

**FACTORS INFLUENCING THE SUSTAINABILITY OF
COMMUNITY WATER PROJECTS RUN BY GRUNDFOS
LIFELINK-KENYA: A CASE OF KATITIKA WATER
PROJECT, EASTERN PROVINCE- KENYA**

BY

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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT
OF THE AWARD OF DEGREE OF MASTER OF ARTS IN PROJECT PLANNING
AND MANAGEMENT, UNIVERSITY OF NAIROBI.**

2011

DECLARATION

This project report is my original work and has not been submitted for a degree award in any other university.


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This research project has been submitted for examination with my approval as university supervisor.

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DEDICATION

This project report is dedicated to my family: my husband Charles, and my children Maxwell Mwendwa, Letitia Mwelu and Warren Mbatha for their love, support and patience throughout my study.

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ABBREVIATIONS

KFWWSP	-	Kenya Finland Western Water Supply Program
TARDA	-	Tana Athi River Development Authority
AMREF	-	African Medical and Research Foundation
MKEPP	-	Mount Kenya East Pilot Project-for Natural Resource Management
JICA	-	Japanese International Corporation Agency

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ABSTRACT

Community water projects have improved on the lives of people especially women and children who are mainly expected to fetch water. The most important one is the reduction in time and energy spent while drawing water. Communities invest heavily in water projects and when a project collapses' it's a major loss of resources. There is however gap between the level of investment by communities in water projects and the sustainability of the same projects. This study investigated the factors that influence the sustainability of water projects run by Gundfos lifelink –Kenya, a case of Katitika community water project. Specifically, the study investigated how independent variables such as financial status of the community, management services, maintenance services and technology and innovation had an influence on sustainability of the water projects. A descriptive survey design was used with a sample size of 96 drawn from the project members, committee members and opinion leaders selected using the Yamane formulae. Questionnaires with both closed and open ended questions were used to collect data. Observation was also used. The findings have shown that most members are comfortable with the new technology and the innovation which reduces their expenditure and ensures accountability since there is no exchange of hard cash which contributed towards sustainability. The study too revealed that the community members saw the new technology as a means of saving time and energy for other economic activities. The study recommends that at least the company should ensure that one of the community members is trained on maintenance of the project. The study concludes that with technology, innovation and accountability most community water projects would be sustainable.

CHAPTER ONE

1.1 Background

Water is a natural resource which should be conserved and sustained for the future generations. According to Nagel Garret (2003) the management of all water resources and water environment sustainability is crucial. This is because the human kind, animals and plants cannot survive without sustainable water sources. Mitche Bruce (1997) argues that there are several principles that should be followed to ensure sustainability of the water projects. These principles include: to practice integrated resource management, to encourage water conservation and protection of water quality and always resolve water management issues. Adamko, (1998) observes that of the 3000 wells, developed in Ghana in 1970's, almost all had collapsed due to lack of sustained community financing. The study will therefore look into the sustainability of water projects run by Grundfos lifelink-Kenya: a case of Katikika water project at Katulani district in Eastern province- Kenya.

1.1.1 The water policy in Kenya

The water policy in Kenya is in accordance with the millennium development goal which states that there will be provision of clean and safe water to all by 2015. Kenya has taken a step to detach the state from direct provision of water and has set up water boards that govern the provision of water to the citizens. According to K'Akum (2006) policy makers and analyst advocate the abdication of the state in favour of private participation. This will bring a host of benefits to all the stakeholders concerned.

1.1.2 Grundfos LIFELINK

Grundfos lifelink-Kenya (GLK) is a private company incorporated in 2008 in a joint venture between the global pump manufacturer Grundfos based in Denmark and the industrialization fund for developing countries. Grundfos has more than 60 years of experience in developing sustainable pump solutions for water projects worldwide. The average annual production of water pumps stands at an annual average of 16million pumps. Grundfos is one of the worlds leading manufacturers of pumps, and has a distribution network for their products which spans over 45 countries.

They also engage in the equipping, maintaining, servicing and installation of their machines. Based on these core competencies, Grundfos developed the 'lifelink' system as a solution for the more than 1 billion people in the world who do not have access to safe water.

The mission of Grundfos 'lifelink' is to improve the living conditions of the population in Kenya and beyond by providing solutions for sustainable water supply for rural and peri-urban communities through development, implementation and ongoing maintenance of the community water projects.

The company mainly equips already sank boreholes, introducing new technology to the communities and working together with them to ensure sustainable and reliable water supply. According to Kalan J.(Jan 7th 2011) the greatest challenge to communities once the projects are handed over is maintenance and funds for repair without which projects fail.

The Grundfos lifelink has developed a system which is about as high tech as rural water solution can get. The system is a single-point water supply system with a submersible pump that is powered entirely by solar energy; the water is pumped to an elevated storage tank then led by gravity to a tap unit in a small, secure concrete housing structure. The tap unit also serves as an automatic payment facility, utilizing an electronic money transfer service that uses mobile

phones. The phone is loaded with money at the agents of safaricom Telecommunications Company. Then the members load their prepaid fob key (with radio frequency identification technology).

The whole system contains a computer – based communication and surveillance module, relaying real-time usage, water table health, and operational information.

Grundfos is responsible for providing maintenance, repair and replacement. In its contract with the community, the consumers agree to pay a 2 or 3 ksh filling fee (depending on location) and Grundfos guarantees that they will fix or replace any parts of the system that may break down.

Notably so the new technology saves on energy and time which can be spend for better economic gains.

1.1.3 M-PESA

M-PESA is an electronic money transfer service that makes use of mobile phones. The company has appointed sales agents for their money transfer services. It is this sales agent through whom money is deposited by members of the community. Any registered member of M-pesa can top up the key fob from anywhere provided they have the code which is specific and unique to individual member.

Mobile money transfer's great success in Kenya cannot be matched anywhere else. Currently it has over 13million Kenyans registered. (Plyler, Haass and Nagarajan, 2010)

M-PESA allows users to store money on their mobile phones in an e-account and deposit or withdraw money in form of hard currency at any of M-PESA's numerous agent locations. It has gained acceptance as mode of settlement of bills. And this is the service utilized by Grundfos lifelink – Kenya.

Safaricom Telecommunications Company is in a partnership arrangement with the pump manufacturer Grundfos lifelink that enables the community to pay for water through the M-PESA electronic money transfer service.

The unique partnership was officially launched in katitika, kitui county . It uses M-PESA's pay bill functionality which transfers a subscriber's M-PESA balance to a smart card which is then used to draw water at subsidized rates from specially calibrated pumps constructed by Grundfos lifelink.

This is one of the Safaricom's commitment to supporting worthy causes within communities and deploying appropriate technologies to answer society's challenges.

The partnership is said to offer a new and sustainable solution for small rural communities. The use of a smart card implies financial sustainability and good governance is ensured and the exchange of hard cash is avoided thus reducing the chances of corruption and mismanagement.

