

**DETERMINANTS OF THE SUSTAINABILITY OF ALPHIA PLUS WATER
PROJECTS IN PUBLIC PRIMARY SCHOOLS IN MANGA SUB-COUNTY NYAMIRA
COUNTY, KENYA**

BY

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**A Research Report Submitted in Partial Fulfillment of the Requirement of the Award of
the Degree of Master of Arts in Project Planning and Management of the University of
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DECLARATION

This research Project Report is my original work and has not been presented to any other examination body of higher learning .No part of this report should be reproduced without my consent or that of the University of Nairobi.

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DEDICATION

This project is dedicated to my loving husband Hezron Onyono, my loving mother Jemimah Bosibori , my children the late Dancan, Edna, Peris, Annette, Deborah, Seth, Trizah and Malachi. My nephews Omwansa, Eric and Benjamin . My sisters Juliah and Ceciliah and my brothers Peter Mosomi and Playon for their support to my work.

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LIST OF ABBREVIATIONS AND ACRONYMS

NGO	:	Non – Governmental organizations
AWPs	:	AphiaPlus Water Projects
PPS	:	Public Primary Schools
MSC	:	Manga sub-county
NC	:	Nyamira County

ABSTRACT

Project Sustainability is a desire of every community, private agency or Government as a means of ensuring that positive gains are delivered to the target communities in long term. This phenomenon was brought to focus in this study based on water projects that aim at improving the quality of life of community water users. The implementation of such projects is always easier but their sustainability poses a challenge. The purpose of this study was to determine the determinants of the sustainability of AphiaPlus water projects in Public Primary Schools, in Manga Sub-county. The study sought to answer the following specific objectives: to assess the influence of training in public primary schools, to determine the influence of technology used in extraction of water in public primary schools and to determine the influence of capital contribution on the sustainability of Aphia Plus water in Public primary schools. The study adopted a descriptive research. The study was based on Public Primary schools in Manga Sub County. The target population was 200 teachers and pupils from all Public Primary schools in Manga Sub County. The sample size of the study was 60 respondents using simple random sampling technique. The primary data was edited, coded and descriptively analyzed using the Statistical Package for Social Sciences (SPSS) and presented in as percentages and frequency tables. The study established that sustainability of various types of water supply infrastructure is dependent upon the degree to which the technology used corresponds to the needs of the local community and the community's ability to maintain and repair it over time. Considering the non-functional state of most manual hand pumps in the county, it is apparent that efforts need to be made to ameliorate the situation. The study established that solar system is one of the technology used in extraction sustainability of water in public primary schools. The study determined that the factors responsible for the non-functioning of boreholes range from extreme low yields, inability to raise funds to acquire spare parts, to lack of access to spare parts. To sustain access to potable water, access to spare parts needs to be improved. The study established that in rural community water supply, most national policies require a capital contribution from the users, either in-kind labor and local materials or, if in cash, in the region of five percent of the capital cost. This is rarely recovered however, and so improved services are by default a gift albeit often with some community participation in construction from the government or NGO to the community. The study recommended that Community training and education on technology used must be done for any alphia plus water project if it is to be sustainable. These trainings need to be frequent and an analysis on the education level of the schools should first be made in order to establish the most suitable language mode of training to use so as to assure effective transfer of knowledge from the trainer to the trainee. The study established that Project sustainability is of paramount importance for any project and especially for Alpha Plus water project and for that matter, schools should be made aware of the need of water projects to serve not only their pupils, but also future generations, hence take the necessary measures to ensure this. The study established that project location is equally important and schools should be involved in identification of the site for the project in order to encourage ownership in terms of protection and cleanliness of the site.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

According to Sean, (2007) projects are designed and implemented to meet specific goals and achieve desired change. A project as a set of coordinated activities with a specific start and finish time, pursuing a specific goal with constraints on time, scope and resources. Some projects require that their activities be sustained over time to ensure continued flow of outputs and hence achievement of the desired change which could be social, cultural or economic. Implementation of most projects may be successful but their sustainability may be a challenge. According to Hurtton et al (2007) water is the most important natural resource, indispensable for life and at the same time the backbone for growth and prosperity for mankind. The General Assembly of the United Nations drew critical attention to the importance of water to sustainable development and poverty alleviation by declaring 2003 The International year of Fresh water with one of its aims being to reassert the Millennium Development Goals target for water of reducing by half the proportion of people without the access to safe drinking water and stop the unsustainable exploitation of water resources.

Water is a natural resource that is necessary for sustenance of life, ecological systems and a key resource to social and economic development. Governments, Non-governmental organizations, local and international organizations from all over the world have implemented water projects to promote safe rural water supply and sanitation over the years. However in most project areas there is lack of sustainability of these water infrastructures and water supply systems as most of the communities don't own the projects, Harvey and Reed, (2007).

Despite there being a universal recognition for the importance of safe water in poverty alleviation and socio-economic development globally, the access to safe drinking water remains low and this are attributed to many water supply systems not being sustainable. Smith and Marin (2005) states that worldwide, about two million people struggle daily for access to safe and sufficient water. In the entire world, Africa is the region that suffers most from inadequate access to water supply with only 62% of its population having access to potable water supply. Furthermore, 55 of the countries in the world whose domestic water supply is below 50 liters per capita per day, 35 of them are in Africa, Yahaya(2004). The Republic of Kenya in 2007 estimated

that piped water coverage provided by Ministry of Water and Irrigation in 2007 stood at 47% nationally.

According to Nerubucha, (2011), Kenya is a water scarce country and it is therefore important to ensure that water resources are continuously monitored, assessed and evaluated in order to plan for water security. It is important to understand the climate and identify trends. It is clear that the water resources are unevenly distributed spatially in the country and hence the need for proper management Whittington, (2012). Failure to adequately manage water resources imposes huge costs on Kenya's economy as observed by Kinoti, (2010). According to the Ministry of Water and Irrigation, there are approximately 680 piped water systems that provide over 740,000 water connections throughout the nation. Additional 350 community run water schemes exist in the country. A great percentage of these connections are however inactive due to poor management and maintenance Republic of Kenya, (2007)

Water projects failure possess a problem that can be self-perpetuating. Vanloon, (2002) in their study on Water Evaluation and Planning System in Kitui, points out that bad experience on unsuccessful water projects in the past alienate people and make them likely to be hostile towards future initiatives. Projects implemented with funding limited to short term goals undermine capabilities of a local institution to sustain itself in long term. Hence in the case of water projects, community participation, their education and training on the technology used and how to use the water system and location of the water project are paramount for sustainability.

According to Harvey and Reed, (2007).)among the 24 million rural dwellers in Kenya about 10 million have access to improved water supply either through piped water or point source systems. Of those with access 30% of them are served by community based water supply schemes which are developed by self-helpgroups through donor support and government institutions. The groups study further reveals that most of these community based water supply schemes are inactive yet the government has continued to establish more water projects with little regard to rehabilitation of non-functioning ones. Community water projects in Manga Sub-County presents a typical case of rural community with water projects previously developed either through self-help groups with donor support or Government institutions like Municipal council of NyamiraCDF or largely by the external institutions through influential people from the community. Most of these water projects are deep dug boreholes, hand pumps, piped water or springs and are run by community project committees/ leaders.

Some projects mostly under the support of Manga Sub county have been reported to be successful and this has largely been enhanced through strategies integrated before completion of projects such as: Effective mobilization of communities through sensitization and training to achieve ownership; Collaboration with various stakeholders local government, local leaders, politicians and target communities; Application of appropriate technologies, Gender considerations that empower women to handle community projects; Capacity building and sensitivity to social-cultural factors in the communities. However the situation in the region still possess question of sustainability as most of the projects do not operate to full potential and some have broken down and not rehabilitated. It's due to this scenario that this study intends to assess the factors influencing sustainability of Aphia Plus water projects in public Primary Schools after external support is withdrawn, Uphoff, (2002).

