplies are either operating intermittently or not operating at all due to breakdowns and management problems. The report associates the problems of water supplies with poor management by the service providers and lack of financial capacity to operate and maintain the systems. From the report, the service providers do not know it either due to lack of knowledge or skills to operate and maintain the water supply systems. It is not known whether the economic constraints among the community members are the causes of financial incapability or lack of government participation in terms of financial assistance, for instance CDF, LATF, and NGOs.

Likewise, the Garissa District Disease Surveillance Office report (2008) indicated that there was increase in the prevalence of water-related diseases in the district. It is not clear whether the increase in the prevalence of these diseases is because of lack of sustainability of the community rural water supplies in Sankuri division or there are some other underlying factors.

Broad objective:

To determine the factors that affect sustainability of community rural water supplies in Sankuri Division, Garissa District.

Specific objectives:

1. To describe effect of demographic characteristics to sustainability of water sources in Sankuri Division
2. To determine the economic factors that affect sustainability of community rural water supplies.
3. To identify knowledge, attitude and practice of the community in relation sustainability of the rural water supplies.
4. To determine government policy and regulations that affect sustainability of community rural water supplies.

Justification of the study:

Improving the sustainability of rural water supplies has a number of consequences. It ensures the ongoing provision of a service that is fundamental to improving health, reducing the burden of carrying water long distances, and enabling users to live a life of dignity. Sustainability today invariably depends upon communities taking financial responsibility for their schemes, which if achieved will enable scarce resources from government and donors to be targeted specifically on areas where there is no improved water supply.

This study explores the reasons behind non-sustainability of community rural water supplies in Sankuri Division, Garissa District. The findings on the factors influencing the sustainability will be of use to policy makers, stakeholders and managers in the planning and implementation of such schemes. It will re-direct a comprehensive approach by government agencies, NGOs and other stakeholders with the aim of improving the livelihood of beneficiary communities in rural areas.

Furthermore, provision of water is critical to the improvement of quality of life of the people, because access to sufficient quantities of clean and safe water enhances the health and productive lives of people in the rural areas.

Literature Review:

Introduction:

Water is the most important natural resource, indispensable for life and at the same time the backbone of growth and prosperity for humanity. More than 1.1 billion people lack access to safe water and 2.6-billion lack access to basic sanitation in the world today. 1.6 Million Children die each year from diarrheal diseases, mainly because of inadequate sanitation, water supply and hygiene (WB, 2006).

The water and sanitation needs of the poor in developing countries are huge. To meet the target of water and sanitation for all by the end of 2015, some 2.9 billion people will have to receive improved water supplies and 4.2 billion improved sanitation. The technology used must be appropriate and in particular, simple, affordable and sustainable (D. Mara. 2003).

In a survey of 11 countries in sub-Saharan Africa, the percentage of functioning water systems in rural areas range from 35 – 80% (Sutton, 2004). The focus has been placed on rural sub-Saharan Africa where half the populations are faced with water and sanitation challenges (Montgomery et al, 2008).

In the neighboring state of Uganda, 40% of the population still had no access to an improved water source and 57% had no improved sanitation in 2004 (NWSC, Uganda, 2004). A research study on the factors affecting sustainability in rural water supplies in Tanzania; indicate that 65% of water distribution points are not functional. The results showed poor financial management was the primary correlate of non-functionality (Haysom, 2006).

Kenya is regarded as a water scarce country with an estimated fresh water supply of 647m³ per capita per year, against the United Nations recommended benchmark of 1,000m³ per capita per year. According to the National Water Services Strategy (NWSS), access to safe water is around 40% in rural areas and 60% in urban areas (WSSR, MOW&I, 2009).

Garissa is a water scarce district with only 37.8% of the population of 137,493 having access to safe water. The rest of the population uses unsafe water from River Tana, 'laggahs', boreholes and pans. This is further amplified by the fact that the district's current production of clean water supply is only 12,500m³ per day against a combined domestic and livestock demand of 30,000m³ per day, reflecting a deficit of 17,000m³ per day (GDDP, 2008-12). This can be achieved if the community effectively and efficiently manages the rural water supply systems.

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri Sankuri division with a current population of 15,452 faces severe water shortages due to non-functionality of the water supply facilities as compared to other divisions in the larger Garissa District. 60% of the population do not have access to safe drinking water and rely on other sources considered unsafe. Sanitation is a major challenge with as low as 7.4% having access to VIP latrines and 90 % having no sanitation facilities (DPHN Report, 2008).

The annual report (2008) of the Garissa District Water Office has shown that most of the water supplies managed by the WSPs and in particular Sankuri Division are not operational and are still dependent on the Government, UN Agencies and NGOs for technical assistance, repairs and spare parts whenever there is a breakdown.

Water supply planning and management:

Basic planning for water supply projects involves an orderly consideration of the project from the original statement of purpose through the evaluation of the alternatives to the final decision of the cause of action. It includes all the work associated with the design of the water supply except the detailed engineering of the components, forming the basis of whether to proceed or to abandon the project (MOW&I, 2005.).

Water Governance:

Water governance refers to the different political, social and administrative mechanism that must be in place to develop and manage water resources and the delivery of water services at different levels of society. Good governance at all levels should ensure that people are empowered to participate and make choices on water usage for consumption and production, as water is a basic human right. In as much as effective water, governance is crucial to the sustainability of livelihoods, in most cases it is not tackled adequately. This has led to increased poverty levels with people lacking access to water and giving up their other rights to education and health in order to ensure that they have water (MOW&I, 2005.).

Management structures must be strengthened at the community level for effective and efficient water supply systems to flourish. However, without incentives for the management committee, the continued active involvement of members in undertaking responsibility roles is limited. Incentives can be in the form of sitting allowances or monthly salary for generating enough financial resources for sustainable water supply.

Capacity Building:

Investment in the capacity building of the community in planning, development, implementation and maintenance of the water supply project is one of the first steps towards sustainable development (UNICEF, 1996.).

Training of the community in managing viable and reliable water service provision is therefore an important aspect of sustainability and a step towards poverty eradication. Basic operation and maintenance skills for pump attendants and committee members should be included in the capacity building training.

Operation and Maintenance (O&M):

The most obvious indicator of sustainability is the ongoing operation and maintenance of the system. O&M is an integrating process, which draws on community participation, health education, financing, and management as well as the technical skills required repairing WS&S facilities. Systems, which are successfully operated and maintained are, in fact, being sustained since all of the foregoing processes must be successfully in place for this to happen.

Studies of the sector often list O&M as the second biggest problem area after inadequate financing (WHO 1989). Both donors and country institutions give too little attention to O&M, profaning to believe that

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri constructing new projects is more worthy of support than maintaining existing ones. When systems are not maintained, most often the fault lies with poor O&M management rather than technical incompetence. While donors and governments are increasingly promoting community-managed systems, there are, in fact, large variations among countries in the locus of responsibility. Communities, national agencies, regional agencies, and the private sector (Roark et al. 1993) may show varying degrees of control.

Some countries see water supply and sanitation as a public good that only the state can provide. Others advocate communities taking on much of the burden of overextended government agencies. More typically, responsibility is divided among several or all of these institutions. Where responsibility lies with community management there are five characteristics of success that have been identified by Srinivasan (1990), namely:

1. Self-esteem. The community and its leaders must be recognized and given credit for their creative and analytic skills in identifying and solving their own problems.
2. Associative strengths. People who bond together for a purpose become stronger and develop the capacity for joint action.
3. Resource-fullness. Each individual is an asset to the community and has some talent to contribute if called upon.
4. Action planning. The community, through its leaders, sits down to plan and then follows through with appropriate actions.
5. Responsibility. The community takes full responsibility for its decision and the consequences that result.

