FACTORS INFLUENCING SUSTAINABILITY OF RURAL WATER SUPPLIES IN KENYA:

(CASE OF UNICEF SUPPORTED RURAL WATER PROJECTS IN LAKE VICTORIA SOUTH AND LAKE VICTORIA NORTH WATER SERVICES BOARD REGIONS)

BY

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D53/CTY/PT/23145/2011

A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTERS OF BUSINESS ADMINISTRATION/STRATEGIC MANAGEMENT OPTION

SCHOOL OF BUSINESS

KENYATTA UNIVERSITY

OCTOBER 2013

DECLARATION

BY CANDIDATE

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ACKNOWLEDGEMENTS

My sincere acknowledgement goes to the various organizations and institutions that made it possible for me to collect the data used in this research project. Specifically, I wish to thank Lake Victoria South Water Services Board and staff and Lake Victoria North Water Services Board and staff for their support. I would also like to acknowledge the invaluable support and guidance received from my supervisor, Mr ShadrackBett and the many faculty members who provided invaluable teaching and coaching experiences for me.

Last but not least, my sincere thanks go to the many colleagues and classmates I met during the course of the study and with whom I shared tea at the only kiosk that operated on Sundays near the Campus. Special thanks must go to two special ladies-Edna Bonareri and LilianMitey who went out of the way to bring me up to speed on my course work at the beginning. To you both I say a special thank you. I cannot conclude this acknowledgement without a mentioningJosphatMwangi, my classmate without whose help I could never appreciate Calculus. Differentiation and Integration are now favourite subjects for me.

DEDICATION

This project is dedicated to my wife Christine Cornelius, Ph.D who paid for and wanted me to do this more than a decade ago. It was not to be but better late than never. My daughters Farhiya and ZeitunTifow who are both Masters students themselves constantly provided moral support to me to stay on course. Samira and AbdulazizTifow the resident gang who got a kick out of my course grades provided the daily relief. To all family members thank you for your faith and unfaltering understanding, inspiration, support and encouragement throughout the course period.

ABSTRACT

Sustainability of community based and managed rural water supplies in Kenya remains a challenge. In spite of concerted efforts to transfer ownership of rural water supplies to beneficiary communities and increasing participation of the communities in the operation and maintenance of these facilities, more than a third of all rural water supplies fail within three years of development. The purpose of this research was to investigate the factors that moderate the effect of various community capacity development efforts to enhance sustainability of community based and managed rural water supplies in Kenya. Specifically, the effect of community participation, choice of technology, skills of water management committees and post implementation support on sustainability and sustainability outcomes were studied. The studycontributes to our knowledge and understanding of factors contributing to the failure of community based rural water supplies and supports the sector to develop training packages and models for training communities and middle level trainers of trainers to improve sustainability of rural water supplies. The training packages benefit staff of the Ministry of Environment, Water and Natural Resources and other stakeholders to improve future sustainability of rural water supplies. A descriptive sample survey of 777WASH Committees and household representatives from259 rural water facilities in 3 districts- Kisumu and Siaya in Nyanza and Busia district in Western Province of Kenya were surveyed. A 10% sample using stratified random sampling was used to select respondents. Data was collected by the use of questionnaire method using two sets of questionnaires, one each of the water management committee members and the other for households. The questionnaires were pilot tested to determine suitability to both the committee members and households. Data was analysed using descriptive statistics including tables and correlation statistics. Every questionnaire was checked to ensure completeness and correctly filled. All questionnaires were coded so that all data can be analysed with the aid of the Statistical Package for Social Scientists (SPSS) computer programme.The results of the study contribute towards policy formulation and practice in the Water Sector and development of theory in approaches to enhancing sustainability in the rural water supply sector.

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OPERATIONAL DEFINITION OF TERMS

Acceptability: Water and the facilities that provide water have to be acceptable to users.

Accessibility: Water services must be accessible to everyone in the household or its vicinity on a continuous basis. Physical security must not be threatened when accessing facilities.

Affordability: Access to water must not compromise the ability to pay for other essential necessities guaranteed by human rights such as food, housing and health care.

Community ownership – A perception of ownership by the user community of a water facility

Community participation–A cross-section of the community participate in the development process of a project. A broad community support for the implementation of the project. Community participation must continue indefinitely.

Cost Recovery– To recover all of the costs associated with construction / installation of a water system, programme or service.

Post Implementation Support– Obtaining and financing professional support for financial services (accounting & bookkeeping), on-going training (technical and managerial aspects of water enterprises), technical services (maintenance), community support (Governance audits & arbitration) and regulation and monitoring.

Sustainability-The indefinite provision of a water service with certain agreed characteristics over time.

TechnologySelection – Method of water abstraction used by a water supply system. It may be solar powered system, hand pump operated system or a diesel powered system etc.

Water Quality: Water has to be safe for consumption and other uses, so that it is no threat to human health.

LIST OF ABBREVIATIONS

AMCOW	African Ministers Council on Water
ASAL	Arid and Semi-Arid Lands
COM	Community Ownership and Management
FGD	Focus Group Discussion
FY	Fiscal Year
GOK	Government of Kenya
IRC	International Water and Sanitation Centre, Netherlands
KDHS	Kenya Demographic Health Survey
LVNWSB	Lake Victoria North Water Service Board
LVSWSB	Lake Victoria South Water Service Board
MDG	Millennium Development Goals
MTSP	Medium Term Strategic Plan
NGO	Non-Governmental Organization
NWP	National Water Policy
O&M	Operation and Maintenance
PRSP	Poverty Reduction Strategy Paper
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund

USAID	United States International Development
VLOM	Village Level Operation and Maintenance
WASH	Water, Sanitation and Hygiene
WCED	World Commission on Environment Development
WHO	World Health Organization
WSP	Water and Sanitation Programme

CHAPTER ONE

1.0 INTRODUCTION

This is an introductory Chapter. It has the background to the Problem, the Statement of the Problem and the Research Objectives and Research Questions. This Chapter also gives the significance and scope of the study. Lastly, this Chapter has the Conceptual Framework of the Study.

1.1 Background to the Study

Increased investment in rural water supply development in the last decade by both Government and development partners has not resulted in the desired levels of service anticipated. Access to safe water is a basic human need necessary for both the wellbeing and social economic development of populations living in rural Kenya. In spite of efforts to increase access, many rural water supplies completed have either stopped operating or are not operating optimally. This has resulted in loss of service to populations living in the rural areas of Kenya. Many of the dysfunctional water sources are operated and managed by community based organizations such as Community Water and Sanitation (WASH) Committees, Water User Associations or Women groups.

The role of the communities in the operation, maintenance and management of rural water supplies was first described in Sessional Paper No. 1 of 1999 on National Policy for Water Resources Management and Development. The paper defined the involvement of communities in project development in all stages including planning, implementation and operation and maintenance in light of the changing economic conditions and increasing burden to government. The paper further recommended institutional steps to be taken to facilitate the role of the communities in the operation and maintenance of rural water supplies. Increasing the participation of the communities in project development was intended to create a sense of ownership of the projects by communities. In line with the recommendations of the Sessional Paper 1999, operation and maintenance of rural water supplies has largely been transferred to

beneficiary communities over the years. Most rural water supplies today are community operated and managed.

In the subsequent water sector reforms and legislation in the Water Act 2002, provision was made for groups or firms that own or want to operate water supply projects as Water Service Providers. Such groups or firms would operate water systems under license on behalf of user populations. However, many rural water supply systems did not meet the license criteria and consequently continue to be operated by community groups without regulation. The sustainability of these communities based and managed water supplies, therefore remains a challenge to progress in the Water Sector and has implications for the attainment of the Water Sector objectives, the Millennium Development Goals (MDG) and VISION 2030 among other policy instruments. This has further implications for the socio-economic development of the affected populations and also child survival and development indicators for Kenya. The United Nations General Assembly has declared access to safe drinking water a fundamental human right. A number of criteria have been used to specify the content of the right: availability, quality, acceptability, accessibility and affordability.

Water is a basic human need and is important for human survival. A number of reports and policy instruments have given estimates of current access levels to safe water in Kenya. It is estimated that more than 80 per cent of Kenya's population live in the rural areas. According to the WHO/UNICEF Joint Monitoring Programme Report 2012, only 52 per cent of the population living in rural Kenya had access to improved drinking water sources as compared to 82 per cent of the urban population in 2010. The national average is 59%. The draft National Water Policy (NWP) 2012 puts current rural coverage at below 50 per cent and attributes this low coverage to the type of sources- point sources (hand pumps, springs, wells and small pipe schemes which have complicated stocking requirements for spare parts and repair efforts. On the other hand, The African Ministers Council on Water (AMCOW) Country Status Overviews 2-Regional Synthesis report for 2011 puts coverage in Kenya in 2010 at only 42%.

The Millennium Development Goals for water and sanitation targets halving the population without access to safe water by 2015(MDG Report, 2008).Yet, the MDG

Report for 2012 has reported that Kenya is already not on course for achieving the MDG goals for water and sanitation. According to the draft National Water Policy (NWP) 2012, "most of the rural water services systems are still not sustainable because of inadequate operation by communities leading to breakdown of facilities and low access rate, poor water quality and increased disputes"(NWP 2012, P.10). Disparities in access to safe water are even more severe in the ASAL areas where there is insufficient densification of water points (NWP 2012).

To underscore the importance of access to safe water, The Bill of Rights under article 43 of the Constitution of Kenya (COK) 2010 states that access to safe water and safe sanitation is a right. The draft NWP 2012further aligns the sector with the new Constitution based on the guiding principles - right to water with pro-poor orientation, participatory approach to water development and management and good governance practices at all levels. The Policy Objectives of the draft further include "progressively achieving universal rights to water supply and sanitation for all by 2030 in the rural and urban areas" (NWP 2012, p. 12).However, in spite of the new policy, legislative frameworks and increased sector investments in rural water development which rose from Ksh 3 billion in 2003/2004 FY to Ksh 12 billion in the 2010/2011 FY, access to improved drinking water still remains low. This is partly attributed to the poor sustainability of existing community operated and managed rural water supplies rather than lack of development of new sources. The study thus investigated factors that influence the sustainability of community operated and managed water supplies in Kenya and more specifically in Western Kenya.

1.1.2 Background to Lake Victoria South and Lake Victoria North Regions

The study was carried out in three districts in the Lake Victoria region, two (Kisumu andSiaya districts) in the Lake Victoria South Water Services Board andBusia district in the Lake Victoria North Water Services Board region. The lake region experiences a high rainfall with 7 to 16 days of rainfall per month in eight months of the year. The other four months experience 2 to 4 days of rain. Consequently there are many rivers, streams and springs draining into Lake Victoria. Due to the high water table in some districts such as Kisumu and Busia, shallow wells form predominant sources of water

supply for the rural populations. Many of these areas experience repeated annual flooding which contaminate the water sources.