According to Mwaniki and Kirimi (2005), Government Ministries and various organizations have carried out surveys to determine the school Water projects in Kenya. The surveys are conducted at various times and revealed that the burden to provide water at school frequently fell on the pupils as they often had to travel to fetch water resulting into stress affecting attendance and performance (Mwaniki, 2005). The findings of this study looked encouraging, however they are likely to mislead because the schools surveyed are those that had been part of a projects for three years and this study was to find out the sustainability of the program.

In Kenya, the school population has continued to grow since 2003 and there has been no corresponding expansion of physical facilities. According to (Mwaniki, 2005) on the water projects in schools, majority of schools were categorized as dangerous with Nairobi province being hardest hit with an average of 414 pupils /latrine in the worst schools. However, Nairobi Province has continued to perform better in KCPE examinations compared to others whose water projects were better yet literature support the relationship between water projects and performance. It is therefore important to have more studies to segregate the schools as rural, urban, private or public so as to inform proper policy review and resource allocation to school water projects.

1.2 Statement of the Problem

The proportion of people without access to water and sanitation by the year 2015 have been important in galvanizing global attention and support for water and sanitation. However such efforts that focus on expansion of new services run the risk of undermining the functional sustainability by encouraging rapid construction of infrastructure rather than long term, critically needed investments in operation and maintenance. What is urgently needed to stem the trend of disrepair and accelerate the progress in achieving MDGs, is a coherent focus on sustainability Elimelech, (2009). Ngetich, (2009) argues that most water projects did not function to full capacity and recommended for more study to be done on the influence of project location on sustainability of water projects, Kainda, (2012) established that school's contribution and awareness were paramount to water projects sustainability but recommended for further studies in other parts of the country on factors influencing the sustainability of Aphia Water Projects in order to bring a generalization of the findings.

Schools are places where children actively stay for most of the day time and therefore for healthy and conducive learning environment, children need safe water for drinking and hand washing, and safe and friendly-to-use sanitation facilities. Improved health and quality learning is not possible without adequate water and sanitation facilities in schools. School children who have no access to safe water and sanitation have more chances to suffer from water and sanitation related diseases. Lack of safe water and sanitation facilities turn schools into unsafe places where diseases are transmitted with mutually reinforcing negative impacts on the children, their families, communities and overall development including academic performance. Limited or poor quality toilets as well as inaccessibility to clean and adequate water in many schools in Kenya increase girls' vulnerability to sexual harassment on their way to and from the toilet, force them out of school to search for water or jeopardize their special needs during menstrual periods, hence there should be more water projects in the area and around all the schools in Nyamira County.

According to Rimbera, (2012), lack of project sustainability due to low level of community awareness, approaches used by developers and lack of proper feasibility study but these Wawire, (2007) point out community participation, project location, training on technology used and community capital contribution as factors leading to lack of sustainability. There being water projects that are not functioning and others that need rehabilitation shortly after establishment in

Manga Sub-county, the researcher believes that this study will be of value in addressing the influence that schools participation, education and training on technology used and capital contribution as well as project location have on the sustainability of Aphia Plus water projects in Manga Sub county. Therefore this study intends to fill the knowledge gap on determinants of sustainability of water projects in Kenya with reference to Nyamira County.

1.3 Purpose of the Study.

The purpose of this study examined the determinants of the sustainability of Aphia Plus Water Projects in Public Primary Schools in Nyamira County.

1.4 Objectives of the Study

The study was guided by the following objectives:

1. To assess the influence of training of the sustainability of Aphia Plus Water in public primary schools in Nyamira county.
2. To determine the influence of technology used in extraction sustainability of water in public primary schools in Nyamira county.
3. To determine the influence that school's capital contribution has on the sustainability of Aphia Plus Water Project in Manga Sub-county.

1.5 Research Questions

The study answered the following research questions:

1. To what extent does training influence the sustainability of Aphia Plus water in public primary schools in Nyamira County?
2. What is the influence of technology used in extraction of sustainability of water in public primary schools in Nyamira County?
3. How does the school's capital contribution influence on sustainability of Aphia Plus Water Project in Manga Sub-county?

1.6 Significance of the Study

This research study was of great benefit to the development schools of Nyamira county as it provided them with information on the influence that community participation, training on technology used in these projects, community capital contribution and water projects location have on water projects sustainability. The findings of this study provided information that was used by government in the formulation of policies that promoted initiatives that were more

sustainable. This study was important to academic researchers, scholars and research organizations who wished to carry out further studies in this area as it provided them with the information that served as a basis for their studies. It was useful to individual researchers as facilitated them to identify gaps for further studies.

1.7 Limitations of the Study

The researcher postulated the following limitations; the key informers would not be willing to disclose all the necessary information due to conflict of interest but this was overcome by the researcher visiting and explaining the rationale of the study to all respondents prior to data collection which enabled her get all information required from them. Personal administration of the questionnaire by the researcher also helped overcome the limitation of low literacy level of most community water users as the researcher was able to explain to them the questions as they gave answers. Time needed to cover this county and financial constraints was among the challenges encountered in this study.

1.8 Delimitations of the Study

This study narrowed to Nyamira County, because the County has many water projects that do not operate to their full potential. This was considered as an appropriate area of study because of the existence of key informers such as Local Leaders and the fact that most of the community water users are natives in the 18 Public Primary School who were well versed with their areas as well as the projects therein. The study was considered the influence of training, influence of technology and influenced that school's capital contribution has on the sustainability of Aphia Plus Water Project in Manga Sub-county.

1.9 Basic Assumptions of the Study

In conducting this study, the researcher assumed that the respondents taking part in this study was willing to answer all the questions with all honesty and to the best of their ability and knowledge, the researcher also assumed that training, technology, school's capital contribution had influence on the sustainability of Aphia Plus Water Project.

1.10 Definations of significant terms

Project	:	An undertaking that has an objective of meeting human needs and aspirations and with specific scope, budget and time frame.
Sustainability	:	Ability of a water project to continuously provide water to the community water users both in the current and future generations.
Technology	:	is the collection of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.
Training		is teaching, or developing in oneself or others, any skills and knowledge that relate to specific useful competencies.
School capital contribution		the total amount of cash, cash equivalents, and the Agreed Value of any Property or other asset.
Independent Variables		variable that is changed or controlled in a scientific experiment. It represents the cause or reason for an outcome
Dependent Variables		is the variable being tested and measured in a scientific experiment

1.11 Organization of the study

Project sustainability in this study is noted to be of paramount importance as it enables the beneficiaries to enjoy the outcomes of the project over time, the aspect on which most water projects fail. The study intended to elaborate the determinants of the sustainability of alpha plus water projects with a specific focus on community water projects in Manga sub-county . The study is therefore organized in chapters each elaborating a different topic. Chapter one gives the introductory part of the study, elaborating the existence of the determinants of sustainability of alpha plus water projects globally, regionally and locally. It gives the objectives, purpose and significance of the study, its limitations and delimitations as well as the assumptions under which the study was conducted and definition of significant terms as was adopted by this study. Chapter two looks at literature review. In this, literature related to the purpose of study was reviewed under five themes, project sustainability; community participation, community education and training on technology used in construction of water projects, project location and community capital contribution. It also gives a summary of the literature reviewed and the conceptual framework of the study. Chapter three elaborates the research methodology the researcher used in conducting this study. It explains the research design, target population, sample size and sampling techniques used, the research instrument; its validity and reliability and the data collection and analysis tools that were used in the study. Chapter four looked at data analysis, presentation and interpretation. Data was analyzed and summarized in line with the purpose and objectives of the study and presented in form of frequency tables and percentages. Chapter five outlines the findings of this study and their relationship with the relevant objectives of the study and describes how the determinants sustainability of Alpha plus water projects . It gives the recommendations of the researcher in regard to the findings as well as the conclusion and contributions that this study can make to determine future research directions are also highlighted.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss the literature related to the determinants of sustainability of water projects in different parts of the world cascading down to Nyamira County. It includes findings of related studies undertaken by other researchers. Literature for this study will be reviewed under three themes; influence of training of the sustainability of Aphia Plus Water in public primary schools in Nyamira county, influence of technology used in extraction sustainability of water in public primary schools in Nyamira county and influence that school's capital contribution has on the sustainability of Aphia Plus Water Project in Nyamira County.