With the development of these five management characteristics, along with technical skills and financial solvency, communities should be fully capable of managing Operations and management successfully.

Sustainability of Rural Water Supplies:

Sustainability of rural water facilities is affected by limited community ownership of the water systems and insufficient maintenance and thus, some of them wait for donor support to attend to the problems of the water supply. Sustainability is also affected by insufficient availability of spare parts and the limited involvement of the private sector (NWSS, MOW&I, Sept 2007).

The greatest challenge facing the World today lies in building competent, efficient, business-like, and service-oriented institutions. Sustainable service provision is only possible where customers themselves cover the cost of operation and maintenance; capital cost recovery is not always possible but often requires predictable public subsidies; and that most subsidies for water supply do not reach the poor (WB Report, 2009).

Community Participation:

It is a common practice for village Water schemes to be managed by a village committee of some sort; the creation of which is intended to enable communities to have a sense of ownership over the scheme and to ensure its ongoing operation and maintenance (Harvey & Reed, 2006). It has been suggested that participation is the single most important factor contributing to project effectiveness (Naryan, 1994). Participation can take different forms, including the initial expression of the demand for water, the selection of technology and its siting, the provision of labour and local materials, a cash contribution to the project costs, the selection of the management type and even the water tariff (Harvey & Reed, 2006). It is thus the process through which demand-responsiveness is exercised, and empowerment achieved.

Participation is also seen as a fundamental right; that beneficiaries should have a say about interventions that affect their lives (Pretty, 1995). Kumar (2002) asserts that participation is a key instrument in creating self-reliant and empowered communities, stimulating village-level mechanisms for collective action and decision-making. It is also believed to be instrumental in addressing marginalization and inequity, through elucidating the desires, priorities and perspectives of different groups within a project area. Participatory methods now dominate in the implementation of development interventions at the village level, the most common method being Participatory Rural Appraisal.

Parameswaran (1999) argues that a range of characteristics such as technology used to implement project activities can be effective to community participation. The more complex the technology, the less participation. The question of technology has direct link with sustainability of project services especially when operational and maintenance costs are to be met by the beneficiary communities. Another factor according to Parameswaran is on human and financial resources, as they are vital when it comes to meeting operational and maintenance costs. Furthermore, transparency accounts for the degree of CP. For this matter, community members will actively participate if benefits are clearly articulated and obtained immediately at the beginning of the project design. For the case of the water project, people expect to see domestic water points installed or boreholes drilled and in operation. Moreover, administrative structures are equally important. Thus, if projects allow users' contribution and if they are flexible, well coordinated and managed well at the local level, with free flow of information then people will automatically participate.

Women's involvement in project activities and capacity building are also essential to sustain project-initiated services. This is because in water projects women are the main stakeholders. Therefore, women participation and leadership positions in WC are inevitable for sustainable water projects (Mbugua et al, 1993)

Gender Equity in Water Development:

The water sector is regarded as a highly relevant sector for rural women in fulfilling their practical gender role as the main providers of water for domestic use. Empowerment of women to perform their gender role in an efficient way is therefore important in order to secure sustainability in rural water use and water resource management.

In water, use women are the main drawers, carriers and managers of water for domestic use. Accordingly, there is need to address gender inequalities in access to and control over water development resources. A gender perspective must be applied.

Therefore, in order to bridge the gender gap, rural water projects should therefore be sensitive to gender aspects and especially ensure women have improved access to affordable and safe water (DANIDA, 2006).

However, the specific roles and responsibilities of women in the management of rural water supplies is a factor, which should be determined for effective sustainability.

Sustainability:

Sustainability pertains to multiple aspects of a rural water supply, with institutional, social, technical, environmental and financial dimensions (Well, 1998). Sustainability is best defined pragmatically as 'whether or not something continues to work overtime' (Abrams, 1998). More specifically for this study, it implies the ability of the community to recover from technical breakdown in the water point scheme. Built into common conceptions of the term are notions of minimal external support, village-level financing and the continuation of a beneficial service over time (Parry-Jones et al, 2001). It is estimated that 35% of all rural water supplies in sub-Saharan Africa are not functioning (Baumann, 2005), and despite the frequency

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri with which it appears in development discourse, the reality of sustainability remains elusive. This accounts for the fact that understanding sustainability is so difficult and why solutions are context specific.

Conceptual frameworks as the one below have been developed to capture the linkages that relate to sustainability as a chain, a weakness in anyone of which can lead to failure of the scheme.

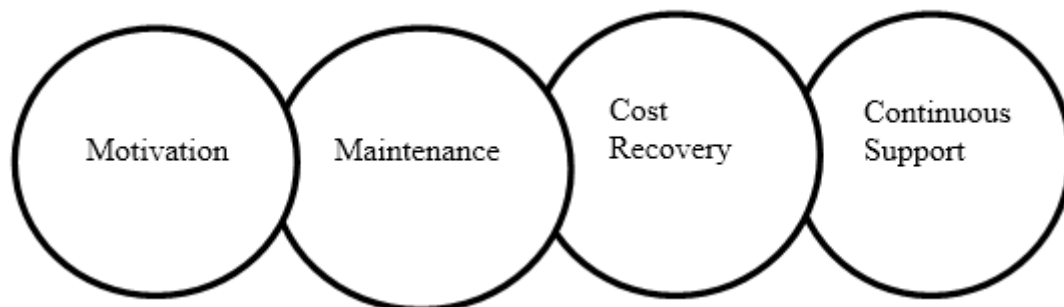


Fig. 1: The sustainability chain, Carter et al (1990).

The widespread failures in water supplies have been attributed to a number of flaws in the project; the intervention was not desired by the community, the capital and/or recurrent costs are too high for the community, lack of ownership results in neglect of maintenance and repairs, the promised benefits don't materialize, education programmes are too short and trained members of the community move away or lose interest (Carter et al, 1999). Other factors such as the on-going use of traditional sources of water, poor systems of cost recovery and the distaste for the water from the improved source also contribute to undermining sustainability (Parry-Jones et al, 2001).

“Sustainability in this study refers to the ability of project beneficiaries to maintain and sustain project activities, services and any measure initiated by a project so as to last long after the expiring of the funding period. In water projects, “we cannot talk of sustainability without mentioning operation and maintenance issues” (Kasiaka, 2004: 41). Safe and clean drinking water supply is sustainable only if, the water consumed is not overexploited but naturally replenished, facilities maintained in a condition that ensures reliable and adequate portable water supply. The benefits for the water supply should continue to be realized over a prolonged period of time (David and Brikke, 1995: 53).

Sustainability is influenced by many factors – technical and non-technical (Choguill, C.L., 1996; Bhandari,B. and Grant,M., 2007; Pushpangadan, K. and Murugan,G., 2008; Rietveld L.G *et al.*, 2009). In other research found that sustainability was related, strongly, to community participation (Lockwood,H. 2004; Satterthwaite *et al.*, 2005; Hoko,Z. and Hertle,J. 2006). Moreover, it was found that a strong correlation between community participation and management to the sustainability was obvious (Kaliba,A.R. 2002). Effective community organizations, ability of the community to operate and maintain facilities, ability of the community to raise adequate user fees for purchasing spare parts, and strong backup support from external parties at the district level to solve major breakdowns were revealed by Musonda,K. (2004) as factors that contribute to the sustainability of water supply systems.

Summary of Literature Review:

Until recently, projects often failed because they used top-down approaches in which community members had little or no say on deciding what or how services were to be implemented. WB now promotes the demand responsive approach (DRA) as part of an effort to achieve effective and sustained community-managed services. Experience with successful projects suggests a set of basic principles to guide the design of rural water and sanitation interventions.