A WASH Baseline Survey (2010) supported by UNICEF in 20 arid and semi-arid and flood prone districts in Kenya showed that only 73 per cent of water facilities in Kisumu and 65 per cent in Siayadistrict were improved while Busia in Western Kenya had 82 per cent of water sources improved. In the same study, it was found the average time spent by households collecting water was 57 minutes, while average times in Kisumu was 47 mins, 50 minutes in Siaya. The time spent collecting water was lowest in Busia with 30 minutes.In the rural areas, women and girls bear the burden collecting basic amounts of household water needs each day – time, which must be valued.

Access to safe water supply and proper use of toilets along with hygienic practices is fundamental to preserving the health of children born into families where diarrheal diseases are common. The lake region is particularly prone to annual flooding and cyclic outbreaks of diarrheal diseases leading to the highest infant mortality rates in Kenya. Deaths from diarrheal diseases among the general population in Kenya are unacceptably high: In 1999, more than 30,000 children died from diarrheal related diseases. Inadequate and poor quality water and sanitation coupled with poor hygiene practices contribute to high infant and under five mortality rates - 55 and 74/1000 live births respectively in Kenya (KDHS 2009)). It is estimated that diarrheal diseases caused about 20% of these deaths (KDHS 2008-2009, NCAPD 2010). Western Kenya and particularly Nyanza province, account for the highest infant mortality rates in Kenya at 206/1000 live births. Improving access to safe water is therefore important to reducing deaths arising from water related diseases among children in Kenya. This is particularly important considering that at household level in Kenya, most water is unsafe to drink (especially from e-coli contamination) or for preparing food; over 2.5 million families do not have toilet facilities; and, 75% of primary child- caregivers and 71% of secondary caregivers respectively do not wash hands with soap at critical times. This is particularly problematic amongst the poorest where the majority does not have access to safe water and sanitation services to facilitate hygiene improvement -- thus putting the children of the poor at greatest risk of diarrhea and death.

In recognition of the poor indicators in the region, the Government of Kenya in collaboration with UNICEF and Government of Netherlands initiated a Water Supply and Sanitation Programme covering 20 ASAL and flood prone districts in 2008. Among the selected flood prone districts which had the lowest indicators areSiaya and Kisumu districts in Nyanza and Busia district in Western Kenya. Theprogramme supported development of new improved water supply sources and a comprehensive household sanitation and hygiene promotion programme targeting increased safe excreta disposal practices through increased household latrine uptake and usage. In addition, household water treatment and safe storage and hand washing with soap practice at critical times were promoted. By mid-2012, more than 300,000 people in the region used 458 new improved water sources while 800,000 people used 160,000 new basic sanitary facilities with hand washing at the household (UNICEF, 2012).Demombynes and Trommlerova (2012) reported Kenya's rate of post neonatal deaths per 1000 live births fell by more than half over a five- year period, dropping from 47 to 22, as measured using data from 2003 and the 2008-09 Kenya Demographic Health Surveys. Among the possible causes of the decline are various targeted public health initiatives including improved access to water and sanitation. It is against this background the study investigated factors influencing sustainability of community operated and managed water supplies in the three selected districts.

1.2 Statement of the Problem

It is important for the organizations or agencies, governmental and non –governmental, who are involved in water services provision for populations living in rural Kenya to achieve their objectives of improving access to safe water for needy populations. In spite of the improved policy, legislative and funding environment, access to safe water for populations in rural Kenya remains low translating to poor social indicators- 46 per cent below the poverty line, high infant mortality and morbidity and high incidence of water borne diseases among these populations. According to an IRC Triple-S 2010 study, despite relative success in the provision of new rural water infrastructure in the last two to three decades, studies in many countries show between 30 to 40 per cent of facilities either do not function or are operating below capacity. In Kenya, about 25 to 30 per cent of the recently completed community managed rural water supply facilities

will become dysfunctional in the first three years following completion. For instance, in Siaya district from eighty water projects constructed by various development agencies in the last decade, 90% were non-functional by the year 2006 (LVSWSB Inventory Report, No.25(Oraro, 2012).Similarly, in the neighbouringNyandoDistrict, UNICEF rehabilitated more than 100 failed water projects in 2009 before initiating new ones. A common denominator in these failed projects is, all are operated and managed by communities. Successful community based Operation and Maintenance (O&M) of rural water facilities therefore remains a challenge and threatens reversing the gains made in improving quality of life for populations in Kenya and particularly Nyanza and Western Kenya. It is against this background the study endeavoured to answer the underlying causes of poor sustainability of community based and managed rural water supplies in Kenya and specifically in Kisumu andSiaya districts in Nyanza and Busia district in Western Province of Kenya.

The Ministry of Water and Irrigation in Kenya has been implementing the water sector reforms since the enactment of the Water Act 2002to improve sector efficiency and overall performance but more importantly created new decentralized institutional framework to among others accelerate water service provision. As a result, the sector's approved development budget rose seven fold in the last eight years from Ksh 4.2 Billion in 2004/2005 FY to Ksh 30.8 Billion in the 2011/2012 FY (Min. of Water and Irrigation, 2012). In line with the sector objectives of improving access to safe water for un-served populations, UNICEF is implementing a six year (2008-2014) water supply programme in 20 rural districts with least access indicators to reach 1.6 million people. More than 850 sources including 100 rehabilitations have been completed by the end of 2012.However, it has become evident that increasing coverage does not equate to increased access due to a high failure rate of water facilities. There is now recognition that while development of new systems is important, it is not enough to provide sustainable services in it. Consequently, National governments and development partners have begun to recognize the scale of the problems associated with poor sustainability of rural water facilities (IRC, 2011).

Sustainability in the specific context of rural water supplies isthe maintenance of the perceived benefits of investment projects after the end of the active period of

implementation (Lockwood and Smits, 2011). This definition is the one closest to the one that simply defines sustainability as "whether or not something continues to work over time" (Abrams, Palmers and Hart, 1998). In this context, whether or not water continues to flow over time. However, the manifestation of these factors in the Kenyan context and their contribution to project failure has not been adequately understood in the sector. This study therefore investigated factors influencing sustainability of community operated and managed water supplies in three districts in Western Kenya.

1.3 Objectives of the Study

The objectives of the study included the following:-

1.3.1 Broad Objective

To investigate factors influencing sustainability of UNICEF supported community based and managed water supplies three districts (Kisumu and Siaya) in Lake Victoria South andBusia district in Lake Victoria North Water Service Board.

1.3.2 Specific Objectives

(i) To investigate how community participation influences affects sustainability of UNICEF supported community based and managed water supplies in the study area

(ii) To determine how choice of technology affects sustainability of UNICEF supported community based and managed water supplies in the study area

(iii) To examine how skills of Water Management Committees affects sustainability of UNICEF supported community based and managed water supplies in the study area

(iv) To determine how post implementation support affects sustainability of UNICEF supported community based and managed water supplies in the study area.

1.4 Research Questions

The study sought to answer the following questions:-

(i) To what extent community participation affected sustainability of UNICEF supported community based and managed water supplies in the study area?

(ii) How choice of technology affected the sustainability of UNICEF supported community based and managed water supplies in the study area?

(iii) To what extent skills of the Water Management Committees affected sustainability of UNICEF supported community based and managed water supplies in the study area?

(iv) To what extent post implementation support affected sustainability of UNICEF supported community based and managed water supplies in the study area?

1.5Scope of the Study

The scope of the study coveredUNICEF supported community based and managed water supplies in Kisumu and Siaya districts in Lake Victoria South WSB and Busia district in Lake Victoria North WSB. It focused on point water sources such as boreholes and shallow wells. All projects were funded through the respective Boards.

All water facilities were operated by communities using diesel generators, solar powered systems, hand pumps or connected to the electricity grid. They were operated and managed by Village WASH Committees, Women Groups or Water User Associations (WUA).

1.6 Significance of the Study

The findings of thestudy contribute significantly to our understanding of factors that influence sustainability of community managed rural water supplies. UNICEF has prioritized sustainability of water supply services as an important strategy in achieving sustained access to safe water. The Water Sector in its Annual Water Sector Conference 2011 also adopted sustainability as one of four thematic areas for achieving sector objectives. Improved understanding of factors influencing sustainability will assist the Water Sector to achieve sector goals in improving access to sustainable safe water for Kenyans living in the rural areas. The sector has grappled with challenges arising from

poor sustainability of community based and managed water supplies which have affected service delivery particularly in rural Kenya.

Specifically the study contributes to our knowledge and understanding of factors contributing to the failure of community based rural water supplies. It assists the sector to develop training packages and modules for training community members and middle level trainers of trainers to improve sustainability of rural water supplies. The training packages support staff of the Ministry of Environment, Water and Natural Resources and other sector actors.

In addition, the findings of the study improve policy formulation by the Ministry of Environment, Water and Natural Resources to improve sustainability of community based and managed water supplies. The findings assist in the design and formulation of future sector funding programmes by donors and other development partners to enhance sustainability of sector investments.

1.7 Limitations of the Study

All care was exercised to ensure the study proceeded with minimum disruption to plans. However, some limitations which included on-return of some questionnaires or returning incomplete questionnaires arose. To increase completion rates of the questionnaires and enhance objectivity of responses, the research team ensured respondents had adequate information on the purpose and use of the research data generated. In addition, respondents were assured of the anonymity of their responses. Where respondents were illiterate or semi -literate and found it difficult to respond adequately to the questions, therespondents were interviewed by the research assistants who assisted the respondents to complete the questionnaires.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction to Literature Review

The objective of this literature review is to reveal the current state of knowledge on factors affecting sustainability of community based and managed water supplies. The review provided a rationale for the research study (Thomas, 2010). The review investigated various sources of literature such as books, journals and reports. It further investigated information or publications in various websites, particularly those by international organizations such as the UN (UNDP, UNEP and UNICEF), websites of specialized sector International NGOs such as IRC, WEDC and WaterAid. The review covered legal and policy documents by governments, particularly government of Kenya (The Constitution of Kenya 2010, The Water Act 2002 and draft Water Bill 2012, draft National Water Policy 2012, VISION 2030) where the research is set. Others included the Millennium Development Goals and the African Council of Ministers on Water and Sanitation Reports.

The review used key words to search for available literature. Among key words used are sustainability and community water, sustainability and community participation, sustainability and technology choice, appropriate technology, sustainability and post implementation support and sustainability and skills.

Further review of literature relating to each of the independent variables selected for the study was carried out, to determine the state of knowledge around each variable and its effect on the research topic. The chapter has a section on critical review which examines if there are any other variables that may affect sustainability of community operated and managed water supplies not covered by the study.

The Chapter concludes with summary findings and any gaps to be filled by the study, in addition to a brief description of the interrelationships between the variables.