2.2 Alpha Plus Water Projects in Public Primary Schools

In Kenya, the introduction of Free Primary Education (FPE) in 2003 resulted in a rapid increase in the number of children in primary schools, placing severe strain on school infrastructure and facilities which were already inadequate. The school population rose from 5.9 million pupils in 2002 to 7.2 million in 2003, to 8.2 million pupils in 2007. Kenya has over 18,000 public primary schools and a large number of non-formal schools offering primary school curriculum .The Ministry of Education, in collaboration with the Ministry of Public Health and Sanitation and other partners, developed a National School Health Policy and National School Health Guidelines in 2009. The National School Health Guidelines are aimed at operationalizing the National School Health Policy by providing specific guidelines which ensures that school age

children, teachers, support staff and community members access quality and equitable services for improved health, Len Abrams, (2003).

Donor support in Schools has been remarkable with UNICEF as a key partner within the Schools sector in Kenya. The Government of Kenya/ UNICEF Program (2008-2013) funded by the Government of the Netherlands includes WASH projects in over 780 schools in 22 districts. According to the MoE Basic Report on Spatial Analysis of School Mapping Data, the national pupil to toilet ratio (2007) is indicated as 38:1 and 32:1 for boys and girls in public schools, respectively (MoE, Feb 2011). These ratios are generally thought to be inaccurate. Additionally, there is no reliable information on the condition and usability of the available facilities. School WASH in Kenya has been prioritized in several policies, plans and laws have evolved. Sessional Paper No.1 of 2005 ultimately aims at expanding access, equity and improving educational quality in the country. United Nations Convention on the Right of the Child (UNCRC, 1989) and African Charter on the Rights and Welfare of the Child (ACRWC) as enshrined in the Children Act (2001) outline four pillars of Child Rights as Survival, Development, Protection and Participation Rights. UNCRC Specifically gives young people the right to preventive healthcare and calls for specific protection for those in difficult situation or living with disabilities. Kenya's Children Act (2001) states that "Every child shall have a right to health and medical care, the provision of which is the responsibility of the parent and the government". International Conference on Population and Development recognizes health as a fundamental human right to which all people including school children are entitled. National Health Sector Strategic Plan, Kenya's blue print in healthcare provision as well as the Kenya Educational Sector Support Programmes, emphasize the need to re-think health and education of school children.

2.3 Concept of Project sustainability

Sustainability as a concept in development projects is dated to 1980s and defining development and sustainability has been difficult. Brundtland, (2002) however defined sustainable development as "one that meets the needs of the present without compromising the ability of future generations to meet their own needs". This means that a sustainable project must meet the present as well as the future human needs and aspirations. It must be one whose outputs and services are maintained continuously over time and keeps that focus with its original goals and

objectives. Projects are designed and implemented to achieve certain set goals. Some projects require that their activities be sustained over time to ensure continued flow of set outputs hence achieve desired change that could be social, cultural or economic. Water projects are implemented to ease accessibility of the community members to clean water and hence improve their well-being. Implementation of these projects is always successful but their sustainability poses a challenge.

Sustainability is a problem which faces almost all development, in industrialized countries as well as in the developing ones. In recent years the debate took on new urgency through the adoption of Agenda 21 at the Earth Summit conference in Rio de Janeiro in June 1992. In the global debate sustainability was considered primarily in terms of continuing to improve human well-being, whilst not undermining the natural resource base on which future generations will have to depend Len Abrams, (2003).

Mulwa (2004), points out that sustainability concerns around projects at community level encompasses different dimensions that include; social and ability of a project to restore peoples sense of worth, dignity and self-belief, economic ability of the local people to identify, procure and use available resources-whether human or material and have no or limited dependency on external, environmental , structural and organizational ,an effort of dominant institutions managing projects to become more responsive and sensitive to local needs and aspirations) as well as technological an effort to develop appropriate technology and promote the use of indigenous knowledge sustainability. A sustainable project should be able to address all these dimensions.

2.3.1 Influence of training in sustainability of Aphia Plus water public primary schools

Human capacity development through specialized training of project managers, staff, community members and the whole project team has been noted to be important for project success and sustainability. Campo, (2008), in an intervention model introduced in Peru for water supply considered community training as an important component in which the project used various methods of training such as audio-visuals, visual etc., argues that training on issues like

operation and maintenance empower the school's community to look after water supply systems thus aiding sustainability.

Lack of training is cited as one of the factors which could lead to breakdown and non-sustainability of water supply projects in developing countries Ademiluyi and Odugbesan, (2008). They further point out that even where full community participation or management is planned from the start, community-level committees and care takers may lose interest or trained individuals may move away. This can be a particular risk if community level organization is on a voluntary basis. Mengesha, (2003) in their study on sustainability of drinking water supply projects in Rural of North Gondar, Ethiopia recommend that building adequate skills and capacity to maintain water sources is an essential factor to sustain the water system. The National Academy of Sciences, (2011) observes that competent operating personnel are vitally important for sustained and safe operation of small water systems. Accordingly, good operator training is as essential to improving small water systems as are improved technologies, organizational fixes or regulatory oversight. Without adequately trained personnel, even a well-financed and organized system with the most advanced technology and regular compliance visits will fail to reliably deliver safe drinking water to its customers with time. This agrees with observations by Campo, (2008) who argued that training on issues like operation and maintenance empower communities to look after water supply systems thus aiding sustainability. Community members must be equipped with the necessary knowledge on how to operate, repair and maintain the water supply system as this will enhance sustainability of the project.

According to Toole (2002), capacity building sessions to develop community awareness of water supply problems will increase local participation in developing and demanding a project that will satisfy the needs of the community. Technical training in construction, operation and maintenance will teach selected individuals' practical skills and may create an understanding and the sense of responsibility for water facilities in the beneficiary community and this enhances community ownership of water projects.

Campos (2008) in an intervention model carried out in Peru for water supply, considered community training as an important component in which the project used various methods of

training including audio-visuals. Campos emphasizes that training on issues such as operation and maintenance empower the communities to look after their water supply systems thus enhancing sustainability. In Ghana, capacity building of key actors in rural water delivery and management usually precedes the provision of the facilities. Capacities of the district assembly staff are strengthened through training and equipment supply e.g. computers, office supplies and motor bikes. All these are geared towards enhancing the district assemblies' role in improving community ownership of water projects in rural areas Fielmua (2011). Targeting teachers for training is critical to the ownership and sustainability of water projects, especially in technical and managerial roles to ensure they actively participate in decision making process this influences community ownership of projects Harvey and Reed, (2007).

2.3.2 Influence of technology used extraction in sustainability of Aphia Plus water in Public Primary School.

In a study conducted in rural India it revealed that approximately a third of India's hand pumps in rural water projects are either nonfunctional or in need of repairs. The largely publicly funded hand pump programme has been a remarkable success. Through the programme access to safe water increased from less than 10 per cent to 31 per cent. This achievement was a result of Non-Governmental Organizations, NGOs using technologies and pumps that require village level operation and maintenance. The Government of India created demand so that private companies stepped in to produce the hand pumps and spare parts. The also trained engineers and mechanics to use and repair these new technologies at the community level so as to enhance ownership of community water projects Mackenzie, (2005).