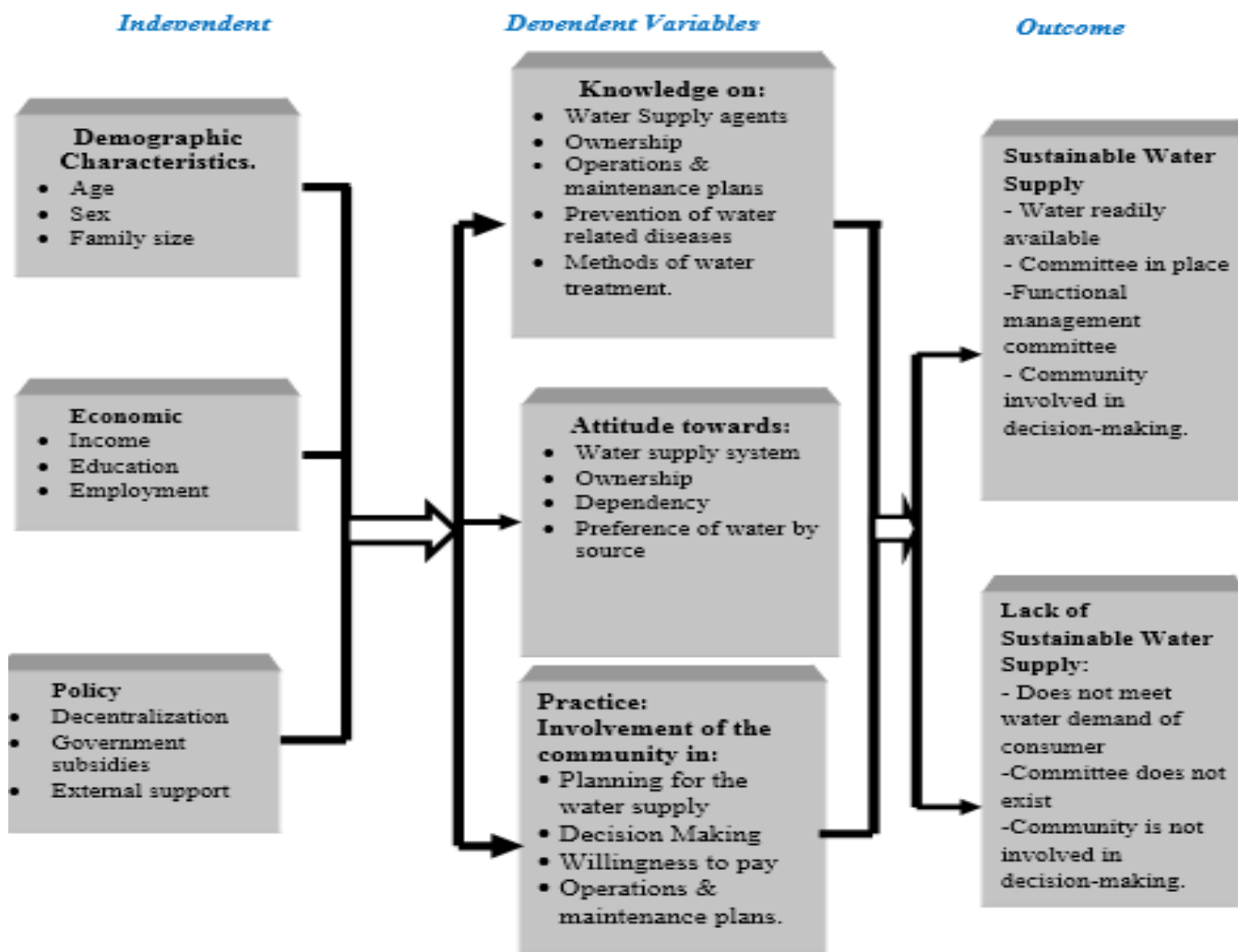
The planners and designers overly underscored the initial choice of technology that was appropriate to the viability and sustainability. The immediate water needs of the community were emphasized at the project

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri inception and did not take into consideration the financial and management implications the project will face later.

The disparities between need and sustainability are some of the gaps this research intends to address. Subsequently, the need to determine other factors that affect the sustainability of community managed rural water supplies is necessary.

This study therefore, seeks to determine the factors affecting the sustainability of community rural water supplies in Sankuri Division, Garissa District so that appropriate and effective interventions are determined. The summary of this literature review is used to develop the theoretical statement

Operational Framework:



Source: Author

Research Method and Materials:

A descriptive cross-sectional study design was adapted to determine the factors that affect the sustainability of rural water supplies in Sankuri Division, Garissa District. The study population was drawn from Sankuri Division with a total population of 11,713 of which 6,197 and 5,516 were males and females respectively with a growth rate of 3.7%.

The research area covered five (5) locations in which three villages were randomly selected and each village regarded as a cluster, making 15 clusters. Each cluster had 26 households to be interviewed, giving 390 households. The houses were identified systematically after a randomly starting point was determined on site.

Results:

Introduction

The study used Chi Square (X^2) to test the statistical significance of an event over the probability of none occurrence of the same event. The study mainly used descriptive statistics to present the results, tables, graphs and charts were used to display results.

Demographic Characteristics of the study population:

Gender of the Respondents:

The study enrolled 389 respondents in Sankuri Division consisting of 1434 family members. Of the 1434 members of the households who participated in the study, 54.7% were males, while 45.3% were females. The overall mean age of the household members was 18.6 years; the median age was 14 years. (Figure 1 below shows the summary).

The member of the household that fetch water:

Majority of the respondents (73.8%) that fetch water for the household are women of which 4.4% are female children. Only 11.6% of the respondents under the study have water in their respective households.