Each user is provided with a smart card fitted with a micro-chip. The user is able to buy water by depositing money from their M-PESA account into a Grundfos M-PESA business account under the pay bill functionality.

The money is then loaded to the user's smart card. Each time the user needs to buy water, the smart card is inserted into a slot on the tapping point and water automatically starts running, when the card is removed the amount tapped is deducted from the card.

The project is claimed to have several in built features to ensure sustainability. Through M-PESA the beneficiaries contribute to a community trust that pays for the solar powered water pump from Grundfos. The money also caters for the maintenance of the pump. The community acquires the water pumping system on credit and at affordable rates. The system has a business model that enables the communities to acquire the pumps while paying for the investment

gradually through utility fees. However some of the projects are sponsored through different organization such as Red Cross.

The model also includes a local service organization for regular maintenance of the system and service calls courtesy of safaricom infrastructure, the units performance is monitored real-time via the internet and failure messages automatically relayed to Grundfos lifelink.

For environmental sustainability, the water system is run entirely on solar energy. This eliminates problems and expenses traditionally associated with diesel driven or hand driven pumps.

1.1.4 Katitika water project

The project is located in Mangina village, Mangina sub location in Itolika division of Katulani district in Kitui county, Eastern province- Kenya. It serves a population 1800 in 300 households. The bore hole was sunk by JIKA in 2006. It was installed with a hand pump which the community used to draw water. The Grundfos lifelink installed the automated water system in 2009. The project is run by community project committee. The project serves four villages that is Mangina, Katitika, Itulu and Mwaani. The project serves 300 households.

1.2 Statement of the Problem

All world over literature review conclusively points that sustainability is a problem which faces all forms of development in both developed and developing countries (Len Abram.2000). Mukhwana and Hukka (1995) in their project evaluation report found out that out of the 14 completed projects, constructed by the Kenya Finland western water supply program (KFWWSP) in western Kenya, nearly all of them had serious problem of sustainability which could be classified as financial, managerial, and technical. In comparison with other community water projects, for example in terms of innovation Malivani water project in Makueni district use

diesel as a source of energy to pump water from the borehole whereas in Katitika the project utilizes solar energy.

The mode of payment differs. For instance in Mwingi district water projects run by TARDA members pay cash to an employee of the project in order to draw water. While at Katitika water project money is transferred from the Mobile money transfer service(m-pesa) to the key fob to enable them draw water at the water point.

Maintenance of these water projects is left in the hands of the water board, while in Katitika water project maintenance is the responsibility of the company, Grundfos life link.

A project such as Musingini water project in Masinga district members use hand pumps to draw water. The exercise is both tiring and time consuming. In Katitika water project all the members require is to load their key fob with money to draw water fast and effortless.

The research therefore seeks to investigate the sustainability of the water projects run by Grundfos lifelink Kenya with specific reference to Katitika water project in Katulani district – Kenya; with a view to providing insights in the management of water projects and at the same time enrich the available information and creating basis for further research.

1.3 Purpose of the Study

The purpose of the study was to assess the factors that influence the sustainability of water projects run by Grundfos lifelink-Kenya: a case study of Katitika, Kitui county of Eastern province-Kenya water project.

1.4 Objectives of the Study

The study was guided by the following objectives:

1. To assess the level to which management services of the project influences the sustainability of water projects.

2. To establish the extent to which technology and innovation influence the sustainability of water projects.
3. To investigate how the financial status of the community influences the sustainability of water projects.
4. To determine the level to which maintenance services of the project by the company influence the sustainability of water projects.

1.5 Research questions

The study set out to answer the following questions.

1. How do the management services of the project influence the sustainability of water projects?
2. How does technology and innovation influence the sustainability of community water projects?
3. How does the financial status of the community influence the sustainability of community water projects?
4. How do the maintenance services of the project by the company influence the sustainability of community water projects?

1.6 Significance of the study

Development of community water projects costs the Government, community, companies and NGO'S a lot of money. This study will contribute to the understanding of the factors influencing the sustainability of water projects run by Grundfos Lifelink Company.

The company will gain through learning their strengths and weaknesses in running of their projects. While other communities will learn skills necessary for creating an environment for sustainability of community water projects.

1.7 Limitations

There were a number of notable limitations regarding this study. First, a descriptive survey approach was used with a self-report questionnaire administered to collect data. A major limitation was that respondents did not have the opportunity to request clarification and people may not have disclosed details they did not wish to. Second, only one project of the many run by Grundfos lifelink company was studied, this limits the generalization of the results. Third, the use of convenient target population was a weakness to this study.

1.8 Delimitations

The study was delimited by the scope of the research which was reduced to dealing with one water project from the many run by Grundfos lifelink. This was mainly to save on time and resources.

1.9 Assumption of the study

This study assumes that all respondents will provide reliable and valid data that can be used to make important conclusions on the study.

The study assumed all variables would remain constant.

1.10 Operational Definition of terms

Challenges-these are the bottlenecks that hinder the smooth running of the community water projects.

Community committee – these are the representatives of the community members who oversee the daily running of the water projects.

Community empowerment-this term is used to imply the ability of the company to enable the communities to take charge of their own development according to their own needs and encouraging innovativeness and the discovery of potential

Community- is used to refer to the group of people who live in the same geographical environment sharing the same resources in this case the water project.

Community participation- this is the role taken by the primary beneficiaries of the project in running and managing their water project.

Ground water- this is the water that is found underground and it can only accessed through digging wells or drilling boreholes.

Key fob-it is a device that makes use of radio frequency identification technology. it is used by members of the water project to assess water. It is usually re-loaded through the M- pesa money transfer.

Management services- is used to mean the responsibility of the project committee to the project members and the water project.

M-pesa- this is an electronic money transfer service within safaricom Telecommunications Company that utilizes mobile phones.

Project beneficiaries-these are the persons that directly benefit from the project. That is use the water from the water projects.

Stakeholders –the term is used to refer to all the persons who are interested in the community water projects. This ranges from the community members, Grundfos lifelink company, safaricom company, the government of Kenya and any donors who may have funded the projects.

Sustainability- This word in the study is used to mean the ability of a water project to develop a strategy of growth and development that continues to function and serve its intended target population now and in the future.

Technology is used to refer to the use of the information technology to aid in collecting money and use of modern equipments to monitor and relay information about the project to the company.

1.11 Organization of the study

The study is organized into five chapters.

Chapter one contains the introduction including the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions of the study, statement of the problem, purpose of the study, limitations of the study and definition of significant terms.

Chapter two represents the relevant literature of the study on the factors influencing sustainability of water projects, a conceptual frame work and a summary.

Chapter three consists of detailed description of the research methodology that was used in the study. This includes the research design, target population, sample size and sampling techniques, research instrument, instrument validity and reliability, data collection procedure and data analysis techniques.