In Kenya , the factors responsible for the non-functioning of boreholes range from extreme low yields, inability to raise funds to acquire spare parts, to lack of access to spare parts. To sustain access to potable water, access to spare parts needs to be improved. Obsolete hand pumps should be replaced with modern ones to ensure easy access to spare parts in case of breakdowns. Community ownership of projects is influenced by the ease of operation and availability of spare parts for the technology incorporated in the water systems Fielmua,(2011).

According to Gleitsmann (2005) in a study conducted in Nyamira County ,sustainability of various types of water supply infrastructure is dependent upon the degree to which the

technology used corresponds to the needs of the local community and the community's ability to maintain and repair it over time. Considering the non-functional state of most manual hand pumps in the county, it is apparent that efforts need to be made to ameliorate the situation. Learning from previous development projects, the latest approaches are addressing the problems of limited availability of spare parts, absence of trained technicians at the local level and the limited role of women in the pump management scheme. These factors influence ownership of water projects by the beneficiary community Mwakila, (2008).

2.3.3 School's Capital Contribution on the sustainability on Aphia Plus Water In public primary school.

According to Boru, (2012), in rural community water supply most national policies require a capital contribution from the users, either in-kind labor and local materials or, if in cash, in the region of five percent of the capital cost. This is rarely recovered however, and so improved services are by default a gift albeit often with some community participation in construction from the government or NGO to the community. There is disagreement among practitioners about whether user cash contributions to capital costs help to cement community ownership of rural water supply systems and so contribute to sustainability.

However, there are cases in which a cash contribution to capital cost is raised but then ring-fenced for the water supply, for instance by putting it into an operation and maintenance account on behalf of the community. In this way it is of direct benefit to the users. The only approach to rural water supply in which the users pay the full capital costs of new or upgraded water points is self-supply. Rockstorm, (2003) notes that operation and maintenance water services worldwide costs money but insufficient funds limits the purchase and spare parts. He argues that External Agencies have been reluctant to finance operation and maintenance activities while Governments often accord it less priority yet the service users community water users who are the potential source of finance on the same, do not typically see water as a commodity for sale and so many a times they are unwilling to pay for it. Community capital contributions could take the form of community levies-where individuals or households in the community agree to contribute a given fee toward running and maintenance of the water system.

Reed, (2007), the contributions could also take the forms of donations from during harvest and fines paid by community members who break community rules. The community capital contributions collection could be affected or hampered by the methods used for the same. The researchers' observation is that most local communities are informal in nature and this makes most of the community projects lack basic procedures and processes of fund collection as they rely on mostly on voluntary labour of elected officials who operate in homes without official facilities. Such systems get low returns and this turns out to be threat to committees that carryout this exercise as some of them are insulted or dehumanized.

These systems also do not have clear accountability records and this may make doubt such systems making them draw back in contributions. Once a project cannot generate enough revenue from beneficiaries, its sustainability will be threatened as repairs and maintenance cannot be provided for when need arise. Misappropriation of funds collected as a result low or lack of professionalism may also contribute to poor maintenance and thus lack of sustainability.

2.4 Theoretical Literature

The conceptualization of the study was pegged on the theory that the core business of government is public service. The services can be provided either on the government's own accord or as a result of demands for their provision placed by the citizens (Alila, 2007). The provision of services to the public is not confined to the government only. The private sector, either on their own or in partnership with the government, can also provide services. In the course of the provision of the public services, interactions occur in various forms/nature and scope between the government, the private sector and the public through any or a combination of the following parameters: market liberalization, privatization, governance, public goods and services, development capital and policy implementation. The government, as a facilitator, a regulator and/or an implementer, still remains key to the provision of public services, especially public goods like water, electricity, education and health. It is in this respect, that the quality, nature and scope of the provision of a public service is bound to be influenced by the nature of interaction between the government, the private sector, other service providers, and consumers of the services. The study will be based on the following theories:-

2.4.1 Community participation theory

The most important process in any development project is the encouragement of the active participation of the local community. Without community participation it is not possible to determine what are the problems, constraints, and local desires for a give community. According to Harvey and Reed (2007) participation of project beneficiaries' ifs of great essence in that it enhances the sense of ownership among members. This is important in ensuring that water projects are operated and maintained after the implementation phase. Cohen and Uphoff's model regarding people's participation is chosen for this study. Community participation theory assumes that the higher the community participation in a decision, the less the likelihood of interferences of external organizations on that decision. In this theory focus is given on the participation of beneficiaries and not that of personnel from the implementing agencies in development projects. Community participation is attained through collaborative or joint involvement of project beneficiaries and the implementing agencies, Khwaja (2004).

2.4.2 Human Capital Theory

The study was based on the Human Capital Theory proposed by Theodore W. Shultz in 1961. The theory looked at human beings as a form of capital, as a means of production and as the product of investment usually in education and health. The theory therefore links to the study in the promotion of investment in education and health of primary school pupils through investment in school WASH programs. The theory however did not identify specific aspects of education and or health for prioritization that gives quick win results. The study therefore seeks to generate information that will justify School WASH programs as one such area that should be given more focus by school managers, policy makers, donors and stakeholders.

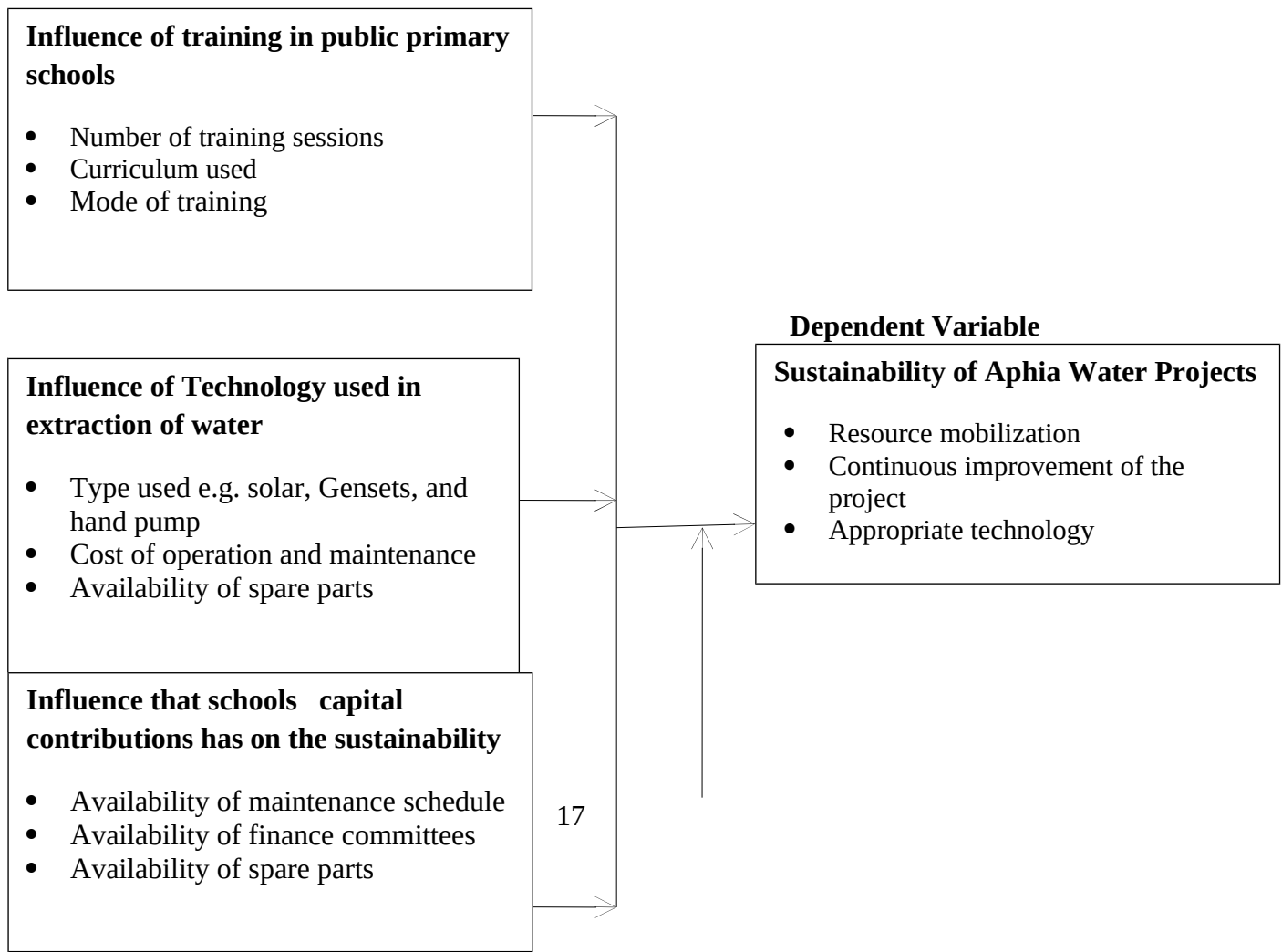
This theory is guided by a number of principles. For example, it asserts that investing in education equips individuals with knowledge, skills and attitudes that are necessary for development. Ideas from this theory has influence in education policies of many governments in different parts of the world and many governments have drawn from this to give greater priority in investing in education with the belief that this brings about economic and health benefits for both individuals and societies (Little 1999) as quoted in (Otieno, 2011). The researcher, based on this theory collected information from rural primary schools that established the extent of investment in school water, sanitation and hygiene and relate this to pupils' performance. From