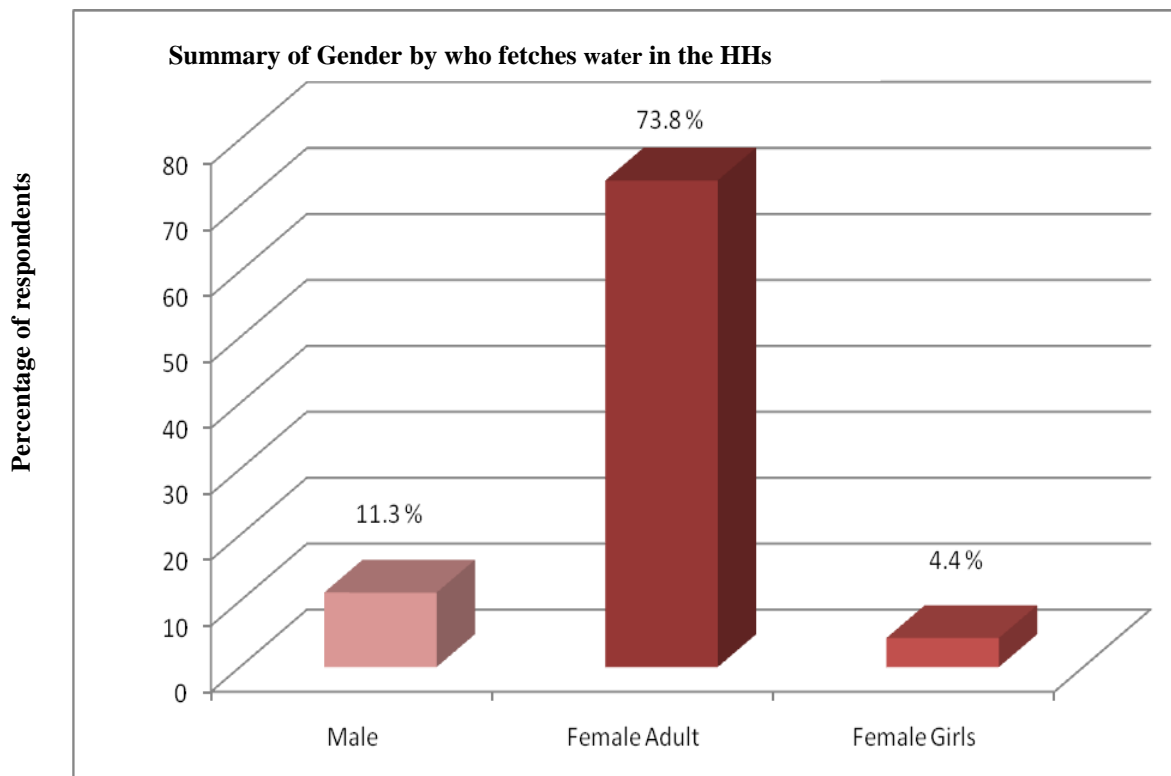


Figure 1: Summary of Gender by who fetches Water in the households

Others who fetch water for the households include male adults, boys and water vendors who account for (10.3%) of the respondents. One of the respondent, who lamented that the girl child is being overburden by the water stress, emphasized this,

“The girls draw water from the river back and forth on their little heads every day and in the process become sick every other week. This has also affected their schooling“

Economic Factors of the study population:

The study also sought to establish the economic status of the community and considered their education status and their main source of income in relation to their willingness to pay for the water services.

The respondents’ level of Education and ability to pay for the Water services

Of total respondents, 46.3% had no education, while 4.3% had secondary education. This had a significant bearing on the ability to pay for water services. The higher the levels of education of the respondent, the more likely were their able to pay for the water services. Therefore, education played an important role in the sustainability of the water supply system and management. Understanding the vital significance of water service provision was key to the basic health and sanitation development of the community.

Main Source of income for the respondents and ability to pay for Water services

The figure 4 below gives a summary of the respondents’ main source of income and their ability to pay for the water services, given the income.

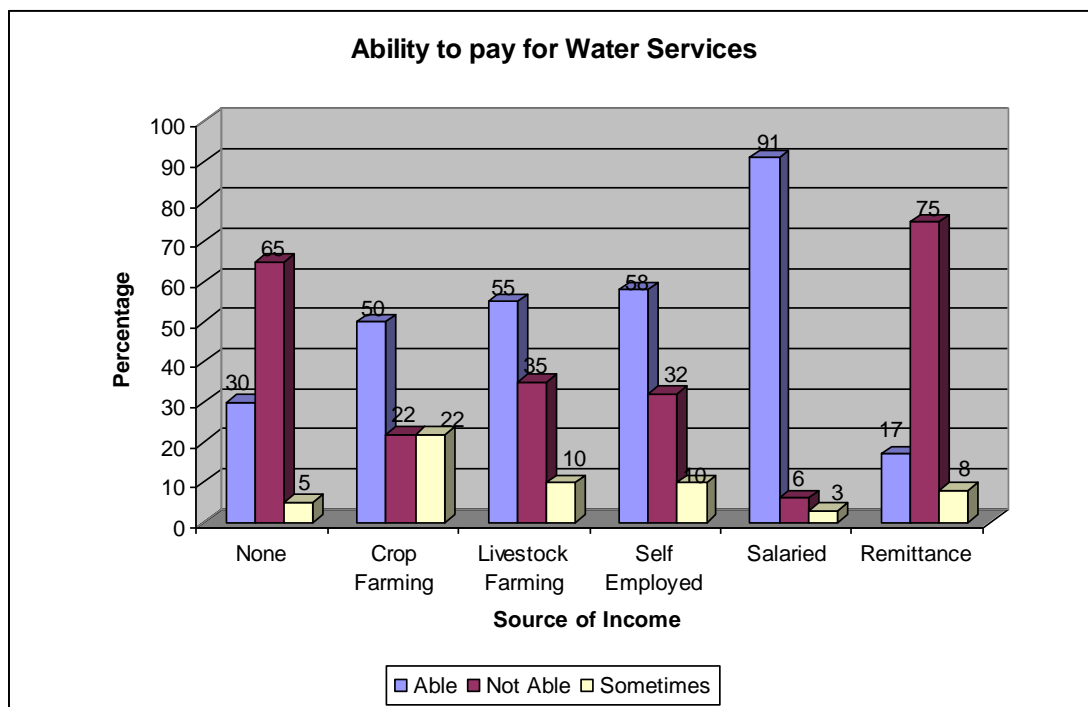


Figure 2: Comparing main source income and ability to pay for water services (n=384)

This study found that 27.3% of the respondents had no source of income, while 7.5% got their finances from farming and remittance, a small percentage 4.5% and 2.4 %of the study subjects were either self employed or salaried respectively (Fig 4). In spite of the economic status of the respondents, one of the key informants said that the community was willing and was able to meet the cost of maintenance of the water supply facility. That they could meet the basic and minimum threshold of buying water at 2/= per 20 litre container.

The ability of the respondents to pay for water used

The findings revealed that 17.1% were able to pay, 13.74% were not able to pay, while 3.56% were able to pay sometimes. However, as per the interviews held with the informants it was echoed that water should be available and affordable to the community since it was a basic need for the community and setting of water tariffs should be standardized, also it was emphasized that the community should not be overcharged water service providers against the maintenance costs which can discourage the communities ability to pay and subsequently have a direct bearing on the sustainability of the Water System.

Knowledge, Attitude and Practice

The study focused on knowledge, attitude and practice of the respondents towards the water supply agents, ownership, maintenance and operations plans as well as prevention of water related diseases. The community’s preference of the water sources and levels of involvement in the processes of decision-making.

The Main Sources of Water for the community

The study sort out the main sources of water for the community, the finding indicated that 33.9% and 33.2% get water from the borehole and dam respectively, followed by 21.9% from the river and only 2.6% get through roof catchment.

The time taken by the respondents to make a round trip to the main source of water and amount of water used

The respondents took between one hour (35%) and more than an hour (31.9%) to make a round trip to their main water source (figure 6). Most of the respondents (51.9%) require 60 litres of water as amount that is required to meet their daily household needs and 34.4% required over 100 litres of water.

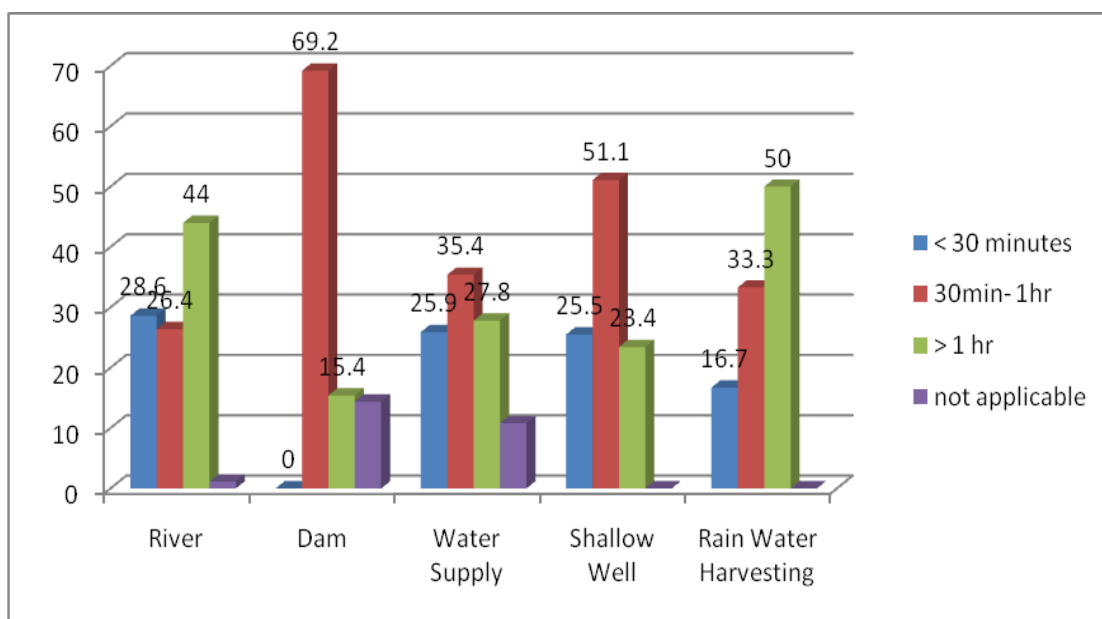


Figure 6: Summary of Time taken to make a round trip to main source and the preferred water source