Chapter four represents the data analysis, presentation, and interpretation of the data while chapter five consists of the summary of the findings, discussion, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter aims identifying what other researchers had done in the area of sustainability of community water projects. The finding of the review would help the researcher to note the gaps in knowledge and create an entry point to the study. It also enriched the conceptual frame work of the research by assessing other factor that influences sustainability. The chapter looks extensively at technology and innovation and maintenance service as one strong area exploited by the company to enhance the sustainability of the community water projects.

2.2. Theoretical issues on sustainability

Sustainability is a term being used in a number of sectors of development. Sustainable development is a main challenge for managers of water supply and sanitation institutions and projects, as well as for the communities involved. According to a newsletter of 'Netwas international' of may 1996, large amounts of projects have been made in the water supply and sanitation sectors in the past but a greater number of projects have reported deficiencies and systems which are not functioning. The benefits and credibility of the investment made is questionable. There is need for a new approach to development which should include going beyond physical results. It should aim for provision of water systems which are keen on generating appropriate benefits over time.

There is growing empirical evidence that social capital contributes significantly to sustainable development, (Isham and Kahkonen, 1999). Sustainability is to leave future generations as many, or more, opportunities as we ourselves have had. Growing opportunity requires an expanding stock of capital. The traditional composition of natural capital, physical or produced capital, and human capital needs to be broadened to include social capital. Social capital refers to the internal

social and cultural coherence of society, the norms and values that govern interactions among people and the institutions in which they are embedded. Social capital is the glue that holds societies together and without which there can be no economic growth or human well-being. Without social capital, society at large will collapse, and today's world presents some very sad examples of this. It is this same social capital that will help enhance sustainability through the use of the mobile money transfer.

There are numerous risks that threaten the sustainability of the water projects and communities often get into problems after the implementing partner has left. Most of these challenges range from problems related to the technical maintenance of the systems management, cost recovery, planning, transparency of decision making and communication between community committees and the community beneficiaries,(Oenga and Ikumi,1997)

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The same observation is reinforced by Okfar (2008) who argues that if things begin to go wrong with the management of the system, distrust in the community will grow and will finally bring the project to its knees. He also says that there are other threats that are too complicated for communities to handle, such as the project outstretching their limits may be because of illegal users, population growth and technological services.

The above review is evidence that sustainability requires the efforts of all stakeholders. The study therefore seeks to find out if Grundfos lifelink-kenya has better chances of attaining sustainability of its water projects which will provide a breakthrough.

2.2.1 Project managerial skills

Sustainable water management includes two important concepts: sustainability and Management of resources. (Harvey, 2006) argues that over the past two decades, community management has become the prevalent model for management of Rural water supplies throughout sub-Saharan Africa. Despite its widespread popularity among donors and implementing agencies, low water supply sustainability levels throughout the sub-continent indicate that it is not panacea it is often presented to be. There is a strong need to distinguish between 'community participation' which is a prerequisite for sustainability and community management which is not. If community management system is to be sustainable, they require ongoing support from an overseeing institution to provide encouragement and motivation, monitoring, participatory planning, capacity building and specialized technical assistance. If such support is not available, alternatives such as household water supplies and private sector service delivery should be considered.

Community water projects, support needs to cover both the scheme development and the post implantation phases.

For an organization to function, it requires having a center of power where authority is seen to flow in the water project, elected members form a committee that runs the projects. However, most committee lacks the power to exercise authority and enforce the set by laws.

Most of the elected leaders lack managerial skills as well and are of low formal levels of education.

As observed by Mathur (1996) most of the community water projects have problems of decision making, resource utilization and accounting for the same which usually forms the major causes of project break up due to lack of community training on how projects are managed.

2.2.2 Method of collecting money

Due to their informal nature, community water projects lack formal procedures and processes and the know how to conduct business.

This brings about so many difficulties in collecting the funds. The payment of the members depends on their good will. The committee also lacks the power to enforce the set by laws.

They may also fail to keep records of the transaction carried due to lack of knowledge, ignorance or even laxity.

The project as well relies on the good will and volunteer work from the committee members. Because of this the members have no moral authority to question the committee members.

2.2.3 Empowering through training

Nyong and Kanoroglou(2001) notes that areas where implementer do not promote the participation of beneficiary communities and the roles of each stakeholder is not clearly defined, it leads to uncertainty and confrontation around the respective roles to be played by all those involved. A community water project will require a community water committee to effectively oversee operation and maintenance services and collect revenue to cover the cost of the services.

Relevant, practical and well-tailor made training will have a great impact towards sustainability.

This enables communities with limited formal education to operate and maintain relatively complex water supply schemes. From the website AMREF (2010) has developed over 40 water projects and its stronghold is information and capacity development of community committees.

In Makeni County, Nyakundi (2005) notes most of the water projects collapsed due to managerial problems after the projects were handed over to the community. Members did not pay arguing that water is God given gift one should not pay for. Where the payments were made poor records were kept amounting to mismanagement.

2.2.4 Financial status of the community

The community water projects are meant to benefit all members equally and so they tend to be based on equality. Members are expected to contribute equally despite their different economic endowment. This implies that the very poor are likely to be locked out of the project.

Hemson (2003) observes that, in water delivery, as in many other programs of social nature there can be 'inverse equity' where by the poorest in the community are always the last in the queue.

Currently, most water projects use the approach of community water management where by community members contribute to the development of their own project and the sustainability of the same. In Kenya for instance, each community contributes 30% of the total project cost in their hands (MKEPP Appraisal report, vol.1,2003) communities may pay as individual or households, a membership fee, and pay also as they fetch the water. The aim is to make the communities responsible towards the project and cultivate a sense of ownership is cultivated.

2.2.5 Technology and Innovation

The level of training needed for empowerment is dependent on the level of sophistication in the technology employed.

Technology sets women and children free as Carte et al(1999) argues that women and children spend so much time and energy getting water for domestic use. Automated projects will relieve them and the projects should therefore be sustained for them to continue enjoying the relief.

Proasne (2005) explains that in order for a project to produce sustainable results, the project managers have to ensure that funding is available and will be available to support the running of the project.

2.3 The mobile money transfer service (M-pesa)

Plyer M,(2010) defines M-pesa as a agent-assisted, mobile phone-based, person-to-person payment and money transfer system. It was launched in Kenya in 2007 by the safaricom

telecommunications company. Since its inception, M-pesa has picked up quickly, covering the majority of geographical areas of the country. It aimed to attract 250,000 customers in its first year and reached that milestone in only four months. Data from the company indicate that by the end of the year 1million customers had registered with M-pesa. Currently it has over 13million registered customers.

In her findings she argues that M-pesa affects the economic outcomes of community members, both as users and non-users of M-pesa.

The study also identifies a number of economic effects within the broad categories of local economic expansion, security, and capital accumulation.