literature reviewed it has been confirmed that despite its importance in reducing cases of diarrhea, increasing retention, enrolments School WASH has not got a fair share of resources as indicated by the surveys conducted especially by the Ministry of water and Irrigation in 2003 as quoted in (Mwaniki, 2005) showing how many schools fall below the recommended pupil: latrines ratios. Major investments in education are in teaching staff, learning and teaching materials and classrooms. It is therefore important to appreciate that improved health and quality learning are not possible without water

2.5 Conceptual Framework

This provides the structural narrative description of the relationship between the variables forming the concepts of the study on sustainability. This framework illustrates the possible underlying factors that influence sustainability of school of Aphiawater projects. It shows project sustainability as the dependent variable, which the study tries to explain how it is influenced by independent variables

Independent Variable



Moderating Variables

- Government Policy
- Attitudes of community members
- Weather

Figure 1 Conceptual Framework

In the conceptual framework the independent variables include Influence of training in public primary schools , Influence of Technology used in extraction of water and Influence that schools capital contributions has on the sustainability . The dependent variable is the Sustainability of Aphia Water Projects. This shows how the independent variables relate with the dependent variables, the training , technology and schools capital influence the sustainability of Aphia water Projects in public primary schools .

2.6 Research Gap

Without the interest and support of the target beneficiaries using the system, no project will succeed. This study will adopt the community participation theory which is considered appropriate for this study because community participation in decision making, implementation, operation and maintenance of development projects influences schools ownership which in turn enhances sustainability of development projects. From the literature reviewed such a study has never been conducted in Manga sub-county. This study will contribute towards the bridging of the knowledge gap.

2.7 Summary of literature reviewed

Baker, (2000) asserts that despite the billions of dollars spent on development assistance year after year, there is very little known about the actual impact of projects on the poor and this implies that sustainability of such development is still a great challenge. External support often does not consider post impact evaluation of the projects. The literature reviewed reveal that in spite of what is known about the value of enhancing sustainability and what has been instituted by different institutions, there are still indicators of poor and even no sustainability. This means

that further studies can unearth some of the factors that contribute to this. It emerges from the reviewed literature that are established to provide beneficial effects access to clean water to the target communities. However there is little that has been done regarding influence of community participation, community education and training on technology used, project location and community capital contribution on project sustainability. Literature reviewed reveals the need for further studies on the factors that influence sustainability in order to achieve generalization of results.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology the researcher used in order to answer the research questions. According to (Mugenda and Mugenda 1999), research methodology outlines the techniques, methods and tools used in data analysis and how to arrive at sample size. It covered research design, target population, sample size and sampling techniques, research instrument, it's validity and reliability, data collection procedures, data analysis and presentation methods.

3.2 Research Design

Research design ensures that the research is relevant to the problem and is an economical procedure for acquiring information (Coopers and Schindler, 2003). Descriptive research design was used in this study. Descriptive research was considered most appropriate because subjects are normally observed in their natural set up and can result in accurate and reliable information

(Britt, 2006). The descriptive survey research aims at describing phenomena or narrating how various behaviors and events occur and the researcher has no control over the variables but can only report what is happening or what has already happened.

3.3 Target Population

This study was conducted in 4 public primary schools in Manga Sub-county, Nyamira County. The target population was all teachers in primary schools, all head teachers and all deputy head teachers or Heads of Department (HODs) and Std 8 pupils. The total targeted population number was 200.

3.4 Sample size and Sample selection

First the schools were stratified and then a simple random sampling was taken to pick the respondents which comprised of 30% of the total. Gay & Mills (2005) advocates that a sample size of 30% of the target population for small population ($N < 1000$) is regarded as adequate for generalization of findings. The teachers were randomly selected to respond to the questionnaire. Out of 200 respondents only 60 respondents was selected.

Table 3.1 Sample size

No	Name of school	No of teachers & pupils	30 % (sample)
1	MORAKO	50	15
2	NYAGECHENCHE	25	8
3	TOMBE	75	22
4	GEKANO	50	15
TOTAL		200	60

3.5 Data Collection Instruments

The researcher used questionnaires as a tool for collecting data. A questionnaire is a collection of items to which the respondents are expected to react to usually in writing. Both open-ended and closed-ended questionnaires were used to collect both quantitative and qualitative data.

3.5.2 Piloting of the study

The researcher tested the data collection tools before actual data collection to ensure that the questions in the questionnaire were answerable and that they provided answers to the research questions. This was done by selecting a school at random then selecting four pupils to test the questionnaire. The decision to select four pupils to test the questionnaire was guided by Taylor et al (2008) who recommended that a sample of three to four is better than no piloting at all. The researcher tested for the appropriateness of the wording, the adequacy of questions in relation to the research and time needed to fill each questionnaire. The data collected from the pilot was processed and analyzed to check if it yields appropriate results. Correction of the questionnaire was where necessary.

3.5.2 Validity of Research Instruments

The validity of the research instruments was done by the use of experts, my supervisor validated the instruments. The supervisor ascertained its face validity before it was taken to the field to collect data.

3.5.3 Reliability of Research Instruments

In order to ensure validity and reliability, the questionnaires will be composed of carefully constructed questions to avoid ambiguity and to facilitate collection of relevant answers to all the research questions. The questionnaires will then be pre-tested in a pilot study through a sample of 4 of selected sample schools in a neighboring sub-county to avoid respondent contamination (Kothari, 2003), after which corrections and adjustments will be done, this will be ensured reliability. The researcher used split half method to test reliability of the research instrument. The questionnaires were tested in four randomly selected schools (Morako, Nyagechenche, Tombe and Gekano) in the County. Pearson Moment Product Coefficient was determined and the results used to determine Correlation Coefficient that was found to be 0.879 which was above the recommended one of 0.7, (Bobbie, 2002).

3.6 Data Collection Procedure

The researcher got permission from the authorities of the schools that were visited for data collection. An introductory letter from the University of Nairobi as proof of the need to carry out this research was presented to the authorities.