A majority (90.5%) of the respondents do nothing to their drinking water in terms of treatment at household level, 5.1% boil their water for drinking and 3.9% add chemicals. Most (96.6%) of the household members store their water in plastic jerry cans, 1.5% in steel drums and 1.6% store in traditional containers.

The institutions involved in the Operation and Maintenance of the Water Supply System

This study realized that the Water Management Committee (48.6%), community elders (19.8%) and Water User Association (11.6%) as shown in figure 7 below mostly did the operation and maintenance of water systems in the study area.

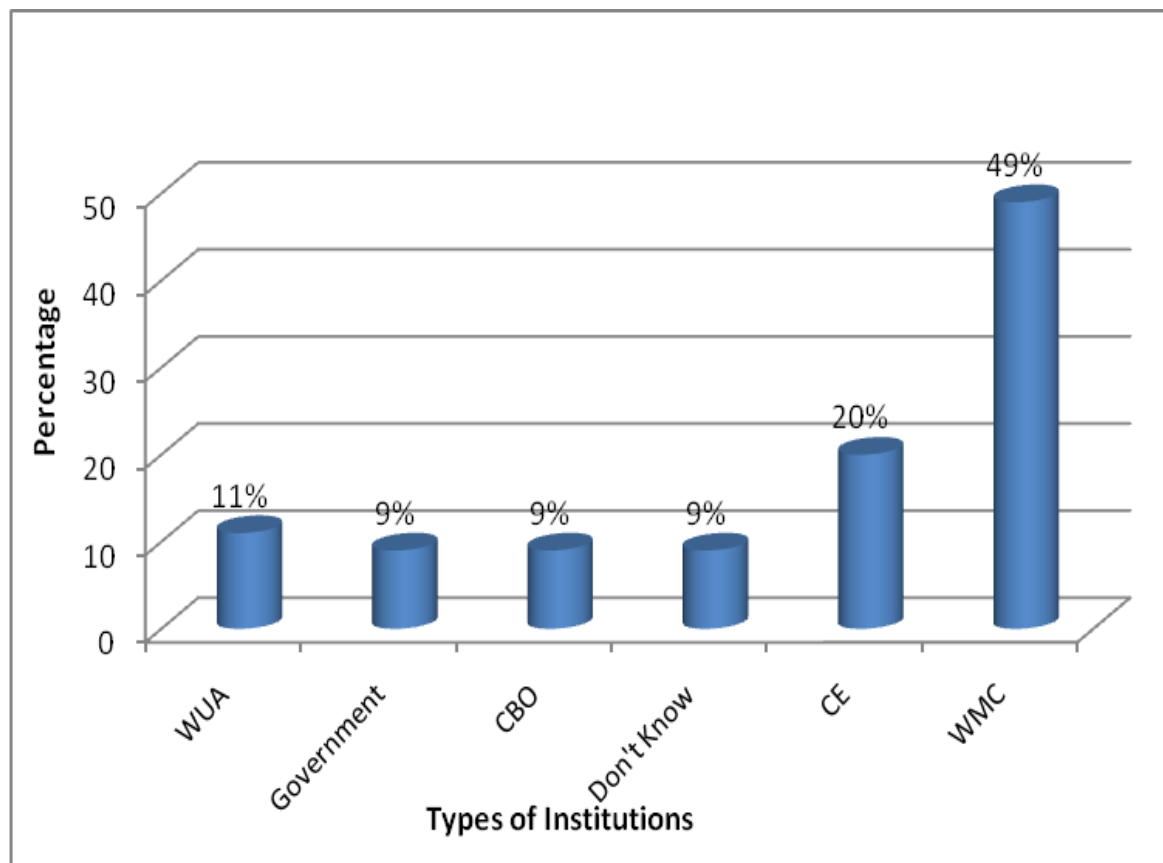


Figure 3: Summary of Institutions involved in O & M of Water Supply System

Management of water supply systems

Most of the respondents (64.8%) believe that the community locally can sustain the water supply system, while 31.1% were of the view that the community cannot sustain the water supply system and only 4.1% did not have any views in relation to the discussions.

The participants were asked reasons as to why they think the community cannot sustain the water supply system. The results indicate that 8% think it is because of poor revenue collection, 3.3% thought the management committee should be changed, and 18% said it is because of poor management skills as shown in figure 8 below.

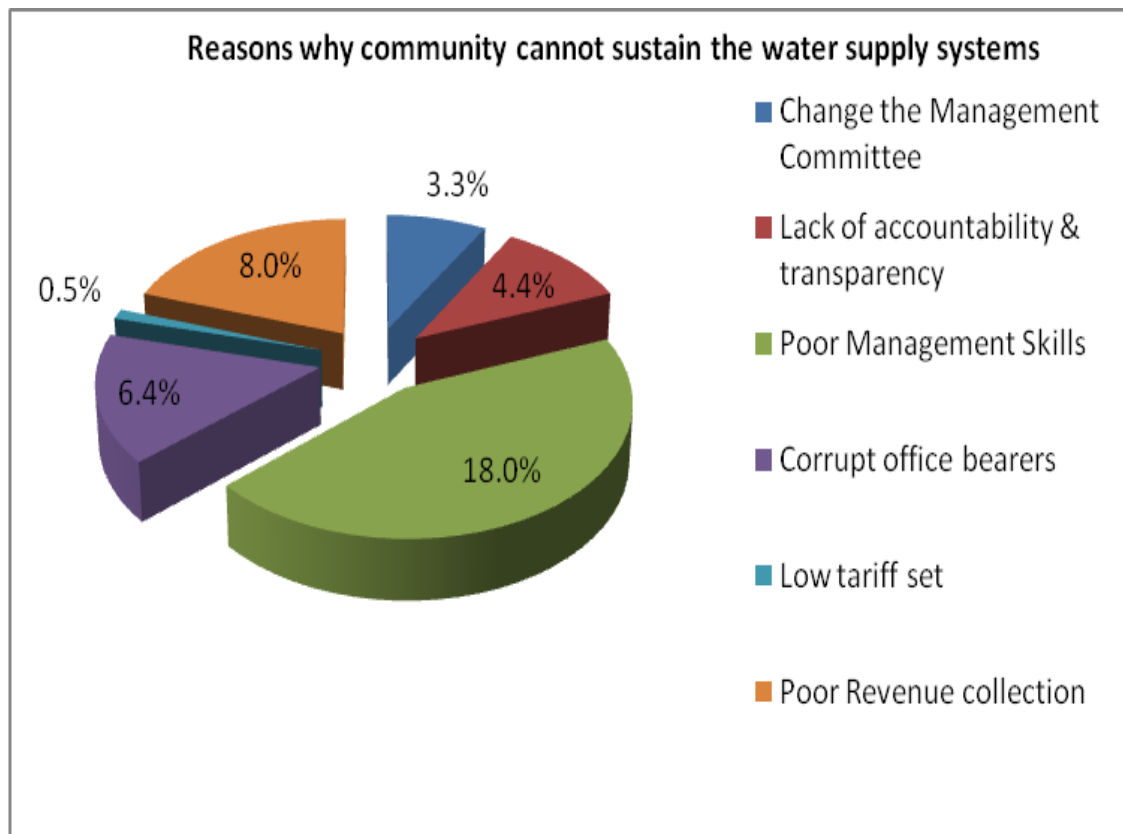


Figure 4: Summary of reasons why community cannot sustain water supply system

In one of the FGDs held in Daley the discussants agreed that the water system was not operational because of poor management, children play with the system, community not participating/ lack of ownership, they had no Water User Association and those managing the system were not trained, i.e., they lacked the necessary skills needed to maintain the water system.