2.2 Past studies/Theoretical and Empirical Review

The most widely used definition of sustainability is that by theBrundtland Commission of the Nations on March 20, 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainabilityis the long-term maintenance of responsibility. It has environmental, economic, and social dimensions, and encompasses the concept of stewardship. Sustainability of water supply and sanitation projects has been defined as the maintenance over time of the project benefits (Hodgkin et al, 1994)). Benefits from water supply projects may be expressed in several ways including health benefits indicated by a reduction in child mortality and morbidity from diarrhoeal diseases, or simply the number of people who have access to portable water from the project. According to Hodgkin, as long as resources can be obtained to operate, maintain and replace the systems from whatever source, there are sustainable benefits. Sustainability is also the ability of the project through the efforts of institutions, to maintain a level of benefits to a static or expanding population after donor assistance has ceased (Hodgkin et al, 1994).Sustainability is therefore the responsible management of resource use. Its meaning might include to maintain or to support. In the water sector, sustainability has to do with sustained access to services, sustainable operation and maintenance of water facilities.

The key indicators for sustainable community managed rural water supplies include reliability, adequacy, accessibility, water fetching time, establishment of operation and maintenance (O&M) fund, ownership, user committee existence and functioning (Panthi and Bhattarai, 2008).In its sustainability framework, WaterAid identified four key things required for sustainability of community managed rural water supplies as: real need and demand, programme design and implementation, existence of active water user committees and external support to the community management systems (WaterAid, 2011). Also important are accounting and allocating responsibility for the true cost of sustainability to prevent the collapse of existing systems and reversal of progress made in extending rural water coverage (Montgomery, Batram&Elimelech, 2009).

A Triple-S scoping study on rural water supplies in Ethiopia found that sustainability of rural water facilities is a major issue and one that is now receiving greater attention (IRC, 2011). The study found that levels of non-functioning facilities are high affecting service delivery for many, while post construction support for community management is extremely low. Yet, Water and Sanitation Programme (WSP)-Africa in its report on "Sustainable Management of Small Water Supply Systems in Africa, Field Note, (2010)" said sustainable rural water supplies are important for the growth of local economic hubs. The report found the growth of rural centres and small towns ranging in population from 2000 to 50,000 people are of considerable strategic importance for economic and social development in Africa, contributing to curbing rural urban migration and the accumulation of the unemployed poor in the slums of large cities.

Water Supply and Sanitation projects utilize three forms of capital-natural capital (water), infrastructure capital and skilful management of human and financial capital, each form of which must endure in order to achieve sustainability (Hodgkin, 1994).. Project sustainability is indicated by the ability to continue to meet objectives defined in terms of benefit levels. Sustainability is therefore the ability of a project to initiate a process by which benefits are maintained.

2.2.1 Sustainability of community based water supplies

A report prepared for Global Programs, Field Support and Research identified several factors affecting sustainability of community managed water supplies (Hodgkin et al, 1994):Institutional factors comprising national, regional, community organizations and private sector entities), and Development processes which includedesign, participation, operation and maintenance and M&E. Technological factors such as Suitability, acceptability, responsiveness, servicing needs, standards and costs. Contextual factors and forces which include factors beyond the control of institutions involved to change. They include environmental, demographic (population size, growth and distribution as well as health indicators such as infant mortality and morbidity from water borne diseases), socio-cultural, political, economic- (rate of inflation, employment opportunities, income generation) and technological- (skills available in the

community, availability of equipment and spare parts and training opportunities relevant to the technology used).

Other factors include project organization and processes includingadministrative and budgeting entities. This pertains to capacity of local and regional institutions to continue development processes that have been initiated and apply skills that have been taught. There are also donor related sustainability issues including control, collaboration, standardization, coordination, flexibility and commitment- (long term).

A study into rural water supply sustainability in Niassa Province in Mozambique found that among all communities visited, finance was compromising rural water supplysustainability as most did not have any savings or collected monthly contributions for operation and maintenance (Jansz, 2011). The study further found that while Water Committees understood their responsibilities, there were variations in how these responsibilities were practiced arising from inconsistencies in capacity and capability. The study found while some Committees raised and repaired some water points due to sufficient technical capacity, others did not because those trained with technical skills had left.

Water and Sanitation Programme-Africa Region(2002) in its Field Note No.13 on rural water supplies in Malawi, Ethiopia and Kenya made some common conclusions for adoption by countries planning community operated programmes. In its assessment of community management and sustainability of rural water supplies in these countries, WSP made the following conclusions on sustainability:Community Management works well in cohesive communities where there is clarity of purpose and sense of ownership, while sustainability requires sound financial management including the authority to set tariffs. Sustainability further depends on paying staff. A few community members cannot be expected to donate a large amount of their time over an extended period in order to maintain a public good. Schemes need staff not just for technical tasks, but also management and administrative. WSP also concluded that managerial and governance training is important. Relevant, practical and well-tailored training has major impact on success. Suitable training combined with good management systems can help people with little formal education to operate and maintain complex systems.Community

Management systems benefit from on-going support. Support may not be continuous but must be available when needed from local departments and NGO partners.

A study of community operated and managed water supplies in Yatta Division of Kenya found that there was a strong relationship between sustainability of community water projects and technology, managerial skills of the committee members and community participation (Mwamati, 2007). The study further suggested that there was a significant relationship between government support and legislation and sustainability of community water projects. Other studies found a significant relationship between community contribution and sustainability of community managed water projects in Nyando district of Kenya (Odie, 2012). In an analysis of UNICEF supported projects in Nyando district, the study further suggested high levels of community contribution to project costs influenced sustainability of the water projects. The study further concluded that where project management committees were effective, the community managed projects were sustainable.

2.2.2 Theories of sustainability

Theories of sustainability attempt to prioritize and integrate social responses to environmental and cultural problems. An economic model looks to sustain natural and financial capital; an ecological model looks to biological diversity and ecological integration. In its rudimentary meaning, sustainability means a capacity to maintain some entity, outcome, or process over time. In its increasingly common use, the concept of sustainability frames the ways in which environmental problems jeopardize the conditions of healthy economic, ecological and social systems. The concept of sustainability thus raises a starkly basic question: Can human activity successfully maintain itself and its goals without exhausting the resources on which it depends.

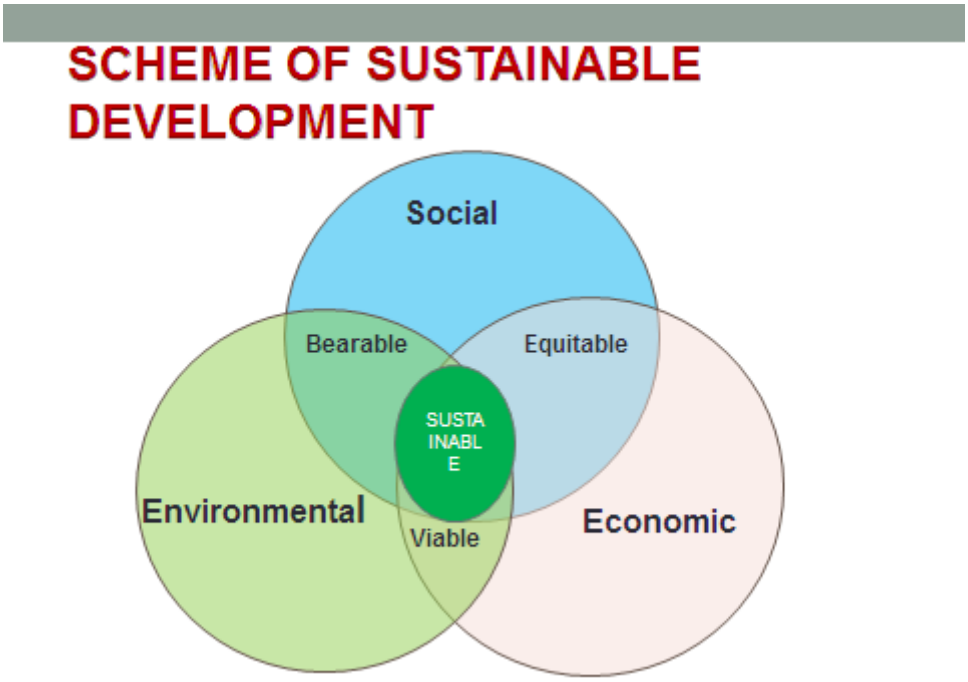


Figure 2.1: Scheme of Sustainable Development

The idea of sustainability came to public attention in a 1972 report, "Limits to Growth", issued by the international think tank "Club of Rome. The International Union for Conservation of Nature, in collaboration with UN Environment Programme and the World Wildlife Foundation in 1980 worked to make sustainability a benchmark of international action. The 1987Report of the World Commission on Environment and Development, "*Our Common Future",* often called the Brundtland Report then gave the term "sustainable development" international public prominence. It defined "sustainable development as development that meets the needs of the present without compromising the ability of the future generations to meet their own needs" (WCED 1987, p.43).

Many theories of sustainability have been espoused and have been organized through such terms as weak or strong or ecocentric or anthropocentric. These have become too complex. Increasingly sustainability models have begun to look at sustainability in the context of what must be sustained. These models- economic, ecological or political- are not mutually exclusive and often integrate complementary strengths of the others.

Economic models of sustainability propose to maintain opportunity, usually in the form of capital. According to the economist, Robert Solow, we should think of sustainability as an investment problem, in which we must use returns from the use of natural resources to create new opportunities of equal or greater value.

This model is consistent with sustainability of water systems model which are influenced by a combination or interaction of technical, institutional, social, financial and environmental factors. The Water Sector must therefore design institutional arrangements for the operation and maintenance of water systems that meet a mix of the above factors for sustainable water supplies and service delivery.

2.2.3 Community Participation and sustainability of water projects

An analysis of water projects in Indonesia, India and Sri Lanka found greater community participation is associated with better water supply and that well-designed community-based water services lead to improvements in health outcomes (Isham and Kähkönen, 1999).A review of USAID projects also argued that projects with participatory elements increased the overall effectiveness of projects particularly in building capacity for collective action (Finsterbusch and Van Wincklin, 1989).

Community involvement and participation assumes that communities will be empowered to plan, manage, operate and maintain their water facilities in the long term if they are involved in decision making right from the project planning period through implementation and eventual hand over to the community. Many projects have achieved a certain level of involvement of communities in this process. However, even among these projects challenges still persist with respect to sustainability. It may therefore be necessary to look further at the dynamics in the community in order to understand who represents what, what are the different role differentiation aspects in a specific community. It might be necessary to ask who should be involved, who makes the decisions or how are water related roles defined. For example, in a study of community managed water supplies in Ghana, it was found that villages where a larger percentage of the WASH Committee were women are more likely to have a functioning system(Komives, Akabang, Thorsten, Kuffuor, Wakeman, Larbi, Bakalian and

Whittington, 2008). In many countries, community management Committees do not have proper legal status and are vulnerable to material, financial, contractual and legal problems (Brikke et al, 2003) contributing to their lack of capacity to sustain services.