3.7 Data Analysis and Techniques

According to Tabachnick and Fidell, (1983) suggest that data abnormalities may lead to an inaccurate analysis and caution in scrutinizing data for these abnormalities is a prerequisite for mature analysis. Thus, problems of missing data, outliers, multi-co linearity and violations of statistical assumptions was diagnosed and corrected before applying statistical procedures. Data collected through the questionnaires was edited, coded and descriptively analyzed using the Statistical Package for Social Sciences (SPSS) and presented in as percentages and frequency tables.

In addition, a multivariate regression model was applied to determine the relative importance of each of the three variables with respect to Sustainability of Aphia Plus water . Multiple regressions is a flexible method of data analysis that may be appropriate whenever quantitative variables (the dependent) is to be examined in relationship to any other factors (expressed as independent or predictor variable). The regression model was as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon$$

Where:

Y = Sustainability of Aphia Water

β_0 = Constant Term

β_1 , β_2 and β_3 , = predictor variables

X1= Influence of training

X2= Influence of Technology used in extraction of water

X3= Influence that schools capital contributions has on the sustainability

ϵ = Error term

3.8 Ethical Considerations

This is the part of a philosophy which dealt with one's behavior and guides ones character (Mugenda and Mugenda,1999) .For the study to be successful the researcher followed the guidelines to ensure that the respondents and the researcher relate well. Plagiarism was very much avoided but only referencing other people's material. The work was done with trustworthiness, integrity faithfulness and honest in data collection, analyze and implementation.

CHAPTER FOUR

PRESENTATION OF FINDINGS, ANALYSIS, AND INTERPRETATION

4.1 Introduction

This chapter presents the research findings which have been analyzed and interpreted under thematic sub sections in line with the study objectives. The sub sections include: response rate of the study, demographic characteristics of respondents influence of training of the sustainability of Aphia plus water , influence of technology used in extraction sustainability and the influence of the school's capital contribution has on the sustainability of Aphia Plus water.

4.2 Questionnaire Return Rate

This section presents the rate at which questionnaires were returned for the different categories of respondents that took part in the study. Quantitative primary data was collected through administration of questionnaires to Headteachers, Deputy headteachers and pupils in class 8 in four different primary schools. Out of the 200 respondents targeted, 150 (75%) responses were obtained. This response rate was achieved because pupils were sampled in their own classroom during school time and only those present on the day of interview were sampled to respond to questions.

Table 4.1 Response Rate

Response rate	Frequency	Percentage
Response	150	75
No Response	50	25
Total	200	100

4.3 Demographic Characteristics of Respondents

This section describes the demographic characteristics of respondents involved in the study. In this case only the distribution of their gender and age are presented.

4.3.1 Gender of Respondents

The respondents were asked to state their gender by the researcher. This was because water, sanitation and hygiene issues affect boys and girls differently and it was important to record if managers of schools and the stakeholders considered this while budgeting for project programs. The results are as presented in table 4.1 below:

Table 4.1 Distribution of Respondents by Gender

Gender	Morako		Nyagechenche		Tombe		Gekano	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Male	30	60	20	67	15	38	25	83
Female	20	40	10	33	25	62	5	17

Total	50	100	30	100	40	100	30	100
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Out of the 150 respondents who participated in the study, male were 60% from Morako, 67% from Nyagenchenche, 38% from Tombe and 83% from Gekano and female were 40% from Morako, 33% from Nyagenchenche, 62% from Tombe and 17% from Gekano. These frequencies found out that males were more than female, hence the gender was distributed equally.

4.3.2 Highest Level of Education

Table 4.2 Distribution of Respondents by level of education

Level of education in	Morako,		Nyagechenche,		Tombe,		Gekano	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Primary	10	20	5	17	15	38	10	33
Secondary	10	20	10	33	5	13	5	17
College	15	30	8	27	10	25	6	20
University	15	30	7	23	10	25	9	30
Total	50	100	30	100	40	100	30	100

Data indicated that primary level there were 20% in Morako, 17% in Nyagechenche, 38% in Tombe and 33% in Gekano, secondary were 20% from Morako, 33% from Nyagenchenche, 13% from Tombe and 20% from Gekano, College 30% from Morako, 27% from Nyagechenche, 25% from Tombe and 20% from Gekano, University 30% from Morako, 27% from Nyagenchenche, 25% from Tombe and 30% from Gekano, University were 30% from Morako, 23% from Nyagechenche, 25% from Tombe and 30% from Gekano. This shows that the questionnaires were well distributed and equal to all levels of education.

4.3.3 Work Experience

Table 4.3 Distribution of Respondents by working experience

Work experience	Morako		Nyagechenche		Tombe		Gekano	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
0-3 months	5	10	7	23	10	25	9	30
1-3 yrs	10	20	8	27	5	13	6	20
3-5 yrs	20	40	10	33	15	38	5	17

5 yrs& above	15	30	5	17	10	25	10	33
Total	50	100	30	100	40	100	30	100

It can be seen that majority of the respondents 0- 3 months were 10% from Morako , 23% rom Nyagechenche , 25% from Tombe and 30% from Gekano , 1-3 years were 20% from Morako , 27% from Nyagechenche , 13% from Tombe and 20% from Gekano , 3-5 yrs were 40% from Morako , 33 % from Nyagechenche, 38% from Tombe and 17% from Gekano finally 5yrs and above were 30% from Morako , 17% from Nyagechenche , 25% from Tombe and 33% from Gekano. The results of the study confirm that most of the respondents had a very high experience hence they are of high integrity of Alpha plus water projects in schools.

4.4 Influence of training of the sustainability of AphiaPlus Water in public primary schools

Table 4.4: Influence of training of the sustainability of Aphia Plus Water

Effects	Very high 5	High 4	Moderate 3	Very low 2	Low 1	$\sum f_i$	$\sum f_i w_i$	$\frac{\sum f_i w_i}{\sum f}$
Mode of delivery	50	20	30	10	40	150	480	3.2
Language	30	20	20	50	30	150	420	2.8
Background of the facilitator	40	20	30	10	50	150	370	2.5
Choice of trainer/gender	20	30	50	40	10	150	460	3.1

From the data shown on table 4.4 it showed that mode of delivery had a mean of 3.2 and was given more weight, Choice of Trainer/gender at 3.1, language with mean of 2.8 and

Background of the facilitator a mean of 2.5 . This shows that mode of delivery had an influence of training of the sustainability of Aphia Plus Water in schools in Manga Sub county.

4.5 Influence of technology used in extraction sustainability of water in public primary schools

Table 4.5 Technology used in extraction sustainability of water in public primary schools

Effects	Very high 5	High 4	Moderate 3	Very low 2	Low 1	Σf_i	$\Sigma f_i w_i$	$\frac{\Sigma f_i w_i}{\Sigma f}$
Solar System	10	50	40	30	20	150	450	3.0
Gravity System	25	30	25	50	20	150	440	2.9
Generators	10	25	30	35	50	150	360	2.4
Hand pump	20	15	50	40	25	150	415	2.7
Rope and Bucket	5	25	60	20	40	150	345	2.3

From the data shown on table 4.5 it showed that mode of solar system had a mean of 3.0 and was given more weight, Gravity system at 2.9 , Hand pump a mean of 2.7, Generators had a mean of 2.4 and Rope and bucket a mean of 2.3. This shows that solar system is one of the technology used in extraction sustainability of water in public primary schools.

4.6 Influence that school's capital contribution has on the sustainability of Aphia Plus Water Project.

Table 4.6 Influence that school's capital contribution has on the sustainability of Aphia Plus Water Project.

Effects	Very high 5	High 4	Moderate 3	Very low 2	Low 1	Σf_i	$\Sigma f_i w_i$	$\frac{\Sigma f_i w_i}{\Sigma f}$
Steady income inform of formal	50	10	30	20	40	150	460	3.1

employment								
Parents willing to make monetary contributions	60	30	10	25	25	150	525	3.5
Parents contribute a given fee toward running and maintenance of water system	40	20	30	10	50	150	440	2.9

From the data shown on table 4.6 it showed that Parents willing to make monetary contributions had a mean of 3.5 and was given more weight, Steady income inform of formal employment at 3.1 and parents contribute a given fee toward running and maintenance of water system a mean of 2.9. This shows that Parents willing to make monetary contributions is the influence that school's capital contribution has on the sustainability in schools .