M-pesa allows users to store money on their mobile phones in an e-account and deposit or withdraw money in the form of hard currency at one of the M-pesa's numerous agent locations. M-pesa has affected Kenyan house holds and communities at social-economic levels. These effects at community level include: local economic expansion, security, capital accumulation, and business environment. Thus, M-pesa has had a very important role in supporting economic activities in the community.

M-pesa has a number of functions. These include sending money, withdrawing money, paying bills. It is this function which is utilized by the partnership between Grundfos lifelink-kenya and safaricom Telecommunications Company. M-pesa allows members pay for water which is accessed from the automated water system.

As an extension the communities improve their health because they will have fewer water borne diseases and increased ability to practice good hygiene.

It is therefore clear that (Kenya economic update, December,2010) among many ways cell phones have been used in Kenya, the most innovative is the mobile money transfer. This global

innovation has the potential to become an additional engine of Kenya's growth and an important tool for poverty reduction. That is why all the other telecommunication company's have also introduced their own money transfer services.

Though still used by the rich members of the society, mobile money transfer is common with the poor and unbanked members of the society. The money flows in the semi-formal financial system and also helps with macroeconomic policy making because it increases information about liquidity in the financial system. Safaricom Telecommunications Company has established more partnerships with other organization but this study will only focus on its partnership with grundfos lifelink.

2.4 Grundfos lifelink

This is a private company incorporated in 2008 in a joint venture between the global pump manufacture Grundfos and the industrial fund of for developing countries. The company has over 60 years of experience in developing sustainable pump solutions. The company is about as high tech as rural water solutions can get. The system is a single-point water supply system with a submersible pump that is powered entirely by solar energy. The water is pumped to an elevated storage tank, then flows though gravity to a tap unit in a small, secure concrete housing structure. The tap unit (the big black box) also serves as an automatic payment facility, utilizing a unique mobile payment system (M-pesa) and a pre-paid FOB key (with radio frequency identification technology),which can be reloaded and paid by customers through a simple text message.

The whole system contains a computer –based communication and surveillance module, relaying real-time usage, water table, health and operational information. The company is responsible for providing maintenance, repairs, and replacements. The community members buy the water at an agreed amount and the company guarantees fixing or replacing any part of the system that may

break down. The company operates in a business manner and the community members pay for all services through installments.

2.5 The water policy in Kenya

The water policy in Kenya is in accordance with the millennium development goal which state provision of clean and safe water to all by 2015. Kenya has taken a step to detach the state from direct provision of water and has set up water boards that govern the provision of water to the citizens. According to K' Akum(2006) policy makers and analyst advocate the abdication of the state in favour of private participation. This will bring a host of benefits to all the stakeholders concerned.

2.6 Conceptual Framework

Conceptual framework of the factors that influence the sustainability of community water projects run by Grundfos lifeLink –Kenya is as shown in figure 1.

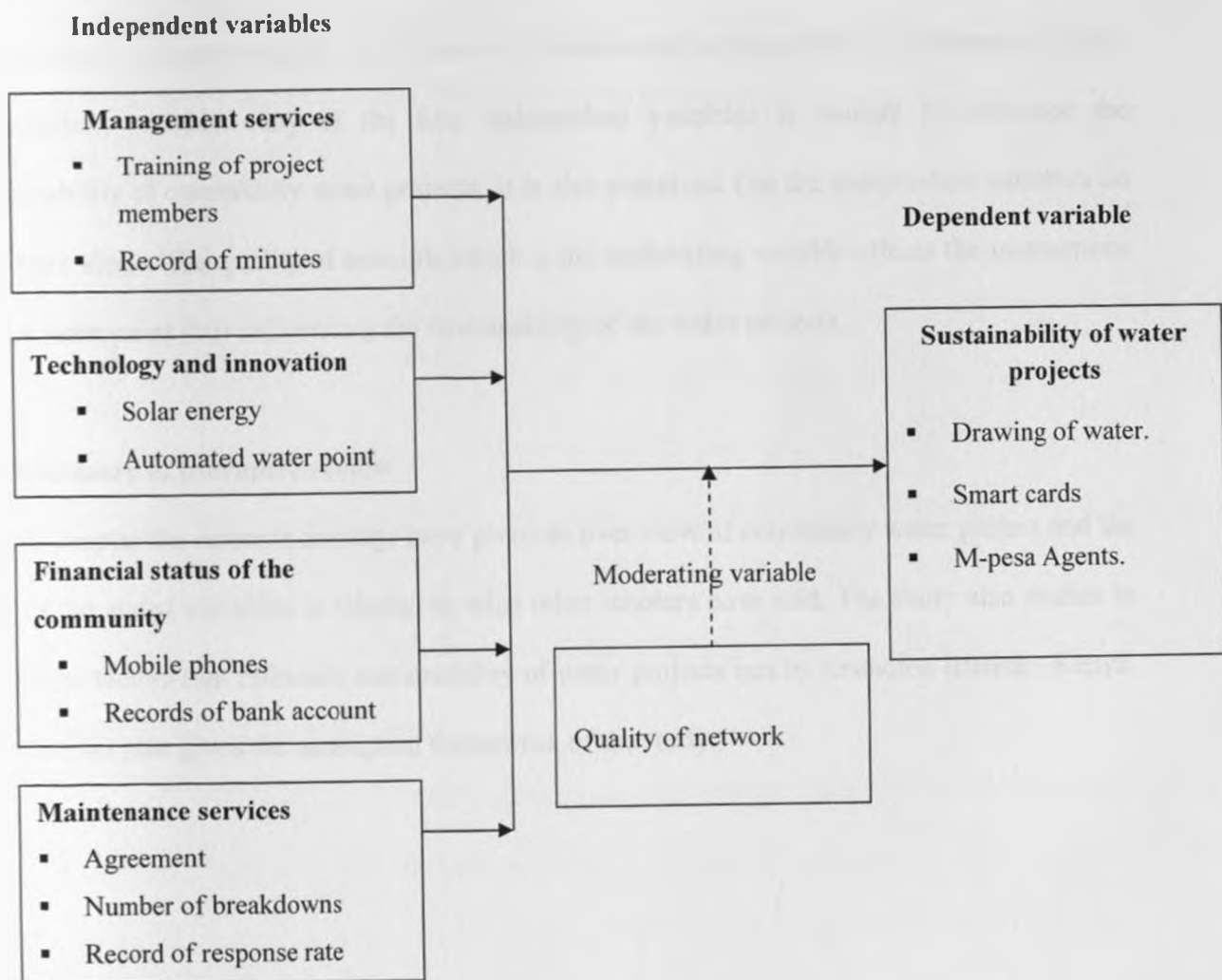


Figure 1: Conceptual Framework

2.7 Relationship among variables

The conceptual framework illustrates how the four independent variables which include management services, technology and innovation, financial status of the community and maintenance services are interrelated to influence the sustainability of water projects. The sustainability of water projects in this case is the dependent variable which is determined by the independent variable. Any of the four independent variables is thought to influence the sustainability of community water projects. It is also perceived that the independent variables do not work alone. The quality of network which is the moderating variable affects the transactions at the water point thus influencing the sustainability of the water projects.