Communities however differ in many ways and attitudes and capacities of communities in one region or country cannot be generalized for all communities everywhere. There are varying poverty levels among communities, an important factor in ability to demand and pay for services. Literacy levels which are particularly low in rural Kenya may underlie the inability of the communities to sustain complex systems. Other factors such as access and affordability of spare parts also contribute to the challenges facing communities to maintaining facilities. Low literacy levels at the community also have implications for finding suitable skills needed for maintaining equipment and facility in the community or community area. It is with this variety in community settings that this study investigated the factors that influence the sustainability of community operated and managed water supplies in three districts in Nyanza and Western Kenya.

The Government of Kenya sees implementation of the Water Policy and Water Act as an important step in reducing poverty and improving living conditions of its people. According the Poverty Reduction Strategy Paper (PRSP) 2005, three-fourths of the country's poor live in rural areas, with the majority of the poor living in Northern, Eastern and Coast Provinces. Not surprisingly, the poor also have the lowest access to safe drinking water and hygienic sanitation facilities. In rural Kenya, less than 35% of the poor have adequate access to safe water, while approximately 70% of the urban population have access to safe water. Poor access to water in Arid-Semi Arid Land (ASAL) areas is a key element of poverty, low productivity and poor health.

2.2.4 Technology Choice and sustainability of water projects

Many studies and reports have documented the influence or effect of choice of technology on sustainability of community managed rural water supplies (Bredero, 2003, Davis, 1995) Sector professionals have used a number of terms to describe affordable, simple technologies that could easily be adapted to local conditions and maintained by communities; among them- appropriate technology, progressive

technology, alternative technology, Village level Operation and Maintenance (VLOM) technology, Intermediate technology, Village technology, Low -Cost technology, Self-help technology and even technology with a human face(Brikke et al, 2003). Brikke et al (2003) suggested the use of "sustainable technology at the community level" and argued that projects must incorporate selection of appropriate technology and integrate Operation and Maintenance (O&M) into project development right from the start.

An analyses of the performance of water systems in a variety of countries found that performance was markedly better in communities where households were able to make informed choices about the type of system and the level of service they required (Katz and Sara, 1997).Among technical factors suggested to contribute to sustainability of services are technology selection, complexity of the technology, the technical capacity of the system to respond to the demand and provide the desired service level, the technical skills required to operate and maintain the system, the availability, accessibility and the cost of spare parts and the overall cost of O&M.

System design and the complexity of the technology involved will clearly have a bearing on the relative weighting of these factors. In the case of hand pumps for example, standardization of pump types, spare parts, support to the private sector for local repairs and institutional arrangements on the part of government in support of community management were all seen as vitally important factors in the sustainability of projects in Africa according to recent research by WEDC (Harvey *et al*, 2002).Sustainability of facilities provided is enhanced by involving the private sector in the direct provision of services to communities and emphasising sound financial management and adequate cost recovery by community-based organisations. All of the above evolve with a legal and institutional framework. At national level there must be clear policies and strategies that support sustainability (Brikke et al, 2003). Support activities such as technical assistance, training, monitoring and setting up effective financing systems are all likely to influence effectiveness of O&M.

Settlement pattern of a community also influences the choice of water supply technology and O&M. For example, a hand pump would serve only a limited number of people in a settlement structure where households are located on individual farms.

Ground water characteristics also influence choice of technology. For example, the choice between a hand pump based system and a diesel powered system will be influenced by the size and depth of the ground water and demand or population to be served.

2.2.5 Skills of WASH Committees and Sustainability of Water Projects

In publications by sector organizations such as the EHP (Lockwood, 2002) and the IRC (Schouten & Moriarty, 2003) and other fora, it is argued that the majority of rural communities cannot be expected to manage rural water supplies on their own indefinitely. In order to guarantee the sustainability of rural water supply projects and the associated benefits, it is necessary to provide support and guidance to communities which address a range of issues. For example, communities should be encouraged to use their own capacities and resources to address the problems they face (Blackman. 2003).Projects should focus on strengthening the community's capacities to address their problems. By doing this, the community is facilitated to address their problems rather than addressing their problems for them. An analyses of the performance of water systems in a variety of countries, found that performance was markedly better in communities where decision-making was democratic and inclusive (Katz and Sara, 1997).

Projects too complex for the community's capacity and located away from centres where institutions are not readily accessible are likely to face more challenges both in the short and long run. Differences in project effectiveness are explained largely by a community's ability to engage in collective action, with high levels of "social capital" improving participation in design and monitoring. In a study of incentives for collective action in a district in south India, Wade (1987) reports that some villages had what he calls a "public realm," with well-functioning institutional arrangements for managing common-pool resources, while others had virtually no public realm. This suggests that stimulating participation by forming community organizations such as water user groups may require more than educating people about their common interests or promoting communal values. It may also require helping them to understand the collective benefits of participation. In spite of training WASH Committees in O&M,

rural water supplies still face management challenges that affect sustainable service delivery to beneficiaries. This study investigated the extent to which skills of WASH Committees influences sustainability of rural water supplies in Western Kenya.

2.2.6 Post Implementation support and Sustainability of Water Projects

Traditional handing over of donor projects have often left both communities and water agencies with schemes which neither party has properly prepared to operate and maintain (Davies and Brikke, 1995). Funds, resources and time need to be allocated for full and proper consultation with the community, government department or agency and other donors during project formulation (Davies and Brikke, 1995).A prescriptive blue print approach to community management is unlikely to be successful.

.Post construction support such as training of caretakers, particularly recent training and visits, even once a year by water agencies is positively associated with system performance (Komives et al, 2008). The same study reported that receiving free spares, grants or help in financial and management assistance were not significantly associated with system performance. Monitoring routines of community water supplies have shown an immense positive impact on the motivation of local communities to properly manage operate and maintain their water supply system, a key requirement for achieving the objectives of sustainability (Koestler and Koestler, 2008).

Attempts to compare pre- and post-institutional support arrangements indicate, there are probably as many combinations of models as there are examples. In many instances these are really a hybrid; for example in Bolivia and Ecuador the arrangements include elements of both the de-concentrated and devolution models. Examples from other documented sources reinforce this view that institutional models and the transition between construction/implementation and long-term support functions are rarely simple and are often influenced by a variety of external factors (Rosensweig*ed*2001; Lockwood 2002). The study investigated whether post implementation support to community managed rural water supplies influences sustainability of rural water supplies in Western Kenya

2.3 Critical Review

Other factors that may affect sustainability of water facilities not covered by this study include environmental issues which affect the quantity and quality of water such as degradation of the catchment/recharge area which may cause the source to dry up or substantially reduce production. Pollution of water sources by both minerals and bacteriological contamination which may affect odour, colour and taste of water leading to abandonment of source.

Policy context is another factor that can affect sustainability of community based and managed water supplies. For example, the Water Act 2002 says that Water Service Boards were the asset holders rather than community groups or water service providers who owned, operated and maintained their facilities.

Whereas as Government of Kenya has espoused the importance and need for achieving sustainable service delivery at community managed water supply, government has not prioritized the same in budgetary allocation. In fact regional and district level Ministry of water institutions have neither acknowledged nor planned for community level capacity development to enhance sustainability of community based and managed water supplies. Regional and district level plans and budgets do not reflect any plans towards support to community managed water supplies, instead concentrating on the more formal Water Services Providers (WSP) serving larger and medium town water supplies.

2.4 Summary and gaps to be filled by the study

Extensive literature exists on factors that have been proposed to affect sustainability of community managed rural water supplies. Several studies have documented various regional experiences and suggested factors considered as determining sustainable systems. However, several studies also show regional and community variations in experiences and findings. Factors affecting sustainability of rural water supplies may vary between regions, are community environment specific and may generally not be generalized across regions as factors such as alternative sources, levels of literacy and skills in the community, poverty, access to and proximity to private sector supported

supply chains also influence sustainability. The findings of this study contribute to improved understanding of factors influencing sustainability of community operated and managed rural water supplies in the Western Kenya region. The findings increase opportunities for enhancing future reliability of rural water supplies in Kenya for better coverage and access to safe water for populations in the rural areas. In addition, the findings on the relationships between the variables investigated assist in the future design of training programmes for capacity development. The study findings further support policy formulation, in addition to improving future programming strategies and approaches to future funding partnerships.

2.5 Conceptual Framework

The conceptual framework shows the linkage between the variables for consideration in the study as shown in figure 2.5.1 below.

Community Involvement is an arrangement in which the community and the beneficiaries at large are involved in the planning and implementation of the project and even contribute at times to the investment cost of the project either in cash or kind**.** This creates a sense of ownership by the community and perception of the project as their own. This can create desire or willingness to engage continuously on the project which eventually ensures sustainability. The communities take a leading role and initiative to contribute to their own projects.

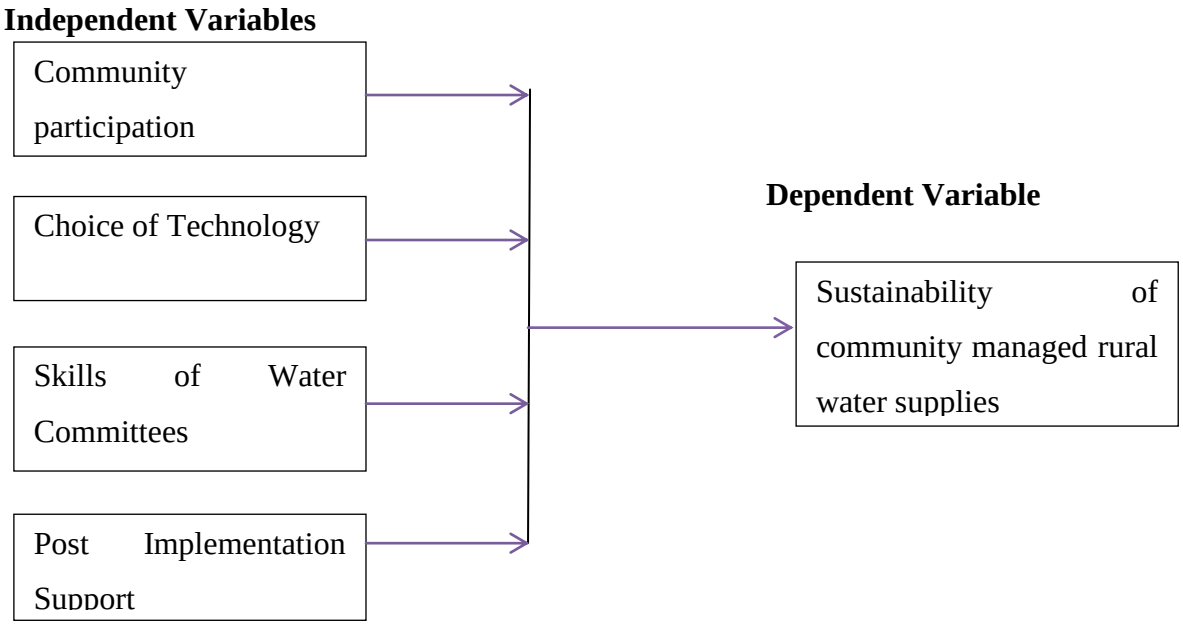
The choice of suitable technology is important in creating synergy between all elements of sustainability such as competence and skills needed for maintaining the facility. The sense of ownership encourages the presence of a well-structured management committee where each and every official has a defined role, creating a perpetual synergy among the various aspects of the project. The members of these management committees had the requisite project management skills, financial management skills and O&M skills which were gained through capacity building opportunities. Capacity building and training of the management committee is therefore a process where the management committee learns new skills and access ideas that when incorporated well

can help in making better decisions. Equipping the management committee with relevant skills therefore empowers them to make the right decisions leading to project sustainability.