4.7 Analysis of Variance

Table 4.7: Summary of One-Way ANOVA results of the regression analysis between sustainability of Alpha Plus Water Projects and predictor variables

Model	Sum of Squares	df	Mean square	F	Sig.
Regression	6.62	4.000	1.655	4.720	0.002
Residual	32.61	191.000	0.351		
Total	39.230	195.000			

From the ANOVA table, the regression model predicting the relationship between the dependent and independent variables is significant at $F= 4.720$ and $P = 0.002$.

4.8 Regression Coefficients

Table 4.8 Coefficients of Regression Equation

Unstandardized coefficients		Standardized coefficients		t	Sig
B	Std. Error	Beta			

(Constant)		1.193	0.432	2.762	0.015
Influence of training	X1	0.806	0.108	0.146	7.463
					0.013
Influence of technology	X2	0.648	0.141	0.126	3.887
					0.029
Influence that schools capital contributions has on the sustainability	X3	0.413	0.125	0.145	4.904
					0.022

Dependent Variable: Sustainability CWPs

The established model for the study was:

$$Y = 1.193 + 0.806 X1 + 0.648 X2 + 0.413 X3$$

The regression equation above has established that taking all factors into account (influence of training, influence of technology and influence that schools capital contributions has on the sustainability) constant at zero sustainability of Aphia plus water projects will be 1.193. The findings presented also show that taking all other independent variables at zero, a unit increase in schools participation would lead to a 0.806 increase in sustainability of Aphia Plus water and a unit increase in education and training on technology would lead to a 0.648 increase in the sustainability of Alpha Plus water projects.

4.7 Discussion

The study attempted to answer the three objectives that mode of delivery had an influence of training of the sustainability of Aphia Plus Water in schools in Manga Sub county, an interruption of water supply in their school , showing that nobody was trained on how to repair the interrupted water supply ,solar system is one of the technology used in extraction sustainability of water in public primary schools and parents willing to make monetary contributions is the influence that school's capital contribution has on the sustainability in schools .

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the major findings of the study, conclusions made, recommendations and suggestions on emerging issues that may require further investigations from the researcher's perspective.

5.1 Summary of Findings

The aim of the study was the determinants of the sustainability of Aphia Plus water projects in public primary schools in Manga sub-county Nyamira county, Kenya. The findings show that, mode of delivery had an influence of training of the sustainability of Aphia Plus Water in schools in Manga Sub county. According to Toole (2002), capacity building sessions to develop community awareness of water supply problems will increase local participation in developing

and demanding a project that will satisfy the needs of the community. Technical training in construction, operation and maintenance will teach selected individuals' practical skills and may create an understanding and the sense of responsibility for water facilities in the beneficiary community and this enhances community ownership of water projects. Targeting teachers for training is critical to the ownership and sustainability of water projects, especially in technical and managerial roles to ensure they actively participate in decision making process this influences community ownership of projects Harvey and Reed, (2007).

The study established that it also showed that an interruption of water supply in their school ,solar system is one of the technology used in extraction sustainability of water in public primary schools .The factors responsible for the non-functioning of boreholes range from extreme low yields, inability to raise funds to acquire spare parts, to lack of access to spare parts. To sustain access to potable water, access to spare parts needs to be improved. Obsolete hand pumps should be replaced with modern ones to ensure easy access to spare parts in case of breakdowns. Community ownership of projects is influenced by the ease of operation and availability of spare parts for the technology incorporated in the water systems Fielmua, (2011).

The study determined that parents were willing to make monetary contributions were the influence that school's capital contribution has on the sustainability in schools . Reed, (2007), the contributions could also take the forms of donations from during harvest and fines paid by community members who break community rules. The community capital contributions collection could be affected or hampered by the methods used for the same. The researchers' observation is that most local communities are informal in nature and this makes most of the community projects lack basic procedures and processes of fund collection as they rely on mostly on voluntary labour of elected officials who operate in homes without official facilities. Such systems get low returns and this turns out to be threat to committees that carryout this exercise as some of them are insulted or dehumanized.

5.2 Conclusion

The study established that sustainability of various types of water supply infrastructure is dependent upon the degree to which the technology used corresponds to the needs of the local community and the community's ability to maintain and repair it over time. Considering the non-

functional state of most manual hand pumps in the county, it is apparent that efforts need to be made to ameliorate the situation. Learning from previous development projects, the latest approaches are addressing the problems of limited availability of spare parts, absence of trained technicians at the local level and the limited role of women in the pump management scheme. These factors influence ownership of water projects by the beneficiary community Mwakila, (2008). Project initiators must therefore involve all levels of the project cycle as this will build ownership of the project, training and education on how to operate and maintain the water facility so that its continuity is not affected by breakdown, the school must contribute towards the choice of the site for the water point and schools need to be advised on the need for them to contribute money towards operation and maintenance of Alpha plus water Projects this encourages ownership and assures continuity.

Appropriateness of design and technology in water projects is quite important and so is the knowledge of how to operate and maintain it if the project is to be sustainable. Lack of community education and training on technology used is one of the factors which could lead to breakdown and non-sustainability of water supply projects in developing countries as observed by (Ademiluyi and Odugbesan, 2008). The study established that solar system is one of the technology used in extraction sustainability of water in public primary schools. The study determined that the factors responsible for the non-functioning of boreholes range from extreme low yields, inability to raise funds to acquire spare parts, to lack of access to spare parts. To sustain access to potable water, access to spare parts needs to be improved. Obsolete hand pumps should be replaced with modern ones to ensure easy access to spare parts in case of breakdowns. Community ownership of projects is influenced by the ease of operation and availability of spare parts for the technology incorporated in the water systems Fielmua, (2011).

The study established that in rural community water supply, most national policies require a capital contribution from the users, either in-kind labor and local materials or, if in cash, in the region of five percent of the capital cost. This is rarely recovered however, and so improved services are by default a gift albeit often with some community participation in construction from the government or NGO to the community. There is disagreement among practitioners about whether user cash contributions to capital costs help to cement community ownership of rural water supply systems and so contribute to sustainability, Boru, (2012),

However, there are cases in which a cash contribution to capital cost is raised but then ring-fenced for the water supply, for instance by putting it into an operation and maintenance account on behalf of the community. In this way it is of direct benefit to the users. The only approach to rural water supply in which the users pay the full capital costs of new or upgraded water points is “self-supply”. Rockstorm, (2003) notes that operation and maintenance water services worldwide costs money but insufficient funds limits the purchase and spare parts. He argues that External Agencies have been reluctant to finance operation and maintenance activities while Governments often accord it less priority yet the service users community water users who are the potential source of finance on the same, do not typically see water as a commodity for sale and so many a times they are unwilling to pay for it. Community capital contributions could take the form of community levies-where individuals or households in the community agree to contribute a given fee toward running and maintenance of the water system.

5.3 Recommendations

The study determined that capacity building in project sustainability is very crucial. Community members need to be trained on water technology used in Alpha Plus water and more so on how to operate and maintain the system. Water technology that schools cannot operate or maintain, on breakdown renders the water project dysfunctional and not able to meet its objectives hence not sustainable. Community training and education on technology used must be done for any alpha if it is to be sustainable. These trainings need to be frequent and an analysis on the education level of the schools should first be made in order to establish the most suitable language mode of training to use so as to assure effective transfer of knowledge from the trainer to the trainee.