2.8 Summary of literature review

In this chapter the research findings have given an over view of community water project and the role of the stated variables in relation to what other scholars have said. The study also studies in detail the factors that influence sustainability of water projects run by Grundfos lifelink –Kenya. The chapter also gives the conceptual framework of the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter includes the method used to collect the data for the study. This includes a description of the research design, target population, sampling design, data collection instruments, data collection procedure and data analysis procedure.

3.2 Research design

The study adopted the descriptive design to investigate the sustainability of the community water projects run by Grundfos lifelink –kenya. This allowed the study to gather information, summarize, present and interpret for the purpose of clarification (Orodho, 2002). The design was also preferred because it was concerned with answering questions such as who, how, what, which when and how much, Cooper and Schindler (2001).

Kothari (2003) too recommends descriptive design because it allows a researcher to describe record, analyze and report what exist.

The chosen design allowed the study to generate both numerical and descriptive data that could be used in measuring correlation between variables. The descriptive research was intended to produce statistical information about aspects of sustainability of water project run by Grundfos lifelink: a case of Katitika water project, Kitui county eastern province-Kenya.

3.3 Target population

Kombo and Tromp(2006) define a population as a group of individuals, objects or items from which samples are taken for measurement. This study was carried out in Katitika water project in Kitui county. The target population was 300 households drawn from four different villages served

by Katitika water project, 15 committee members of Katitika water project and 10 opinion leaders.

Table 3.1 The Target Population

Category	Target population	Source
Community members	78 households	Katitika village
Community members	74 households	Mangina village
Community members	72 households	Mwaanl village
Community members	76 households	Itulu village
Total community members	300 households	Katitika water project
Project committee members	15	Katitika project committee
Opinion leaders	10	Opinion leaders

Source: Grundfos lifelink

3.4 Sampling and Sampling procedure

Orodho and Kombo (2000) define sampling as the process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group.

This study adopted the stratified random sampling method. This is because the study will include people of all walks of life who benefit either directly or indirectly from the community water project. The strata will be based on the project members, project committee and opinion leaders.

As Corchran (1977) argues, stratification ensures a gain in precision in the estimates of characteristics of the whole population. It also ensures the inclusion of sample groups which

would probably be entirely omitted (Mugenda and Mugenda,1999).In this case stratification ensured that all stakeholders were given a chance in the sample. A total of 76 households, 13 committee members and 9 opinion leaders were sampled. The sample will be calculated using the Yamane formula which assumes a normal distribution. That is $n = \frac{N}{1+N(e)^2}$ where n is the sample size is population size and e is the error of sampling. This study allows the error of sampling on 0.1.

Table 3.2 Sampling Procedure

Category	Target population	Sample size= $n = \frac{N}{1+N(e)^2}$
Project members	300	76
Committee members	15	13
Opinion leaders	10	9
Total sample size		98

Since the number of households in all the four villages were almost equal the researcher divided the sample for the project members in to four equal parts. From each village a total of 19 households were sampled. The committee members were equally picked from the four villages.

3.5 Methods of Data Collection

The study used questionnaires for the purpose of gathering information from the committee members, project members and community leaders. The researcher also used observation method to enrich the responses. The observation was made while administering the questionnaires. The observation was used to compare with responses given and fill in any gaps.

Both primary and secondary data was collected for the purpose of this study. The primary data was collected through the questionnaires with open and closed ended question. This helped in

seeking the in depth information. The secondary data was got through the existing records both at the company and from the community committee. The questionnaire had adequate instructions and easy to understand language.

3.6 Instrument Validity

Mugenda and Mugenda (1999) define validity as the accuracy and meaningfulness of inferences which are based research results. It is the degree to which results found from an analysis actually represent the phenomena under study.

To ensure validity the researcher ensured that research instruments were accurate through making adjustment after a pilot study. The pilot study was conducted at Kola water project in Makueni district, a project also run by Grundfos lifelink.

There was the use of triangulation, which is the use of different data collection methods to gather the same information. The researcher used both questionnaires and observation methods. The use of the two research methods enhanced validity.

3.7 Reliability of instrument

Mugenda and Mugenda (1999) also define reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials. Reliability was important for it helped the researcher to identify ambiguities and inadequacy in the research instrument and made all necessary adjustment. This was done after the pilot study.

3.8 Operational Definition of Variables

Objectives	Variables Independent	Dependent	Indicators	Measuring scale	Data. Tool	Type of analysis
To assess the level to which management systems of the project influences the sustainability of water projects	Management systems		<ul style="list-style-type: none"> - Committee - Minutes of meeting - Records - Training members on technology - Training committee on management 	<ul style="list-style-type: none"> - Nominal - Nominal - Nominal - Nominal 	Questionnaire Observation	Descriptive
To establish the extent to which technology and innovation influence the sustainability of water projects	Technology innovation		<ul style="list-style-type: none"> - Relaying information - M-pesa services - Automated water point - Check balance - Solar energy 	<ul style="list-style-type: none"> - Nominal - Nominal - Nominal - Nominal 	Questionnaire Observation	Descriptive
To investigate how financial status of the community influence the sustainability of water projects	Financial status of the community		<ul style="list-style-type: none"> - Mobile phones - M-pesa charges - Amount spent daily 	<ul style="list-style-type: none"> - Nominal - Nominal - Nominal - Nominal 	Questionnaire Observation	Descriptive
To determine the level to which maintenance services of the project by the company influence the sustainability of water project	Maintenance services		<ul style="list-style-type: none"> - No of break downs - Spare parts - Response for company - Training on maintenance 	<ul style="list-style-type: none"> - Nominal - Nominal - Nominal 	Questionnaire	Descriptive
		Sustainability of water project	<ul style="list-style-type: none"> - Drawing water - The smart card - M-pesa Agents 	<ul style="list-style-type: none"> - Nominal - Nominal - Nominal 	Observation Questionnaire	Descriptive

3.9 Methods of Data Analysis

The data collected was analyzed using descriptive statistics. First the researcher eliminated all unwanted and unusable data which was ambiguous. The researcher then organized the data ensuring that the raw data had been edited to free it from inconsistency and incompleteness. This involved the scrutiny of the completed instrument in order to detect and reduce as much as possible, errors, incompleteness, misclassification and gaps in the information obtained from the respondents. Secondly, the data was coded to establish how possible answers would be treated by assigning to them numerical values. Then the data was analyzed using the SPSS and was presented using frequency tables. The data was stored in both electronic and paper format.

3.10 Summary

The study adopted a descriptive survey design to investigate the sustainability of water projects run by Grundfos lifelink company-Kenya. Stratified sampling was used to ensure there was equal representation of all stakeholders. Questionnaires were used as the instrument of collecting the data. They were pre-tested for validity and reliability. Management service, technology and innovation, financial status of the community and maintenance systems were tested as the dependent variables while sustainability of water project was the independent variable.