Over all, the way the community perceive the projects funded by development partners is very essential for their sustainability. When the community feels that the water projects within their locality is owned by them and not the partner, this may lead to high association with projects and potential sustainability of the project. For projects to be sustainable, they must originate from the community's needs and prioritization which assures them that their opinions are valued and therefore develop positive attitudes towards the projects.

However, certain conditions may influence the outcome of community participation in water projects. These include the policies that guide partner interaction with the communities that are funded in order to get safe water points, which highlight the funding procedures and the ceilings for a given project. This determines how the community participates in these water projects during design, planning, implementation, monitoring and evaluation.

2.5.1 Conceptual Framework



Source: Researcher (2013)

Figure 2.5.1 Conceptual Framework of the Study

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction to Proposed Methodology

This section deals with the methodology used for the research and contains issues of research design, target population and sample design. It also has a section on how data was collected and analysed. It concludes with a section on the expected outputs

3.2 Study Design

A descriptive research design was used. A descriptive research design is used when the problem is well defined and the researcher knows something about the problem.

The study used a descriptive survey research design with a cross-sectional approach. A survey involves studying a situation as it is, in an attempt to explain why the situation is the way it is (Wiersma, 1999). This design allowed for accounting and adequate descriptions of activities, objects and persons. The design type not only offers descriptions and explanations, but also identifies and predicts relationships in and between the variables of the study (Mugenda and Mugenda, 2003). A Cross-Sectional approach was used to collect both qualitative and quantitative data from the respondents. The approach is relatively fast and inexpensive because it provides self-reported facts about respondents, their feelings, attitudes, opinions and habits (Kombo & Tromp, 2007, Kothari, 2007). Survey design enables researchers to make accurate assessment, inferences and relationships of phenomenon, events and issues (Kasomo, 2006).

3.3 Target Population

The population of interest were the beneficiaries of UNICEF funded rural water supplies in Lake Victoria South (Nyanza) and Lake Victoria North (Western) Water Services Board Regions. Specifically the study focused on 259 rural water supply projects comprising 213 newly constructed shallow wells fitted with hand pumps, 36

rehabilitated existing shallow wells fitted with hand pumps and 10 boreholes powered by electricity or diesel powered generators. All the facilities were managed by community groups and were serving a total population of 77,250 people. All projects were implemented between 2009 and 2010 and averaged 3 to 4 years of operation at the time of the study. The study sampled two Management Committee members of the selected facilities and one household member from each of the facilities in the three districts of Kisumu, Siaya and Busia districts (Table 1).

Table 3.1: Percentage of selected target population by region

District	Number of facilities	Target population of two management committee members and one household member	Percentage
Kisumu	76	228	29.3
Busia	106	318	41
Siaya	77	231	29.7
Total	**259**	**777**	**100**

3.4 Sampling Design

From the above population of 777 Management committee and Household members a stratified random sample of 10% was taken as indicated in Table 2 below:

Table 3.2: Sample size

District	Target Population	Sample Ratio	Sample Size
Kisumu	228	0.1	23
Busia	318	0.1	32
Siaya	231	0.1	23
Total	**777**		**78**

A stratified random sampling procedure is appropriate when the population of interest is not homogeneous and has been subdivided into mutually exclusive and heterogeneous sub populations called stratums (Mugenda and Mugenda, 2003). A 10% sample was considered representative because according to Kothari (2003) a representative sample is one that is at least 10% of the population of interest. However, Selltiz, Weightsaman and Cook as cited by Mugenda and Mugenda (2003) argued that for greater accuracy in the findings, the number in each stratum should be based on the relative variability of the characteristic in the study rather than proportionate to the relative size of the group. From the sample facilities selected, three respondents (two Management Committee members and one household) were selected. The two committee members and households were purposively sampled, as the technique allows researchers to use cases that have the required information with respect to the objectives of the study (Mugenda and Mugenda, 2003). According to Mugenda and Mugenda (2003), researchers proposing to use purposive sampling technique must specify the criteria for choosing the particular cases, in this case one executive member of the management committee and one committee member comprised members of the elected Water Management Committees (WASH Committee) who operate and maintain the water facilities under study. The other was a household representing households using the facility. The household member who came to collect water from the facility at the time of the survey at the facility was interviewed. These groups had intricate knowledge of how each of the variables affecting the operation of their water facilities and could provide insightful responses.

3.5 Data Collection Procedures/Instruments

Data was be collected by the use of questionnaire method. The questionnaires were pilot tested to determine their suitability to both the committee members and households. Two types of questionnaires– one for the management committee and the other for households were used. A drop and pick method where the questionnaires were dropped in the morning and collected in the afternoon was used. The questionnaires had both open ended and closed questions for issues related to the problem.

Three research assistants were recruited in each of the three districts to assist in data collection. The Research Assistants recruited from the local area were briefed on the process and procedures for administering and recording data. The Research Assistants were also briefed on ethical issues prior to embarking on the research. Prior information was passed to all research participants on the interview dates, locations and times. Every effort was made to ensure research participants were not inconvenienced and time lines adhered to. The study coordinator obtained consent from all relevant institutions such as the Water Service Boards, Ministry of Environment, Water and Natural Resources and relevant groups and individual participants.

3.6 Data Analysis

A qualitative and quantitative data analysis was used to analyse the research data. It followed a systematic process starting with editing of all the data obtained from the field. Every questionnaire was checked to ensure it was complete and correctly filled. This was followed by coding of all data so that it could be analysed with the aid of the Statistical Package for Social Scientists (SPSS) computer programme.

After data collection, all returned questionnaires were numbered, categorized and data coded. Specific responses to the structured questions were each assigned a number to give it a numerical code. A code book containing all the variables derived from the research objectives and research questions of the study as presented in the questionnaire was developed. Data was analysed using descriptive statistics including tables, percentages and other measures of central tendency such as the mean, mode and median. Cross tabulation was used to analyse some data using a regression model targeting the level of significance of each variable and how it influences sustainability of community managed rural water supplies.

3.7 Expected Output

The researcher expected to establish that the variables community participation, choice of technology, skills of management committees and post implementation support affect the sustainability of community based and managed water supplies and make

recommendations for policy formulation to address sustainability needs of rural water facilities.

3.8 Ethical Issues

The researcher sought the necessary authorization from relevant authorities in Government and ensured respondents adequately understood the research they were participating in. Openness and honesty in reporting research objectives, methods and results are imperatives in research. The researcher was careful not to mix views or policies of his organization on the findings. All material references were acknowledged. All information collected was treated with highest level of confidentiality.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION OF RESULTS AND DISCUSSION

4.1 Introduction

The main objective of this study was to investigate factors influencing sustainability of UNICEF supported community based and managed water supplies in three districts Kisumu, and Siaya in Nyanza Province and Busia district in Western province of Kenya. Data was collected using the instruments as described in the previous chapter. This chapter, therefore, is the presentation, interpretation and discussion of the findings from the data collected for the research study. The chapter is divided into: response rate; background of the respondents; sustainability of the water supplies; community participation and sustainability of UNICEF supported community based and managed water supplies; choice of technology and sustainability of UNICEF supported community based and managed water supplies; skills of water management committees and sustainability of UNICEF supported community based and managed water supplies and post implementation support and sustainability of UNICEF supported community based and managed water supplies.

4.2 Response Rate

A total of 78 questionnaires were administered. Out of these, 52 were administered to sampled WASH committee members and 26 to sampled households within the three study districts. The response rate was as shown in Table 4.1.

Table 4.1: Response Rate

Group	Designated Sample size	Number Achieved	Response Rate
Household	26	26	100%
WASH Committee	52	47	90.38%
Total	**78**	**73**	**93.58%**

The entire designated household sample size of 26 was achieved, representing a 100% response rate for the household respondents. However, 47 out of 52 WASH committee questionnaires were successfully administered, representing a 90% response rate. Overall, a 94% response rate was achieved. This response rate was considered credible enough to allow for generalization of the findings to the target population besides the arriving at the conclusions of the study, as, according to Necamaya (1996), a response return rate of more than 75% is enough for the study to continue.

4.3 Background of the Respondents

This section discusses the distribution of the respondent by sex, age, level of education and position held in the committee (for WASH committee respondents).

4.3.1 Sex of the Respondents

The distribution of the household respondents by sex was as shown in Table 4.2 below.

Table 4.2: Distribution of the Household Respondents by Sex

Sex of Respondent	Frequency	Percentage
Male	12	46.2
Female	14	53.8
Total	**26**	**100.0**

(Source: Field data 2013)

Fifty four percent (54%) of the household respondents were women while 46% were male. The high percentage of women respondents may be attributed to the household gender roles that confine women to household related chores such as fetching water, thus making it possible to be easily reached during household surveys such as the current study. However, a significant 46% male respondent may also be indicative of changing values where household chores such as fetching water may be shared more between men and women at the household. This is a significant departure from opinions commonly held about gender roles in household water management and may reflect the impact of recent advocacy for gender mainstreaming in the sector. Furthermore, this finding may also be significant for enhancing sustainability of water

facilities as more men begin to share in the burden of household water collection and management.

4.3.2 Distribution of the Respondents by Age

The distribution of the respondents by their age was as shown in Table 4.3.

Table 4.3: Age Distribution of the Respondents

Age	Household respondents		WASH Committee Respondents	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Under 30 years	9	34.6	8	17.0
30-40 years	6	23.1	16	34.0
Over 40 years	11	42.3	23	48.9
Total	**26**	**100.0**	**47**	**100.0**

The highest percentage of the household respondents (42%) as well as the WASH committee respondents (49%) were over 40 years of age. There were more household respondents aged less than 30 years (35%) than there were the WASH committee respondents (17%) and more of the WASH committee respondents were aged 30- 40 years (34%) as were the household respondents (23%). The high percentage of WASH committee respondents aged over 40 years may be explained by the voluntary nature of participation in WASH Committees where older people are more likely to volunteer for common community services rather than young people.