Majority (76.1%) of the respondents felt that they have a role to play in the management of water systems and others 23.9% said no role, while 73.3% felt that they are part of the water supply system and 26.7% felt they are not part of the water supply system.

Sustainability of the Water Supply Systems

The study's outcome was based on the aspects of sustainability of the water supply systems set up within the community for continual accessibility of water supply, operations and management of the water supply system, the functionality of the water supply management committee and community involvement in decision making of the water systems.

Criteria used to Elect Water Committee Members

Figure 9 below gives a summary of the criteria used in the electing water committee members.

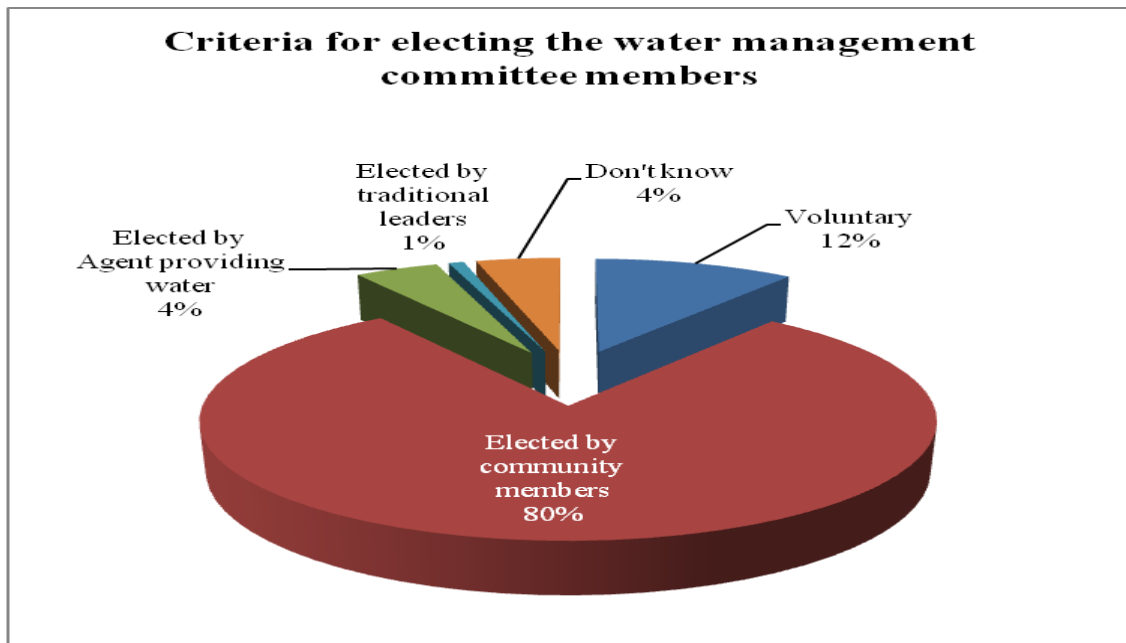


Figure 5: Distribution of criteria for electing water management committee members

Of the respondents, 80% indicated that community members elected Water Management Committees in existence, while 12% volunteered to function as committee members. The agents providing water and 1% by the traditional leaders in the community elected the rest 4%. Another 4% did not know about the Water Committees and the role they play in Water Supply System Management. As regards sustainability elements this elements seemed to favor sustainability as an aspect of community involvement.

Opinion of the water consumers for a change to be introduced in water supply management :

The respondents 34.2% proposed the Government ministry to manage the water supply systems, 24.2% suggested new committee members to be engaged, and 1.0% local authority to manage, 18.3% the management to be handed over to women groups while 22.4% did not know. However, one of the key informants disagreed that the Water User Association should be discarded and replaced with Service providers who are more legal groups. Besides the informant explained that in ensuring the communities in the study area are prepared to manage their water supply facilities, first the service providers should be registered, secondly opening of savings accounts and thirdly employing and training of the operators. The training of water service providers includes issues on O&M skills, pump attendants trained on minor maintenance of pump equipment, and pipeline maintenance. However, it was said that hand pump is difficult to repair by the community as this quote from a woman in one of the FGDs illustrates: *“We are lacking technical know how, it is only Japanese who are able to repair the hand pump, so that water cannot reach the entire community. We need an engine system easy to operate, because it is easy to maintain as we can hire technicians from Garissa town to repair”*.

Community Involvement in the Water Supply Systems:

Majority (75.8%) of the study subjects admitted that the community was involved when the water point was

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri being initiated and 18% said NO, while 6.2% did not know. The community (46.8%) made the decision to construct the water supply point/Facility and 29.8% agreed that it was the government that made the decision for the facility to be constructed and others (23.5%) included the NGOs, CBOs and FBOs. In one of the FGDs, two discussants agreed that the community made the decision for the construction of water points and an NGO called Action or Sudden facilitated a meeting in which the community made the decision that there was need of clean water.

Besides involvement in decision-making, the study sought to establish any contribution the community made towards construction of the water supply. The data revealed that 33.7% contributed towards labour, 20.1% contributed cash, and 14.9% contributed materials compared to 31.3% who did not contribute anything. These findings are in agreement with the responses made by the discussants in one of the FGDs that the community contributed in terms of labour provision for instance digging of the trenches, sand collection, and charcoal used as filter media. This was an indication that community involvement in the process of establishment of the water system was clear.

Relationship of variables in Water Supply System Sustainability:

Table 1 below gives a summary of the relationship between specific variables and the water supply system sustainability.

Table 1: Summary of relationship of variables and sustainability of WSS

Summary of Relationship of variables and water supply System sustainability Responses on Sustainability				
	Overall	Yes (%)	No (%)	P value
Overall	373 (16 DK excluded)	252 (64.8)	121 (31.1)	
Source of Water				0.00
Roof catchment	10(2.6)	6(60.0)	2(20.0)	
Shallow well	33 (8.5)	6(18.2)	26(78.8)	
Water System	132 (33.9)	117(88.6)	11(8.3)	
River	85 (21.9)	32(37.6)	45 (52.9)	
Piped Tap water	129 (33.2)	91(70.5)	37(28.7)	
Water source protected				0.25
Yes	244 (62.7)	162(66.4)	76(31.1)	
No	140 (36.0)	87(62.1)	43(30.7)	
Time to water source				0.00
<30 min	101(26.0)	82(81.2)	15(14.9)	
30min- 1hr	136(35.0)	83(61.0)	47(34.6)	
>1 hr	124(31.9)	62(50.0)	56(45.2)	
Person fetching HH water				0.001
1= Water in House	45(11.6)	35(77.8)	9(20.0)	
2= Female HH	287(73.8)	173(60.3)	104(36.2)	
3= Male HH member	7(1.8)	4(57.1)	1(14.3)	
4= Female children	17(4.4)	10(58.8)	5(29.4)	
5= Male children	3(0.8)	2(66.7)	1(33.3)	
6= Brought by vendors	11(2.8)	11(100.0)	0(0.0)	
7= Any member of HH	19(4.9)	17(89.5)	1(5.3)	

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri
Comparing the four variables in table 1 and sustainability, the result indicate that 88.1 per cent of those who draw their water from the borehole were more likely to say that the water supply system was sustainable compared to 70.5 per cent who use piped tap water, 60 percent who rely on water catchment. Of the 31.1 per cent who said that water supply system in the community was not sustainable, a majority 78.8 per cent draw their water from shallow well, 52.9 per cent of them get water from rivers while only 20 per cent and 28.7 per draw the water from roof catchment and piped tap water respectively.