3.11 Ethical Issues

This research will contribute to the knowledge of how to attain sustainability in community water projects; it also maintained utmost confidentiality about all respondents. All necessary research authorities were consulted and permission sought. Adequate and sufficient explanations were given to the respondents. A copy of the report would be sent to the community through Grundfos lifelink-kenya.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the findings of the data collected from sampled Katitika community water project, an investigation of the sustainability of water projects run by Grundfos lifelink –Kenya. Out of the 98 respondents the study targeted there were 81 responses. This was 82.6% of the targeted group. The data was interpreted according to the research questions. The analysis was done through descriptive statistics and findings of the study were presented in form of frequency tables. The discussion of the outcome is based on outputs from statistical package for social sciences (SPSS).

4.2 Questionnaire response rate

The total number of households sampled was 78, while the committee members were 13 and 9 opinion leaders.

Table 4.1 Questionnaire Response Rate

Title of respondent	Number of questionnaires issued	The percentage of	Response rate	The percentage
Community members	76	77.55%	66	87%
Committee members	6	13.26%	6	46%
Opinion leaders	9	9.18%	9	100%
Total	98	100%	81	82.6%

The target sample population for the study was 98. The overall respondent return rate was 81(82.6%). Out of the 76 (77.5%) questionnaires issued to the project community members, 66 (87%) were returned. The response rate for committee members was 6 (46%). The response rate from the opinion leaders was 9(100%).

4.3 Factors Influencing Sustainability of Water Projects

The study sought to assess factors that influence sustainability of water projects in Katitika division, based on the indicators of management services, technology and innovation, financial status of the community and maintenance services.

4.3.1 Management Services

On whether management services influence sustainability of water projects the study used various indicators such as meetings of the project members, training of project members and transparency of the project committee and the findings were as outlined.

The respondents were asked to indicate if they had a project committee and the responses are shown in table 4.2.

Table 4.2 Project committee

	Frequency	Percentage	Cumulative percentage
Yes	58	87.9%	90.6%
No	6	9.1%	100%
Total	64	97.0%	

There was a frequency of 58 (87.9%) of the respondents who said that they had a project committee in place while 6 (9.1%) indicated that there was no project committee in place.

4.3.1 Meetings for project members

On whether the project committee ever convened meetings for the project members, the respondents were asked to indicate if they ever had project meetings. The responses are shown in table 4.3.

Table 4.3 Meetings of project members

	Frequency	Percentage	Cumulative percentage
Yes	58	87.9%	90.6%
No	6	9.1%	100%
Total	64	97.0%	

Out of the 64 members 58(87.9%) agreed that they held meetings of the project member while 6 (9.1%) said that they never had any meetings as project members.

4.3.2 Transparency of the committee

The project members were requested to indicate whether they found the project committee transparent in the management of the project.

Table 4.4 Transparency of the Committee

	Frequency	Percentage	Cumulative percentage
Yes	62	93.9%	96.9%
No	2	3.0%	100%
Total	64	97.0%	

The findings of the study reflected that 62 (93.9%) of the respondents found the committee transparent while 2 (3.0%) of the respondents found the committee not transparent in managing the project.

4.3.3 Training on Management

The committee members were asked to indicate if they had been trained on the skills of managing a community project.

Table 4.5 Training on Management

	Frequency	Percentage	Cumulative percentage
Yes	2	33.3%	33.3%
No	4	66.7%	100%
Total	6	100%	

Out of the 6 committee members 2 (33.3%) said they had been trained on management of the project while 4(66.7%) indicated that they had never been trained on the skills of project management.

4.3.4 Membership

The respondents were required to state if there was any membership fee paid before one was accepted as a member of the project.

Table 4.6 Membership fees payment

	Frequency	Percentage	Cumulative percentage
Yes	64	97.0%	97.0%
No	2	3.0%	100%
Total	66	100%	

The findings from 64(97.0%) of the respondents indicated that it was mandatory to pay membership fees while 3% indicated that membership fees was not mandatory.

4.4 Technology and Innovation

On whether technology and innovation influence sustainability of water projects the study used various indicators such as ability to draw water and M-pesa charges.

The respondents were asked to indicate if they were able to draw water without assistance.

Table 4.7 Ability to Draw Water without Assistance

	Frequency	Percentage	Cumulative percentage
Yes	60	90.9%	96.8%
No	2	3.0%	100%
Total	62	93.9%	

The findings showed that 60 (90.9%) of the project members were able to draw water on their own while 2(3.0%) of the respondents said they were not able to draw water on their own.

4.4.1 M-pesa Charges

The project members were requested to indicate how they rated the M-pesa charges, whether the charges were too high, or moderate.

Table 4.8 M-pesa Charges

	Frequency	Percentage	Cumulative percentage
Too high	18	27.3%	30%
Moderate	42	63.3%	100%
Total	60	90.9%	

Out of the 60 project members who responded to the questionnaires 18 (27.3%) indicated that the charges were too high while 42 (63.3%) said that the M-pesa charges were moderate.

4.5 Financial status of the Community

On whether financial status of the community influence sustainability of the water projects the study used various indicators such as funding of the project, mobile phones and availability of M-pes agents.

4.5.1 Funding of the Project

The respondents were asked to rate the mode of funding of the project in terms of excellent, good or poor.

Table 4.9 Funding of Project

	Frequency	Percentage	Cumulative percentage
Excellent	60	90.9%	93.8%
Good	2	3.0%	96.9%
Poor	2	3.0%	100%
Total	64	96.9%	100%

A total of 60 (90.9%) of the project members rated the form of funding as excellent, while 2 (3.0%) rated the same form of funding as good. Another 2 (3.0%) rated the mode of funding as poor.

4.5.2 Mobile Phone

The respondents were asked to indicate if they owned mobile phones which enabled them to load their key fobs though the M-peas money transfer service.

Table 4.10 Mobile Phones

	Frequency	Percentage	Cumulative percentage
Yes	50	75.8%	80.6%
No	12	18.2%	100%
Total	62	93.9%	

A total of 62 (93.9%) respondents answered this question. Out of the total who responded 50 (75.8%) said that they had mobile phones while 12 (18.2%) indicated that they did not have mobile phones.

4.5.3 Availability of M-pesa Agents

The researcher sought to know if there were M-pesa agents within the reach of project members.

Table 4.11 Availability of M-pesa Agents

	Frequency	Percentage	Cumulative percentage
Yes	48	72.8%	75%
No	16	24.2%	100%
Total	64	97.0%	

Out of the 64 (97.0%), 48 (75%) indicated that there were M-pesa agents at their reach while 16 (24.2%) said that there were no M-pesa agents available.

4.6 Maintenance Services

On whether the maintenance services influence sustainability of the water project the study used various indicators such as breakdowns, frequency of the breakdowns and the one responsible for repairs. A Pearson correlation matrix was done to determine the strength of relationships amongst indicators in maintenance services.