4.3.3 Respondents' Level of Education

The WASH committee respondents were asked to indicate their level of education. Education is one of the most important characteristics that might affect a person's attitude and understanding of social phenomena. Table 4.4 shows the distribution of the WASH committee respondents by their level of education.

Table 4.4: Distribution of WASH Committee Respondents by Level of Education

Level of Education	Frequency	Percentage
No formal education	4	8.5
Primary level	20	42.6
Secondary	20	42.6
College/University	3	6.4
Total	**47**	**100.0**

Equal percentages of the WASH committee respondents at 43% had either Primary level or Secondary level education, while 6% had college/university level education. At least 9% of the WASH committee respondents did not have formal education. It is significant to find that more than 91% of WASH Committee members had some formal education with 49% of these having secondary and college level education. This has implication for improving future sustainability of facilities as more and more people with higher education retire into these communities and participate in management of common services at the community level.

4.3.4 Distribution of WASH Committee Respondents by Position Held in the Committees

The WASH committee respondents were required to indicate the positions they held in their respective committees. Table 4.5 shows the distribution of the WASH committee respondents by positions held in their respective committees.

Table 4.5: Distribution of WASH Committee Respondents by Position Held

Position Held	Frequency	Percentage
Chairperson	8	17.0
Secretary	13	27.7
Treasurer	5	10.6
Member	21	44.7
Total	**47**	**100.0**

The distribution of the respondents among the executive committee and the ordinary members of the management committee was well balanced at 55% for the executive (Chairpersons, Secretaries and treasurers) and the WASH committee respondents interviewed (44.7%), Specifically, the ratios of the executive by position held comprised 27.7%, 17% and 10.6% who were secretaries, chairpersons and treasures to the WASH committees respectively.

4.4 Sustainability of the Water supplies

Preceding the determination of the factor influencing the sustainability of the UNICEF supported community based and managed water supplies, the study sought to establish the operational status of the sampled projects. This section, therefore, presents and discusses the findings from the respondents' opinions on the operations of the water supplies.

4.4.1 Age of the Water supply facilities

The WASH committee respondents were asked to indicate when their respective water supplies facilities were developed. Their responses were as shown in Table 4.6 below

Table 4.6: Age of Water Supplies Facilities

	Frequency	**Percentage**
Under 3 years	26	55.3
3-4 years	15	31.9
4-5 years	2	4.3
5-6 years	2	4.3
Over 6 years	1	2.1
Don't Know	1	2.1
Total	**47**	**100.0**

More than half of the WASH committee respondents (55%) indicated that their respective water supplies facilities had only been operational for less than three years, 32% reported that the facilities had been in operation for 3-4 years, 4% in each case for

between 4-5 and 5-6 years and 2% for over six years. At least 2% of the respondents could not remember the age of their facilities.

4.4.2 Functional Sustainability of the Water Supplies Facilities

The respondents were asked to indicate whether their water supplies facilities were functional. Their responses were as shown in Table 4.7.

Table 4.7: Functionality of the Water supplies Facilities

Functional	Frequency	Percentage
Yes	42	89.4
No	4	8.5
No Response	1	2.1
Total	**47**	**100.0**

Majority of the WASH committee respondents (89%) reported that their water supplies facilities were functional compared to 9% who reported otherwise. 2% did not respond to this question. Of those who reported that their water supplies facilities were not functional, 75% indicated that the situation had only prevailed for between 2-5 days (less than a week) while 25% indicated that the facilities had not been functional for a week. The main reason given by the respondents for the failure of the facilities to function was break down of the equipment.

4.4.3 Extent of Sustainability of the Water Supplies

All the respondents, both WASH committee and household respondents were required to indicate whether they thought the water supply facilities were sustainable. Whereas all the household respondents responded in the affirmative, 96% of the WASH committee respondents had a similar observation, with only 4% of the WASH committee respondents indicating that the water supplies were not sustainable. When asked to indicate the extent to which the water supplies were sustainable, their responses were as shown in Table 4.8.

Table 4.8: Sustainability of the Water Supplies

Extent of Sustainability	Household Respondents		WASH Committee	
	Frequency	**Percentage**	**Frequency**	**Percentage**
To a very great extent	14	53.8	16	34.0
To a great extent	7	26.9	20	42.6
Sometimes good, sometimes bad	-	-	7	14.9
To a very low extent	5	19.2	-	-
To a low extent	-	-	1	2.1
No response	-	-	3	6.4
Total	**26**	**100.0**	**47**	**100.0**

The findings indicate that whereas more than half (54%) of the household respondents and 34% of WASH committee members thought that the water supplies facilities were sustainable to a very great extent, another 27% and 43% of household and WASH committee respondents respectively thought that they were sustainable to a great extent. A significant 19% of the household respondents indicated that the facilities were sustainable to a very low extent.

4.5 Community participation and sustainability of rural water supplies

The first objective of the study was to investigate how community participation influences sustainability of UNICEF supported community based and managed water supplies in the study area. This section presents and discusses the findings and analyzes the interaction between the respondents' opinions on community participation and sustainability of the water supplies.

4.5.1 Community Participation

Household respondents were required to indicate whether the community had participated in the planning of their respective water projects. On the other hand, the WASH committee respondents were asked to indicate the extent to which they thought

the community had participated in the planning and implementation of their projects. All the household respondents confirmed that the community had participated. The WASH committee respondents' responses on the extent of community participation were as shown in Table 4.9.

Table 4.9: Community Participation

Community Participation	Frequency	Percentage
Not involved	1	2.1
To a low extent	5	10.6
To some extent	18	38.3
To a great extent	20	42.6
To a very great extent	3	6.4
Total	**47**	**100.0**

The highest percentage of the WASH committee respondents (43%) thought that the community had participated in the planning and implementation of their water projects to a great extent compared to 38% who thought that the community participated to some extent, 11% who thought that community participation was to a low extent and 6% who indicated that the community participated to a very great extent. On the other hand, the household respondents' opinion on the extent of community participation ranged from "To a great extent" (27%) to "To a very great extent" (73%).

4.5.2 Importance of Community Participation

The WASH committee respondents were asked to indicate whether community participation was important for sustainability of their water projects. Majority of the respondents at 94% responded affirmatively while 4% and 2% either gave a negative response or withheld their response to the question respectively. When asked to indicate the extent to which such participation was important, the respondents' views were as shown in Table 4.10.

Table 4.10: Importance of Community Participation

Importance of Community Participation	Frequency	Percentage
To a great extent	23	48.9
To some extent	10	21.3
No Response	4	8.5
To a low extent	3	6.4
To a very great extent	7	14.9
Total	**47**	**100.0**

The findings in the table indicate that 49% of the WASH committee respondents considered community participation as important to a great extent, 21% to some extent15% to a very great extent and only 6% considered such community participation as important to a low extent. Generally, a combined 64% of the respondents opined that community participation was important at least to a great extent. This implies that the community is well aware of the need for the community members to be actively engaged in identifying and resolving the problems affecting the community and take charge of their own destiny, an imperative for sustainability of community development projects whose ultimate goal is to improve the living standards of the community.

4.5.3 Who in the community should participate?

The respondents were asked to indicate the persons in the community that should be involved/participate in community water projects. The findings were as presented in Table 4.11.

Table 4.11: Community Participation Groups (WASH Committee Responses)

Community Participation Persons	Frequency	Percentage
Water User Association	15	31.9
Women Groups	34	72.3
Licensed Water Service Provider	3	6.4
Community leaders	35	74.5
Others	9	19.1

Majority of the WASH committee respondents thought that both the women groups and community leaders should participate in the community water projects as shown by the 72% and 75% support respectively. Similarly, 65% of the household respondents preferred the involvement of all the community members with a significant 30% supporting the involvement of community leaders and a paltry 4% in support of the WASH committees' participation. This is a significant finding as it points to changing attitudes and values in the community with respect to gender roles in water management. The finding is consistent with the distribution by sex above of those collecting household water where nearly a similar percentage of men and women came to collect household water at the facility during the interviews/research.

4.5.4 Decision-Making on Water

Household respondents were asked to indicate who, between men and women, made decisions on water in the community. Their responses were as shown in Table 4.12.

Table 4.12: Decision-Making on Water

Decision-Makers	Frequency	Percentage
Men	4	15.4
Women	13	50.0
Both Men and Women	9	34.6
Total	**26**	**100.0**

Half of the respondents reported that women were the decision-makers on water in the community, while 15% indicated that it was men who made such decisions. However, 35% of the respondents reported that both men and women were involved in decision-

making on water. The findings suggest changes in attitudes and gender based role assignments at the household and in the community with respect to the role men play in the management of household water. An increased decision making role by men in household water management has significant implications for the future sustainability of rural water supplies particularly in the study area where women traditionally played greater roles.

4.5.5 Community participation and sustainability of the water supplies

The respondents' responses on the extent of community participation and extent of sustainability of the water supplies facilities were cross-tabulated to determine the influence of community participation on the sustainability of the water supplies. The WASH committee's findings were as shown in Table 4.13.

Table 4.13: Community participation and sustainability of the water supplies

Extent of Community Participation	**Extent of Sustainability**					
	No Response	**To a low extent**	**Sometimes good, sometimes bad**	**To a great extent**	**To a very great extent**	**Total**
Not involved	-	-	-	(1)	-	**(1)**
	-	-	-	100.0%	-	**100.0%**
To a low extent	(2)	-	(2)	-	(1)	**(5)**
	40.0%	-	40.0%	-	20.0%	**100.0%**
To some extent	(1)	(1)	(3)	(10)	(3)	**(18)**
	5.6%	5.6%	16.7%	55.6%	16.7%	**100.0%**
To a great extent	-	-	(2)	(8)	(10)	**(20)**
	-	-	10.0%	40.0%	50.0%	**100.0%**
To a very great extent	-	-	-	(1)	(2)	**(3)**
	-	-	-	33.3%	66.7%	**100.0%**
Averages	**(3)**	**(1)**	**(7)**	**(20)**	**(16)**	**(47)**
	6.4%	**2.1%**	**14.9%**	**42.6%**	**34.0%**	**100.0%**

The figures in parentheses () represent frequencies

The findings indicate that all the WASH committee respondents who though that the community had participated "To a great extent" also indicated that the water supplies projects were sustainable either to a "great extent" (33%) or "To a very great extent" 67%. On the other hand, a significant 40% of those who thought that the community had participated only to a low extent rated sustainability of the water supplies as "Sometimes good, sometimes bad", with another 40% of the same group withholding their responses on sustainability of the water supplies. Those who indicated that the community had participated "To some extent" had response across all levels of sustainability, the highest relating to sustainability "To a great extent" (57%). These findings were corroborated by the respondents' responses when asked to indicate the extent to which community participation affected sustainability of UNICEF supported community managed rural water supplies as shown in Table 4.14 below.