The data further reveal that of the 62.7 per cent who said the water source is protected, 66.4 percent of them were likely to say that water supply is sustainable compared to 31.1 per cent who said that water supply is not sustainable. However, protection of the water source was not a significant factor associated with the opinion on whether water supply will be sustainable or not.

Time taken to reach the water source had a significant association with the opinion of whether water supply will be sustainable or not. Majority of the respondents (35.0 percent) took 30 minutes to one hour to make a trip to the water source, while 31 per cent took more than an hour trip to the water source. Of the 26 per cent of those who take less than 30 minutes trip, 81.2 per cent of them were more likely to say that the water supply is sustainable compared to 14.9 per cent who feel the water supply is not sustainable(p value =0.00)

Government policy and regulations on sustainability of water supply systems in the study area.

Policy framework:

The policy framework variables focused on decentralization of water services, government subsidies and external support for the rural community. The study through KII established the following:-

One of the Key Informants explained that resource sharing by different groups in the community is a big challenge when asked the role the policy framework has played in clarifying the roles and responsibilities of stakeholders in rural water supply. He emphasized on the sensitization of the community on the issues of ownership of the water schemes, governance, operation and maintenance of water resources, identification of the roles and responsibilities of water users and enhancing linkages with other stakeholders in order to achieve sustainability of water supply systems in the study area.

Government role:

Two of the key informants interviewed on the critical factors that promote sustainability of rural water supply in the study area, agreed that the government do rehabilitation of the water supplies so that they are more sustainable, improvement of infrastructure and investment in the schemes to a more manageable status. Education and training to the community members on the ability to conduct their own management well, to expand and improve the water supply system and the community/ water users should consider commercializing water as a commodity.

Discussion:

The study was to determine the factors affecting the sustainability of community rural water supplies. Three approaches were used, namely household heads interviews, key informant interviews and focus group discussions. The study's results discussed in relation to other studies as follows:

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri
Sustainability of Community Rural Water Supplies:

This study established that majority (73.8%) were female as household members who fetched water, this concurred with the report of DANIDA (2006) that in water use women are the main drawers, carriers and managers of water for domestic use. Accordingly, there is need to address gender inequalities in access to and control over water development resources. Therefore, in order to bridge the gender gap, rural water projects should therefore be sensitive to gender aspects and especially ensure women have improved access to affordable and safe water, through active participation in decision making and planning process.

Interviews with female users of water supplies who are primarily responsible for the collection of water suggest that users prioritize convenience in access to water over other possible concerns such as health. Systems will be used, and valued, if they are accessible and closer to the community, representing a saving in the time and effort spent collecting water every day.

Given changes and increasing diversity in the management of rural water supplies (village water committees, board of directors and public private partnership), it is apparent that community management of rural water schemes without support is not an ideal solution for achieving sustainability. It affirmed that to achieve a real community participation in the project is difficult. Government agencies, NGOs, FBOs and CBOs were mainly involved during the planning phase and local communities during implementation phase. Interference by the politicians, involvement of local government administrators and inability of the water schemes to recover costs were the main problems facing water schemes. The consequence was poor performance and failure of some schemes to deliver the services. Generally, the findings lead to a subjective inference that community management of rural water schemes alone is not an ideal solution for attaining sustainability. Community management of rural water schemes is a good idea if implemented where there is demand-driven community involvement right from the beginning of the projects.

Economic factors that affect Sustainability of Community Rural Water Supplies:

This study found out that most of the respondents have no source of regular income and not able to pay for the water services. This explains why some of the water supplies were not functional. The study findings agree with the annual report (2008) of the Garissa District Water Office which had shown that most of the water supplies managed by the WSPs and in particular Sankuri Division are not operational and are still dependent on the Government, UN Agencies and NGOs for financial, technical assistance, repairs and spare parts whenever there is a breakdown.

According to Garissa District Development Plan (2008-2012), indicate that 64% of the populations in this region live below the poverty line; hence, their economic status and affordability of the water tariff set by the Water Service Provider play a significant role to revenue earned to sustain the Water System. According to the findings 14% were not able to pay for the water services provided, while 65% were dependants, thus making 79% of the study population not being able to pay, this has a major impact on the sustainability of the Water Supply System. This was captured during the FDG, where a respondent had this to say passionately:-

“Our community is poor and cannot afford the daily bread, we even sleep hungry, how does one expect us to pay for Water Services, this is the role/work of the government to provide for us....what do you want us to do?....”

Respondent from Saka location.

Knowledge and skills gap of service providers and the community:

In one of the FGDs the discussants agreed that the water system was not operational because of poor management, children play with the system, community not participating/ lack of ownership, they had no Water User Association and those managing the system were not trained, that is, they lacked the necessary skills needed to maintain the water system. The findings of this study are in agreement with Harvey & Reed (2006) findings, that it is a common practice for village Water schemes to be managed by a village committee of some sort; the creation of which is intended to enable communities to have a sense of ownership over the scheme and to ensure its ongoing operation and maintenance. It has been suggested that participation is the single most important factor contributing to project effectiveness (Naryan, 1994).

Likewise, UNICEF (1996) affirmed that investment in the capacity building of the community in planning, development, implementation and maintenance of the water supply project is one of the first steps towards sustainable development. Training of the community in managing viable and reliable water service provision is therefore an important aspect of sustainability and a step towards poverty eradication. Basic operation and maintenance skills for pump attendants and committee members should be included in the capacity building training.

Government policy and regulations:

Two of the key informants interviewed explained that; education to the community on the ability to conduct their own management well, to expand and improve the water supply system and the community/ water users should consider commercializing water as a commodity to meet the operational costs of the water systems. These findings agree with the World Bank Report (2009) on Water and Sanitation that the greatest challenge facing the World today lies in building competent, efficient, business-like, and service-oriented institutions. Sustainable service provision is only possible where customers themselves cover the cost of operation and maintenance; capital cost recovery is not always possible but often requires predictable public subsidies; and that most subsidies for water supply do not reach the poor.

Conclusions:

According to the study objectives, the following conclusions were drawn from each of the findings:

Demographic factors of the study population in relation to community rural water supplies.

This study concludes that women in the study area are the ones who handle water mostly for household use. This exposes them to many threats including attacks from crocodiles and diseases with less time given to

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri management of household chores. Therefore, in order to bridge the gender gap, rural water projects should be sensitive to gender aspects and especially ensure women have improved access to affordable and safe water. Women should be involved and participate in the management of water supply schemes.

Economic factors that influence sustainability of community rural water supplies.

This study concludes that most of the respondents had no source of income and this explains why some of the water supplies were not functional. Therefore, immediate water needs of the community were not accentuated at the project inception. Hence, no consideration of the financial and management implications the project was to face later.