Table 4.12 Pearson correlation matrix

	Are there their breakdowns	their frequency	Who repairs	Speed of response	of Ever missed water
Are there breakdowns	1	-.692	.623	-.341	.185
their Frequency	-.692	1	-.983	.577	-.267
Who repairs	.623	-.983	1	-.573	.237
Speed of response	-.341	.577	-.573	1	-.124
Missed water	.185	-.267	.237	-.124	1

A correlation study on maintenance using the Pearson's correlation indicated that the correlation was significant at the 0.01 level.

The relationship between frequency of breakdowns and who repairs had the highest positive correlation coefficient of 0.623. there was a strong negative correlation between who repairs and frequency of breakdowns at -0.983. there was no relationship between missing water and the breakdowns correlation 0.185.

4.7 Summary

This chapter makes an assessment of how the management services of the project committee, technology and innovation, financial status of a community, and maintenance systems influence the sustainability of community water projects. The findings are presented as received from the respondents.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings and discussion as per the responses from the respondents. This is in relation to the objectives of the study. The chapter also looks into the conclusions and recommendations as deduced from the study findings. Finally the chapter points out the areas the researcher thought would require further research in related fields.

5.1 Summary of Findings

This section summarizes the findings of the study based on the research objectives.

Table 5.1 Summary of Findings

	Findings	Remarks
To assess the level to which management systems influence the sustainability of water projects	87.7% of the respondents cited that management services influenced sustainability while 9.1% said it did not lead to sustainability.	Management services influenced sustainability of water projects.
To establish the extend to which technology and innovation influence the sustainability of water projects	90.9% of the respondents said that technology and innovation led to sustainability of water project while 3.0% said that it did not lead to sustainability.	Technology and innovation influenced sustainability of community water projects
To investigate how the financial status of the community influences the sustainability of water projects	90.9% of the respondent cited that the financial status of the community influenced sustainability of water projects while 3% said that it did not influence sustainability.	The financial status of the community influences the sustainability of water projects
To determine the level to which maintenance service influences the sustainability of water projects	89.9% agreed that maintenance contributed to sustainability of water projects while 3% said that maintenance did not contribute towards sustainability.	Maintenance services influences sustainability of water projects.

5.2.2 Management Services

The importance of a project committee was seen with 87.9% agreeing it was important and 87.9% assuring the project members had regular meetings to be updated on the project. Though the committee members were never trained on project management skills, 66.7% noted that no training had offered to them. In terms of decision making the observation was that there was extensive consultation within the project members. The study shows 93.9% was consulted when decision was being made

5.2.3 Technology and Innovation

The technology used in the project was rated in the three different questionnaires as appropriate. The study revealed that 93.9% found the technology quite appropriate and time saving. The use of the solar energy as a source of energy was viewed as economical since it cut on fuel expense. Members were trained on the use of the facility with the study revealing that 96.8% could draw water without assistance

5.2.4 Financial status of the Community

The study revealed that the financial status of the community was good in relation to the demands made by the project. This was confirmed by the 97.0% registration of the members and acquisition of the key fob. The study also confirmed that 75.8% of the members owned mobile phones and rated the charges for charging their mobile phone and M-pesa as fair. The project which is a loan from the company to the community made it easy for the community to acquire the project. 90.9% of the members rated the agreement between the community and the company as excellent.

5.2.5 Maintenance Services

The study reveals the company's commitment to their agreement, with 78.8% of the acknowledging their responsibility. The study too reveals the company's response rate as prompt. 83.3% rated it at two days after breakdown. This ensures that the community never runs out water for long.

5.3 Discussions of the Findings

Sustainability of community water project is very fragile. As observed by Oenga and Ikumi (1997), most of these challenges range from problems related to maintenance, management, transparency in decision making and communication between committees and the community beneficiaries.

The management services of the project especially from the committee members on management issues and training of members is important for the sustainability of any community water project. The study revealed that the committee members had to take voluntary turns to guard the water point and all the members had been trained in the new technology. This agrees with what (Harvey 2006) observes community management has become prevalent model for management of rural water supplies.

The study also revealed that technology and innovation had a positive impact to the community members. The members argued that they were able to save time and spend less energy in drawing water. The findings seemed to agree with Carte et al (1999) who argues that women and children spend so much time and energy getting water for domestic use. The innovation, use of solar as a source of energy, saved the community financially.

An assessment of the financial status of the community revealed that the project members were able to meet the financial demands of the new technology. This included acquiring mobile phones, meeting the M-pesa charges and the charges of charging their mobile phones. This seemed to agree with an argument raised in (MKEPP Appraisal report, vol.1,2003) that each community in Kenya contributes 30% of the total project cost. They pay also as they fetch water.

During this study maintenance services was seen as the greatest challenge since no one had been trained among the project members to be able to repair the machine. Any breakdown requires the company to send technicians to the project. Though their response rate is fast it would be faster and cheaper if one among the project members were to maintain the project. As result then the proceeds from the project would spill over to other economic activities.

5.4 Conclusion

The study also realized that the businesslike approach given by Grundfos lifelink-Kenya to the community water project instilled a sense of ownership to the members and the members would guard it at all cost.

The study also revealed that technology and innovation was key to the sustainability of any community water project.

The study also established that the community projects were run and managed by elected community members. However the said committee lacked in skill in as far as project management skill was concerned; the most challenging part being conflict resolution. The committee also served on involuntary basis.

Another great challenge is the breakdown of communication between the company and the project members.

5.5 Recommendations

Based on the findings of the study the following recommendations were made:

1. It is important for the company to train a member of the community on maintenance service, so that they are able to run the project even if the company closes down.
2. The company should open communication with community to iron out the unresolved issues. The company should take the initiative to train communities who manage their projects.
3. The elected members to manage the project should be equipped with relevant management skills to ensure the projects run smoothly.

5.6 Areas for Further Study

There is need to assess how community members can get benefits accruing from the community project.

Another area of research is to assess to what extent the automated water projects can be replicated to other needy communities.

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APPENDIX 1: LETTER OF INTRODUCTION

University of Nairobi

College of Extra Mural Studies

School of Continuing and Distance Education

Nairobi

To whom it may concern

Dear Sir/ Madam,

Re: Academic Research

I am a post graduate student of Nairobi University pursuing a Masters Degree in Project Planning and Management. Am conducting a research on sustainability of water projects run by Grundfos lifelink-Katitika Water Project.

Your project has been chosen to provide information relating to issues of sustainability of water projects.

I hereby request you to kindly fill the enclosed questionnaire as accurately as possible. The questionnaire has four sections that will focus on Economic status of community, technology and innovations, project management and maintenance service. The information that you will give is confidential and will be used only for the purpose of my academic research. Thank you in advance.