Table 4.14: Influence of Community participation on sustainability water supplies

Influence of Community Participation	Frequency	Percentage
Very low	2	4.3
Low	8	17.0
Moderately	12	25.5
High	13	27.7
Very High	12	25.5
Total	**47**	**100.0**

The highest percentage of respondents at 28% indicated that community participation highly influenced sustainability of rural water supplies. Equal percentages of the respondents (26%) reported high and moderate influences, while 17% and 4% indicated low and very low influences respectively.

4.5.6 Relationship between Community Participation and sustainability of the water supplies

To determine the relationship between Community Participation and sustainability of the water supplies, the Likert-type questions were used. A scoring strategy was adopted for sustainability of the water supplies where a score of 5 was adopted for a "very great extent" response, 4 = "great extent", 3 = "sometimes good, sometimes bad, 2 = "low extent" and 1 = "very low extent". A similar scoring strategy was adopted for the extent of community participation where the scores ranged from 5 = "participation to a very great extent" to 1="Not involved". The Pearson's Product Moment Correlation (PPMC) was then conducted to determine the relationship between sustainability of water supplies and community participation and the findings were as shown in Table 4.15.

Table 4.15: Relationship between Community Participation and Sustainability of Water Supplies

		Sustainability of water Supplies	Community Participation
Sustainability of water Supplies	Pearson's (r)	1	.504**
	P – value		.000
	Sample size (n)	47	47
Community Participation	Pearson's (r)	.504**	1
	P – value	.000	
	Sample size (n)	47	47

***. Correlation is significant at the 0.01 level (2-tailed).*

The PPMC analysis revealed that there was a significant positive correlation between community participation and sustainability of rural water supplies (r=0.504). The correlation was of moderate strength and significant at the 0.05 level, indicating that high levels of sustainability of the water supplies was associated with greater community participation. Water supply projects that reported greater community participation also reported higher levels of sustainability. The findings are consistent with those of (Odie, 2012).

Although a significant relationship (r=.504, P<0.05) was found, the data also shows sustainability is a sector issue requiring the participation of all stakeholders including governments for putting in place the enabling environment, private sector for a reliable supply chain for improved access to spare parts and service requirements, development partners for capacity building and the community itself for accountability. These roles are interdependent and must work collectively to achieve sustainability.

4.6 Choice of technology and sustainability of rural water supplies

The second objective of the study was to determine how choice of technology affects sustainability of UNICEF supported community based and managed water supplies in the study area. This section presents and discusses findings related to the respondents' views on the choice of technology and relates the same to sustainability of the community water supplies.

4.6.1 Appropriateness of Technology

The WASH committee respondents were asked to indicate whether the technology choices were appropriate for their respective water facilities. Their responses were as shown in Table 4.16.

Table 4.16: Appropriateness of Technology Choice

Appropriateness of Technology choice	Frequency	Percentage
Yes	44	93.6
No	3	6.4
Total	**47**	**100.0**

Majority of the respondents at 94% responded affirmatively on the appropriateness of technology choice for their water facilities. This was supported by an overwhelming 96% of the household respondents who indicated that they were happy with the technology used for operating their respective water facilities. However, asked whether the technology was the most appropriate, although a majority of the WASH committee respondents at 85% responded positively, a significant 15% indicated that their respective water technology choices were not the most appropriate indicating that at least 9% of the WASH committee respondents, who had indicated that the technology

choice was appropriate were of the view that there could still be better technologies than what had been adopted. Further analysis on the extent to which the respondents thought that the technology choices were the most appropriate is as shown in Table 4.17 below.

Table 4.17: Extent of Appropriateness of Technology

Extent of Appropriateness of Technology	Frequency	Percentage
No Response	9	19.1
To a low extent	1	2.1
To some extent	13	27.7
To a great extent	17	36.2
To a very great extent	7	14.9
Total	**47**	**100.0**

The highest percentage of the respondents (36%) indicated that their respective technologies were the most appropriate to "a great extent" while 28% indicated that they were appropriate "to some extent". However, a significant 19% of the respondents did not respond to the question of the extent of appropriateness.

4.6.2 Community Participation in Technology Choice

The study sought to establish whether the community had been involved in deciding the technologies adopted for their water facilities. To this end, 72% of the WASH committee respondents confirmed community participation while 26% indicated that the community had not participated. At least 2% of the respondents did not respond to the question. Asked to indicate the extent to which the community had been involved in choosing the technologies, their responses were as shown in Table 4.18.

Table 4.18: Community Participation on Technology Choice

Community Participation in Choice of Technology	Frequency	Percentage
No Response	13	27.7
To a low extent	2	4.3
To some extent	11	23.4
To a great extent	17	36.2
To a very great extent	4	8.5
Total	**47**	**100.0**

The findings indicate that 36% of the WASH committee respondents reported that community had participated in choosing the technology "to a great extent", 23% indicated participation "to some extent" while 9% and 4% reported that the community had participated in the choice of the technology either to a "very great extent" or to a "low extent" respectively. The 28% who did not respond represents the group who had indicated that the community did not participate and those who did not respond to the prior question on community participation in technology choice.

4.6.3 Choice of technology and sustainability of water supplies

The respondents' responses on the appropriateness of technology choice and extent of sustainability of the water supplies facilities were cross-tabulated to determine the influence of appropriateness of technology choice on the sustainability of the water supplies. The WASH committee's findings were as shown in Table 4.19.

The findings indicated that where the respondents rated the choice of technology highly, the water supplyproject was equality rated to be more sustainable compared to where choice of technology was lowly rated. For instance, among those who indicated that the choice of technology was the most appropriate for their projects to a very large extent, 43% and 29% respectively also indicated that their water supply facilities were sustainable to a large extent and to a very large extent respectively. This trend was also replicated to the group who rated choice of technology as appropriate to a large extent, where 41% and 47% respectively thought that their water supply facilities were sustainable to a large extent and to a very large extent respectively. On the contrary, majority of those who indicated that the technology choice was the most appropriate

only “to some extent” (69%) rated sustainability as “sometimes good, sometimes bad”, reflective the level of uncertainty of project sustainability. Those who did not respond to the question on the extent to which technology choice was the most appropriate also remained skeptical about the sustainability of the water supply facilities.

Table 4.19: Choice of technology and sustainability of water supplies

Appropriateness of Technology Choice	**Extent of Sustainability**					
	No Response	**To a low extent**	**Sometimes good, sometimes bad**	**To a great extent**	**To a very great extent**	**Total**
No Response	-	(1)	-	(1)	(7)	**(9)**
	-	11.1%	-	11.1%	77.8%	**100.0%**
To a low extent	-	-	1	-	-	**(1)**
	-	-	100.0%	-	-	**100.0%**
To some extent	(2)	-	(2)	(9)	-	**(13)**
	15.4%	-	15.4%	69.2%	-	**100.0%**
To a great extent	-	-	(2)	(7)	(8)	**(17)**
	-	-	11.8%	41.2%	47.1%	**100.0%**
To a very great extent	(1)	-	(1)	(3)	(2)	**(7)**
	14.3%	-	14.3%	42.9%	28.6%	**100.0%**
Averages	**(3)**	**(1)**	**(7)**	**(20)**	**(16)**	**(47)**
	6.4%	**2.1%**	**14.9%**	**42.6%**	**34.0%**	**100.0%**

The figures in parentheses () represent frequencies

The respondents’ views on the influence of technology choice on sustainability of UNICEF supported community managed rural water supplies were as shown in Table 4.20.

Table 4.20: Influence of Technology Choice on Sustainability of Water Supplies

Influence of Technology Choice	**Frequency**	**Percentage**
Low	3	6.4
Moderately	18	38.3
High	19	40.4
Very High	7	14.9
Total	**47**	**100.0**

More than half of the respondents (55%) reported that technology choice influenced sustainability of UNICEF supported community managed rural water supplies at least to a high extent while 38% thought that such influence was moderate. Cumulatively, at least 94% of the WASH committee indicated that technology choice influenced the sustainability of UNICEF supported community managed rural water supplies at least to a moderate degree. To confirm this, when asked whether they thought technology influenced sustainability of their project, 94% of the WASH committee respondents responded on the affirmative while 6% denied that technology influenced sustainability of their water supplies projects.

4.6.4 Relationship between Choice of Technology and sustainability of the water supplies

The respondents' responses on the question related to the extent to which they thought the technology chosen was the most appropriate was scored on a 5-point scale, where appropriateness of the technology ranged from "to a very great extent" with 5 points to "not at all" with 1 point. These scores were used to compute the Pearson's Product Moment Correlation (PPMC) between choice of technology and sustainability of the water supplies. The results of correlation analysis were as shown in Table 4.21.

Table 4.21: Relationship between Choice of Technology and sustainability of the water supplies

		Sustainability of water Supplies	Choice of Technology
Sustainability of water Supplies	Pearson's (r)	1	.296*
	P – value		.043
	Sample size (n)	47	47
Choice of Technology	Pearson's (r)	.296*	1
	P – value	.043	
	Sample size (n)	47	47

**. Correlation is significant at the 0.05 level (2-tailed).*

The PPMC analysis indicated that there was a significant but weak, positive correlation between choice of technology and sustainability of the water supplies (r=0.296). The correlation was significant at the 0.05 level. The more the beneficiaries felt that the technology adopted was the most appropriate augmented by community participation in choosing the technology, the more likely that the water supply project would be sustainable.

4.7 Skills of Water Committees and sustainability of rural water supplies

The third objective of the study was to examine how skills of Water Committees influences sustainability of UNICEF supported community based and managed water supplies in the study area. This section presents findings on the management of the water supply facilities, training of the management committees and adequacy of the skills. The later sub-section explores the interaction between the skills of the management committees and sustainability of the water supplies.

4.7.1 Management of Water Supplies

The respondents were asked to indicate the persons managing their water supply facilities. Their responses were as shown in Table 4.22 below.

Table 4.22: Management of the Water Supplies

Management Water Supplies	Frequency	Percentage
No Response	1	2.1
Water Committee	37	78.7
Women Group	9	19.1
Total	**47**	**100.0**

The findings indicate that majority of the water supplies were managed by water committees as alluded to by 79% of the respondents. A significant 19% of the respondents indicated that their water supply facilities were managed by women groups, while 2% did not indicate the persons charged with the responsibility of managing their water facilities.

4.7.2 Adequacy of Management Skills

The WASH committee members were required to indicate whether they thought they had adequate skills to manage their water facilities. Their responses were as shown in Table 4.23.