Knowledge and skills gap of service providers and the community:

The study also concludes that the study community lacked training, technical knowledge and basic skills for handling hand pumps and other water systems leading to most of the water systems being non-functional. Hence, training of the community in managing viable and reliable water service provisions are important aspects of sustainability and a step towards poverty eradication. Basic operation and maintenance skills for pump attendants and committee members should be included in the capacity building training.

Government policy and regulations that influences sustainability of community rural water supplies.

The study concludes that the community is not receiving subsidized services from the Government and the community is not motivated so that it participates in the sustainability of the rural water systems. Therefore, this explains that good governance at all levels should ensure that people are empowered to participate and make choices on water usage for consumption and production, as water is a basic human right. In as much as effective water, governance is crucial to the sustainability of livelihoods, in most cases it is not tackled adequately. This has led to increased poverty levels with Sankuri community lacking access to water and giving up their other rights to education and health in order to ensure that they have water.

Recommendations

The following were recommendations made on two levels, the government and the water service providers:

Government:

1. Basic operation and maintenance skills for pump attendants and committee members should be included in the capacity building training. Transparency and accountability should be emphasized.
2. Basic book keeping techniques and accounting be part of the training package.

Water Service Providers:

1. The consumers have shown a strong preference in the Management Committee to undertake the operation and maintenance of the water supply system. Therefore the committee members should be

Dr. Githae N.M et al. Factors Affecting the Sustainability of Community Rural Water Supplies in Sankuri trained adequately on management skills and proper book keeping so that elements of transparency and accountability be maintained at all times. This will enhance sustainability.

2. Appropriate tariffs that are affordable to the water users and the community at large should be adopted such that water bills are paid and money to maintain the water system is available.
3. Annual stakeholders and management meetings should be held in order to develop trust and ownership of the water facility.

References:

1. **Abrams, (1998)** Understanding sustainability of local water services. <http://www.africanwater.org/sustainability.htm> (accessed: 25th August 2006)
2. **Annual Report (2008)** Garissa District, District Water Office, MOW & I
3. **Annual Report (2007)** Garissa District, District Public Health Nurse, *MOPH*.
4. **Baumann, E. (2005)** Common RWSN context, *Discussion Paper, St. Gallen, SKAT/RWSN*. In Harvey, A. and Reed, R. (February 10, 2006) Communitymanaged water supplies in Africa: sustainable or dispensable? *Community Development Journal Advance Access* 10.1093/cdj/bs1001
5. **Bhandari, B. and Grant, M. (2007)**, “User Satisfaction and Sustainability of Drinking Water Schemes in Rural Communities of Nepal”, *Spring*. V. 3: 12-20
6. **Biscoe J, de Ferranti D, (1988)**, Water for rural communities: Helping people to help themselves, Word Bank.
7. **Carter, R. C., Tyrrel, S. F. and Howsam, P. (1999)**. The impact of sustainability of community water supply and sanitation programmes in developing countries, *Chartered Institute of water environmental management*.
8. **Choguill, C.L. (1996)**. Ten steps to sustainable infrastructure. *Habitat Intl*. V. 20 (3): 389-404.
9. **Churchill A, (1987)**, Rural Water Supply: Time to change. Discussion paper No.18. World Bank.
10. Community based Management of the water environment, Gosh G, Unicef, Dec, 1996)
11. **David J. and Brike F. (1995)**, Making your Water Supply Work: Operation and maintenance of small Water Supply Systems IRC: International Water and Sanitation Centre, The Hague, Holland.
12. **Garissa District Profile, (2008)**, Ministry of planning & National Development.
13. **Garissa District Development plan (2008-2012)**, Ministry of planning & National Development.
14. **Harvey P, Reed R, (2007)** Community managed water supplies in Africa: Sustainable or dispensable. *Community Development Journal*
15. **Haysom A, (2006)**. A study of the factors affecting sustainability of rural water supplies in Tanzania.
16. **Hoko, Z. and Hertle, J. (2006)**, “An evaluation of the sustainability of a rural water rehabilitation project in Zimbabwe”, *Physics and Chemistry of the Earth*. V. 31: 699–706
17. **Kaliba, A.R.M. (2002)**, Participatory Evaluation of Community- Based Water and Sanitation Programs: The Case of Central Tanzania, Dissertation, Department of Agricultural Economics, College of Agriculture, Kansas State University, Manhattan
18. **Kasiaka K. (2004)**, Participatory Planning and Sustainability of Water TASAF Water Project, UDSM Press, Tanzania.
19. **Kenya Demographic Health Survey, (2003)** Ministry of Health Central bureau of Statistics, July, 2004.

20. **Kimberley, C. (1998)**, Guidance Manual on Water Supply and Sanitation Programs, WEDC, London, UK
21. **Kumar, S. (2002)** Methods for community participation: a complete guide for practitioners. *ITDG*, London, U.K.
22. **Kothari C, (2004)** Research Methodology: *Methods and Techniques, 2nd Edition*
23. **Lockwood, H. (2004)**. Scaling up community management of rural water supply, IRC International Water and Sanitation Centre
24. **Mara D, (2003)** Water, Sanitation and Hygiene for the health of developing nations. *Public Health*.
25. **Mbugua, J. and Nissen, P. (1993)**, Community Participation for Sustainable Water and Sanitation, FAKT SD Consultant, Nairobi, Kenya.
26. **Mugenda O, Mugenda A, (2003)** Research Methods: *Quantitative and Qualitative Approaches, Revised*.
27. **Musonda, K. (2004)**, Issue Regarding Sustainability of Rural Water Supply in Zambia, Master Thesis the University of South Africa
28. **Narayan,D (1995)** The contribution of people’s participation. Evidence of 121 rural water projects.
29. **Parry- Jones, S., Reed, R. and Skinner, B. H. (2001)** Sustainable handpump projects in Africa: A literature review. *WEDC*, Loughborough University, UK
30. **Paramenswaran L. (1999)**, Mechanisms for Sustainability in a supply driven environment. *Water lines* Vol.18 No.1
31. **Pérard E. and F. Mattei (2007)**, Private Sector Participation and Regulatory Reform in Water Supply: The Middle East and North African (MEDA) Experience, *Journal for Private Sector Participation and Regulatory Reform in Water Supply*.
32. **Pushpangadan, K. and Murugan, G. (2008)**, “On the Measurement of Sustainability of Rural Water Supply in India: A Supervaluationist – Degree Theory approach”, *Development Economics Seminar*, School of Social Sciences, University of Manchester, UK, on 12th February 2008
33. Practice manual for water Supply services in Kenya: Ministry of Water and Irrigation, October 2005.
34. **Report on Operationalization of the Water Act 2002** in Water Resource Management, Ministry of Water and Irrigation, Oct,2002
35. **Richard C. (1999)**, Impact and Sustainability of Water Supply and Sanitation Program in Developing Countries. *Journal of the Chartered Institution of Water and Environment Management*. Vol. 13, .292-296
36. **Roark, P., (1987)**. Privatization Study of the Village Water Supply Project Lesotho. WASH Field Report No. 215. Arlington, Va.: Water and Sanitation for Health Project.
37. **Satterthwaite, D., McGranahan, G. and Mitlin, D. (2005)**, *Community-driven development for water and sanitation in urban areas*, Water Supply and Sanitation Collaborative Council (WSSCC), Geneva
38. **Sutton, S (2004)** A fresh approach to water for rural populations. *Water and sanitation programme. Field Notes*. http://www.wsp.org/publication/af_selfsupply.
39. **The National Water Resources Management Strategy (2007-15)**: Ministry of Water and Irrigation.
40. **Water Services Sub-sector Report; Issue No. 2, (2009)**. Ministry of Water and Irrigation.
41. World Bank Report on Water and Sanitation, (2006) Washington DC
42. World Bank Report on Water and Sanitation, (2009) Washington DC