Jane Mbatha

APPENDIX II: Questionnaire (Community project members)

Please answer these questions to the best of your knowledge

Write your responses in the spaces provided. Please put a tick (✓) where appropriate.

Section A: Background information

1. Gender

Male () Female ()

2. Are you a member of the water project?

Yes () No ()

3. How long have you been a member?

(a) Less than one ()

(b) 1 to 5 years ()

(c) 6 – 10 years ()

(d) Ever since it began ()

4. Age

(a) Under 25 years ()

(b) 30 – 35 years ()

(c) 30 – 35 years ()

(d) Over 35 years ()

Section B: Financial Status of the community

5. In your opinion indicate how you view the current funding of the water project.

a) Excellent

b) Good

c) Fairly good

d) Poor

6. Did you contribute any membership fee?

Yes No

7. Do you think it was a fair amount to pay?

Yes No

8. Do you have a mobile phone?

Yes No

9. What do you use to charge your phone ?

Electricity Solar energy

10. Do you pay to have your phone charge?

Yes No

11. How do you rate the charges?

Too high

Moderate

Fair

12. Are M-pesa agents available?

Yes No

13. Are they always open?

Yes No

If no what is your alternative.....
.....

14. Are non-members allowed to draw water?

Yes No

15. Is use of Mpesa Expensive?

Yes No

Section C: Maintenance services

16. Has the project ever broken down?

Yes No

17. How many times does it breakdown in a month

One

Twice

Frequently

Rarely

18. Who repairs?

Company

Trained member

Hired artisan

19. How fast is the company's response?

Same day

After two days

Same week

20. Have you ever gone without water?

Yes No

If yes for how long and why?.....

Section D: Management systems

21. Do you have a committee?

Yes No

22. Who constituted the committee?

Company

Community

Volunteered

23. How was the committee constituted?

Elected Appointed

24. Do they call meetings of project members?

Yes No

25. Do you trust the committee members?

Yes No

26. Are the committee members transparent?

Yes No

27. Are there conflict in the management?

Yes No

28. Is the committee able to deal with the conflicts?

Yes No

29. How are decisions about the project arrived at?

a) Through consultation

b) Chairperson's ruling

c) Others

30. Were you trained on how to use this technology at the water point?

Yes No

If yes who organized the training?

i) Company

ii) Community

iii) Any other

Section E: Technology and Innovation

31. Are you comfortable using this technology

Yes No

If no explain why.....

.....

32. Can you come to draw water on your own?

Yes No

33. Is there someone to assist always at the water point.

Yes No

34. Are you able to top up your key fob?

Yes No

If no who assists you.....

35. What do you think of the M-pesa charges?

a) Too high

b) Moderate

c) Fair

36. Does the project have a bank account?

Yes No

37. Are you usually updated on the account balance?

Yes No

If yes how frequently.....

38. Who pays for maintenance fee?

Proceeds from project

Company

I don't know

Government

Section F: sustainability

If the company pulled out of the project will you be able to sustain it?

Yes No

Appendix III: Questionnaire (opinion leaders)

Chief, subchief, village head

Instructions

Please put a tick where appropriate

Use the space provided to fill in your answers

Section A: Background information

1. What is your gender?

Male Female

2. How long have you been in your position?

Less than one year

1-5 years

6- 10 years

Over 10 years

3. Please indicate your age?

a) Under 25 years

b) 25 – 30 years

c) 30 – 35 years

d) Over 35 years

Section B: Financial status of the community

4. In your opinion indicate how you view the current funding of water project?

a) Excellent

b) Good

c) Fair

d) Poor

5. In your opinion how do you rate accountability of this project?

Poor

Fair

Good

Excellent

SECTION C: Technology and innovation

6. What do you think of this technology?

1. Appropriate

2. Moderately appropriate

3. Inappropriate

7. Do you think it enhances accountability?

Yes No

If no explain why.....

.....

Section D: Management systems

8. Do you think there is need for community committee?

Yes No

9. How frequently do they meet?

a) Hardly ever meet

b) Monthly

c) Quarterly

d) When need arise

10. How is the committee constituted?

a) Appointment

b) Electron

c) Volunteer

11. These are some of the factors affecting water sustainability. Please indicate the extent to which they influence the sustainability.

1) To great extent

2) To some extent

3) Moderately

4) Moderately

5) I don't know

Economic status	1	2	3	4	5
Management					
Technology and innovation					
Maintenance services					

Section E: Financial Status of the community

12. Do you think this technology is too expensive?

Yes No

13. What can be done to reduce the expense?

.....

14. Are there people who are unable to member themselves?

Yes No

Where do those who cant afford a phone get water from?.....

End

Appendix IV: Questionnaire (Committee members)

Please answer the questions to the best of your knowledge

Please put a tick where appropriate

Section A: Background Information

1. Gender

Male Female

2. What leadership position do you hold in the project?

Chairperson

Secretary

Treasurer

Any other

3. How long have you been in that position?

a) Less than one year

b) 1- 5 years

c) 6 -10 years

d) Over 10 years

4. Age

a) Under 25 years

b) Between 25 – 30 years

c) Over 35 years

5. How long has the project been in operation?

a) Less than one year

- b) 1- 5 years
- c) 6 – 10 years
- d) Over 10 years

6. How many members does the project have?

- Less than 500
- More than 1000

B: Financial status of the community

7. Is there membership fee?

- Yes
- No

8. Does the project have money saved for maintenance?

- Yes
- No

9. It is difficult to sustain the project due to lack of funds. To what extent do you agree with this statement.

- 1. Strongly agree
- 2. Agree
- 3. Neutral
- 4. Disagree
- 5. Strongly disagree

10. In your opinion how do you think the project funds are used?

- 1. Poorly
- 2. Fairly well

3. Very well

Section C: Maintenance services

11. Does the project require occasional repairs?

Yes No

If yes, who does the repair?

1. Company

2. Project

3. Trained Community members

4. Hired artisan

12. How is the response from company?

Same day

Two days

Not respond

13. Were the members trained on the technology?

Yes No

If yes who trained them.....

Section D: Management systems

14. How frequently does the committee meet?

1. Weekly

2. Monthly

3. Quarterly

4. Annually

5. When need arise

15. As a project leader, have you ever trained on how to manage projects?

Yes No

16. Who facilitated the training?

1. Government

2. Company

3. Community

17. How do you arrive at decisions?

1. Consulting member

2. Voting

3. Chairperson ruling

4. Any other.....

18. Are there conflicts in your project?

Yes No

19. How do you resolve your conflicts?

Section E: Technology and innovation

19. Do you think this technology is appropriate for the community?

Yes No

20. Do you ever run out of water because of lack of energy?

Yes No

If yes how frequently.....

21. Is the technology too expensive for the community?

Yes No

22. Are all members able to draw water from the water point without help?

Yes No

23. Does the technology make work easy for the people?

Yes No

Section F: Sustainability

24. If the company pulled out of the agreement would you be able to sustain the project

Yes No

END