The study established that Project sustainability is of paramount importance for any project and especially for Alpha Plus water and for that matter, schools should be made aware of the need of water projects to serve not only their pupils, but also future generations, hence take the necessary measures to ensure this. Most of the hand pumps in the division are either no longer operating (45%) or have been stolen as a result of not operating due to lack of capacity to maintain after breakdown (50%). Implementation of springs, lockable boreholes or piped water systems would work well for the division. Community participation has for long been identified

as a tool of helping schools to focus their energy and mobilize resources in order to solve their own problems. When community members identify, plan and share tasks involved in projects with professionals, and are involved in decision making on the activities that affect their lives, projects initiated are more likely to achieve their objectives. Community Participation make projects gain a great support and ownership from schools and this assures sustainability of projects and should be encouraged in all community water projects.

The study established that project location is equally important and schools should be involved in identification of the site for the project in order to encourage ownership in terms of protection and cleanliness of the site. Operation and maintenance of any water project need money and the community water users should be encouraged to contribute towards the same in order to avoid rendering the project dysfunctional or unsustainable on breakdown as they wait on well-wishers who may not be available. Community capital contributions could take the form of community levies-where individuals or households in the community agree to contribute a given fee toward running and maintenance of the water system.

5.5 Suggestions for Further Studies

Project sustainability is of paramount importance for any project and especially for Aphia Plus water Projects and for that matter, the school should be made aware of the need of water projects to serve not only their generation, but also future generations, hence take the necessary measures to ensure this. Most of the hand pumps in the division are either no longer operating (45%) or have been stolen as a result of not operating due to lack of capacity to maintain after breakdown (50%). Implementation of springs, lockable boreholes or piped water systems would work well for the division. Community participation has for long been identified as a tool of helping rural as well as urban dwellers to focus their energy and mobilize resources in order to solve their own problems. When community members identify, plan and share tasks involved in projects with professionals, and are involved in decision making on the activities that affect their lives, projects initiated are more likely to achieve their objectives. Schools Participation make projects gain a great support and ownership from the assures sustainability of projects and should be encouraged in all community water projects.

Capacity building in project sustainability is very crucial. Community members need to be trained on water technology used in Aphia plus water projects and more so on how to operate and maintain the system. Water technology that schools cannot operate or maintain, on breakdown renders the water project dysfunctional and not able to meet its objectives hence not sustainable. Community training and education on technology used must be done for any water projects if it is to be sustainable. These trainings need to be frequent and an analysis on the education level of the water projects should first be made in order to establish the most suitable language mode of training to use so as to assure effective transfer of knowledge from the trainer to the trainee.

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APPENDICES

Appendix i : Letter of Introduction

University of Nairobi

School of open and distance,

Department of open learning

Kisii Centre.

The District Commissioner,

MSC, NC

Dear Sir/ Madam,

Re: Academic Research

I am student of University of Nairobi pursuing a Master of Arts degree in project Planning and Management .I am undertaking an academic research on Factors Influencing Sustainability of Aphia Plus Water Projects in Manga sub-county and Public Primary School have been selected for this study .Attached is a copy of questionnaire intend to use to collect data and I

hereby humbly requested you to fill it as accurate as possible .The questionnaire focuses on four factors; the school community participation , Public Primary School training and Technological Competency used, location and the water user' capital contribution to keep the AWP going

Thank you

Yours faithfully,

Zibia Kemunto Momanyi

Reg no : L50/86487/2016

Cell phone: 0722997881

Appendix ii Questionnaire for teachers and headteachers

Instruction 1.

Please answer the questions below to the best of your knowledge by writing your responses in the spaces provided. Tick (✓) where appropriate.

Part A:Background Information

1. Gender

Male [] Female []

2. What is your highest education level?

a) Primary [] b) Secondary [] c) Middle level college [] d) University []

4. For how long have you stayed in this area?

0 - 3 months []

1 - 3 years []

3 - 5 years []

More than 5 years []

Part B:

1. Influence of training in public Primary schools

Instruction: Tick appropriately where applicable, for open ended questions provide brief answer as possible

i. How does education and training affect school ownership of water projects in Your school?
.....

ii. To what extent does education and training affect school ownership of water projects in your County?

To a very great extent []

To no extent []

To a little extent []

To a very little extent []

iii. What is the extent to which the following aspects of education and training affect school ownership of water projects in your school? Tick appropriate answer

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Mode of delivery					
Language					
Background of the facilitator					
Choice of trainer/gende					

r					
---	--	--	--	--	--

2. Influence of technology used in extraction of water in public primary schools

a) Do you experience interruption of water supply in this area?

Yes [] No []

b) If yes what causes the interruption (Tick appropriately)

Pipe burst and leakages []

Dry weather conditions. []

Generator failure []

Rationing []

Lack of fuel []

Pump breakdown []

c) Who repairs the water facility in case of a breakdown?

Local Technician trained on maintenance []

Hired Technician []

Ministry of Water and Irrigation []

NGOs []

Other (s) Specify.....

8. To what extent do you agree on who pays for the repair works?

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Water management committee					
CDF					

Ministry of Water and Irrigation					
NGOs					
Individual philanthropist					

Others, specify.....

9. To what extent do you agree to the type of technology used in extraction of water in this area?

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Solar system					
Gravity system					
Generators					
Hand pump					
Rope and bucket					

3. Influence that schools capital contribution has on the sustainability of Aphia Plus Water Projects

i. To what extent do capital contribution on sustainability are influenced in your county?

To a very great extent []

To no extent []

To a little extent []

To a very little extent []

ii. To what extent do aspect of capital contribution influences sustainability of Aphia Plus Water Projects?

Very great extent 4.Great extent 3.Moderate extent 2.Little extent 1. Not at all

	5	4	3	1	1
Availability of spares					
Availability of maintenance schedule					
Availability of finance committees					

THANK YOU FOR YOUR COOPERATION

Appendix iii: Questionnaire for Pupils

Instruction 1.

Please answer the questions below to the best of your knowledge by writing your responses in the spaces provided. Tick (✓) where appropriate.

Part A: Background Information

1. Name of the pupil

.....

2. Age

10-12 []

13- 14 []

15 and above []

3. Sex

Male [] Female []

Part B:

1. Influence of training in public Primary schools

a) What is the extent to which the following aspects of education and training affect school ownership of water projects in your school? Tick appropriate answer

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Trained on Hygiene					
Trained on maintenance of the equipment					
Is the technology used acceptable by users and is it easy to operate and maintain?					
Children are trained on how to operate the equipment including taps					
Children are trained on how to operate the equipment including taps					

b) To what extent do availability and access to safe drinking water in your school improves your academic performance education and training affect school ownership of water projects in your School?

To a very great extent

To no extent

To a little extent

To a very little extent

c) Are there lessons about water in your school?

Yes No

2. Influence of technology used in extraction of water in public primary schools

1) To what extent do you agree to the type of technology used in extraction of water in this your school ?

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Solar system					

Gravity system					
Generators					
Hand pump					
Rope and bucket					

2) To what extent do you agree on who repairs the water facility in your school?

5. Very great extent 4. Great extent 3. Moderate extent 2. Little extent 1. Not at all

	5	4	3	1	1
Local Technician trained on maintenance					
Hired Technician					
Ministry of Water and Irrigation					
NGOs					

3. a) Do you pay for water ?

Yes . No

b) If yes how much do you pay per jerrican of water

.....

c) If No in 3aabove probe for reasons why water is not paid for?

.....

3. Influence that schools capital contribution has on the sustainability of Aphia Plus Water Projects

a) To what extent do you agree on the following:-

5. Very great extent 4. Great extent 3.Moderate extent 2.Little extent 1. Not at all

	5	4	3	1	1
steady income in form of formal employment or self-employment to support the water project					
Are your parents willing to make monetary contributions towards maintenance and operations of water project					

Do your parents contribute a given fee toward running and maintenance of the water system.					

THANK YOU FOR YOUR COOPERATION