Table 4.23: Adequacy of Management Skills

Adequacy of Management Skills	Frequency	Percentage
No Response	1	2.1
Yes	38	80.9
No	8	17.0
Total	**47**	**100.0**

Majority of the WASH committee members (81%) indicated that indeed, they had adequate skills to manage their water facilities while 17% thought otherwise. At least 2% did not indicate whether they had or did not have such skills. The extent to which the respondents thought that they had adequate skills was as shown in Table 4.24 below.

Table 4.24: Extent of Adequacy of Management Skills

Extent of Adequacy of Management Skills	Frequency	Percentage
No response	9	19.1
Not at all	1	2.1
To a low extent	7	14.9
To some extent	22	46.8
To a great extent	5	10.6
To a very great extent	3	6.4
Total	**47**	**100.0**

The highest percentage of the WASH committee members (47%) thought that they had adequate management skills "to some extent". A cumulative 17% indicated that they had adequate management skills at least to a "great extent" while 15% indicated that

they had such skills only to a "low extent". At least 19% did not indicate the extent to which they possessed adequate management skills. However, these findings were contradicted by the household respondents' majority (89%) who felt that the committee had the necessary skills to manage their water facility sustainably. Only 11% of the household respondents thought that the WASH committees did not have the necessary skills to manage their water facility sustainably.

4.7.3 Training of the Management Committees

The types of training received by the management committee members were as shown in Table 4.25.

Table 4.25: Type of Training received by WASH Committees

Type of training	Frequency	Percentage
Operation & Maintenance	26	55.3
Management	29	61.7
Book Keeping	16	34.0
Others	13	27.7

The findings indicate that 62% of the respondents had been trained on management, 55% had also received training on operation and maintenance and 34% on book keeping. 28% of the WASH committee members had received other types of training that mainly included kiosk operation and trouble shooting for first line repairs of the hand pumps.

4.7.4 Skills of Water Management Committees and sustainability water supplies

The WASH committee respondents' rating of the extent of adequacy of skills of water management committee and extent of sustainability of the water supplies facilities were cross-tabulated to determine the influence of skills of water management committee on the sustainability of the water supplies. The findings were as shown in Table 4.26.

Table 4.26: Skills of Water Management Committees and sustainability water supplies

WASH Committee Management Skills	Extent of Sustainability					Total
	No Response	To a low extent	Sometimes good, sometimes bad	To a great extent	To a very great extent	
No Response	-	-	(2)	(2)	(5)	**(9)**
	-	-	22.2%	22.2%	55.6%	**100.0%**
Not at all	-	-	-	-	(1)	**(1)**
	-	-	-	-	100.0%	**100.0%**
To a low extent	(1)	-	-	(5)	(1)	**(7)**
	14.3%	-	-	71.4%	14.3%	**100.0%**
To some extent	(2)	(1)	(4)	(8)	(7)	**(22)**
	9.1%	4.5%	18.2%	36.4%	31.8%	**100.0%**
To a great extent	-	-	-	(4)	(1)	**(5)**
	-	-	-	80.0%	20.0%	**100.0%**
To a very great extent	-	-	(1)	(1)	(1)	**(3)**
	-	-	33.3%	33.3%	33.3%	**100.0%**
Averages	**(3)**	**(1)**	**(7)**	**(20)**	**(16)**	**(47)**
	6.4%	**2.1%**	**14.9%**	**42.6%**	**34.0%**	**100.0%**

The figures in parentheses () represent frequencies

The percentages in the table indicate that among those who indicated that they had adequate management skills to a great extent, 80% equally indicated that the water supplies were sustainable to a great extent while the other 20% thought that sustainability of the water supplies was to a very great extent. 71% of those who indicated that the adequacy of their management skills was to a low extent, thought sustainability of the water supply facilities was to a great extent, and so, were 56% of those who did not indicate the extent to which they had adequate management skills but reported sustainability to a very great extent. WASH committee members who had reported possessing adequate management skills to a very great extent were equally distributed in their responses to sustainability from "sometimes good, sometimes bad", "to a great extent" and "to a very great extent". However, the group that alluded to

having adequate management skills only "to some extent" had responses distributed across all the levels of sustainability as shown in the table. The findings suggest that adequacy of skills of management committees while important, does not in itself alone lead to sustainability of rural water supplies. Asked to indicate the extent which skills of committee members affected sustainability of UNICEF supported community managed rural water supplies, the responses of the WASH committee members were as shown in Table 4.27 below.

Table 4.27: Influence of Skills of committee members on sustainability water supplies

Influence of Management Committee Skills	**Frequency**	**Percentage**
Very low	1	2.1
Low	3	6.4
Moderately	19	40.4
High	19	40.4
Very High	5	10.6
Total	**47**	**100.0**

The highest and equal percentages of the WASH committee members (40%) reported that Skills of committee members either highly or moderately influenced the sustainability of UNICEF supported community managed rural water supplies. At least 11% reported that skills of the management committee influenced sustainability of the projects to very high extent, while 6% and 2% respectively reported low and very low levels of such influence.

4.7.5 Relationship between Skills of Water Management Committees and sustainability water supplies

The respondents' responses to the Likert-like question on adequacy of skills to manage their respective water facilities were scored on a five-point scale, where the score range varied from 5 for adequacy of management skills "to a very great extent" to 1 for

adequacy rated as "not at all". The scores were then correlated with the scores for sustainability of the water supplies and the findings were as shown in Table 4.28.

Table 4.28: Relationship between Skills of Water Management Committees and sustainability water supplies

		Sustainability of water Supplies	Skills of Water Management Committees
Sustainability of water Supplies	Pearson's (r)	1	.370*
	P – value		.010
	Sample size (n)	47	47
Skills of Water Management Committees	Pearson's (r)	.370*	1
	P – value	.010	
	Sample size (n)	47	47

**. Correlation is significant at the 0.05 level (2-tailed).*

There was a significant positive relationship between skills of water management committees and sustainability water supplies (r=0.37). The correlation was statistically significant at the 0.05 level of significance, indicating that WASH committee members who had higher management skills also reported higher levels of project sustainability. Thus, sustainability of rural water supplies is associated with higher managerial skills of the WASH committees.

4.8 Post implementation support and sustainability of rural water supplies

The fourth and final objective of the study was to determine how post implementation support influences sustainability of UNICEF supported community based and managed water supplies in the study area. This section presents and discusses post-implementation support in terms of the type, the agencies involved and the duration over which such support is provided. The section also explores the influence of the post-implementation support on the sustainability of the water supplies.

4.8.1 Type of Post-Implementation Support

The WASH committee respondents were asked to indicate if they got any post-implementation support from the water supplies funding agencies/partners. Majority of the respondents at 66% indicated that they did not receive post-implementation support while 34% responded positively. The types of post-implementation support provided were as shown in Table 4.29.

Table 4.29: Type of Post-Implementation Support

Type of post-implementation support	Frequency	Percentage
No response	33	70.2
Community sensitization and organization	2	4.3
Operation and Maintenance training	5	10.6
Monitoring and guidance	7	14.9
Total	**47**	**100.0**

The findings indicate that 15% of the respondents received monitoring and guidance post-project implementation support, 11% received operation and maintenance training while only 4% were supported in community sensitization and organization after the projects had been implemented. Majority of the 70% who did not respond to the question on the type of training received included the 66% who had indicated that they did not receive any post-implementation support.

4.8.2 Agencies Providing Post-Implementation Support

The agencies that provided post-implementation support as per the WASH committee members' responses were as shown in Table 4.30.

Table 4.30: Agencies Giving Post-Implementation Support

Agency	Frequency	Percentage
No Response	31	66.0
District Water Office	4	8.5
Regional Water Services Board	9	19.1
NGO partner	3	6.4
Total	**47**	**100.0**

The highest percentage of the WASH committee members (19%) reported that they got post-implementation support from the Regional Water Services Board, 9% from the District Water Office and 6% from the NGO partners. The 66% represented the WASH committee members who had earlier reported that they did not receive any post-implementation support.

4.8.3 Duration of Post-Implementation Support

The respondents were asked to indicate the period for which post-implementation support was required. Their responses were as shown in Table 4.31 below.

Table 4.31: Duration of Post-Implementation Support

Duration of Post-Implementation Support	Frequency	Percentage
No response	3	6.4
A few months after handing over of project	2	4.3
One year after handing over	5	10.6
Two years after handing over	4	8.5
Continuously	33	70.2
Total	**47**	**100.0**

Majority of the WASH committee members at 70% indicated that post-implementation support was required continuously, 11% wanted post-implementation support up to one year after handing over of the project, 9% wanted such support provide across a two-year period after handing over while only 4% wished that such supported would be provided for a few months after handing over of project.

4.8.4 Post-implementation support and sustainability of water supplies

The respondents' responses on the provision of post-implementation support and extent of sustainability of the rural water supplies were cross-tabulated to determine the influence of post-implementation support on the sustainability of the water supplies. The findings were as shown in Table 4.32 below.

Table 4.32: Post-implementation support and sustainability of water supplies

Post-Implementation Support	Extent of Sustainability					
	No Response	**To a low extent**	**Sometimes good, sometimes bad**	**To a great extent**	**To a very great extent**	**Total**
Yes	(2)	-	(3)	(8)	(3)	**(16)**
	12.5%	-	18.8%	50.0%	18.8%	**100.0%**
No	(1)	(1)	(4)	(12)	(13)	**(31)**
	3.2%	3.2%	12.9%	38.7%	41.9%	**100.0%**
Averages	**(3)**	**(1)**	**(7)**	**(20)**	**(16)**	**(47)**
	6.4%	**2.1%**	**14.9%**	**42.6%**	**34.0%**	**100.0%**

The figures in parentheses () represent frequencies

The findings indicate that half of those who reported that they had received post-implementation support indicated that their water supplies facilities were sustainable "to a great extent" while 19% in each case reported that their facilities were either sustainable to "a very great extent" or were "sometimes good, sometimes bad". On the other hand, those who had not received post-implementation support reported sustainability across all levels ranging from sustainability "to a low extent" to "a great extent", with a significantly high percentage (13%) indicating that sustainability was "sometimes good, sometimes bad". These findings were supported by the respondents' views on the extent to which post-implementation support influenced sustainability of UNICEF supported community managed rural water supplies as shown in Table 4.33.

Table 4.33: Influence of Post-Implementation Support on sustainability water supplies

Influence of Post-Implementation Support	Frequency	Percentage
Very low	3	6.4
Low	8	17.0
Moderately	14	29.8
High	14	29.8
Very High	8	17.0
Total	**47**	**100.0**

Whereas the highest and equal percentages of the WASH committee members reported that post-implementation support either highly or moderately influenced sustainability the rural water supplies (30% in each case), other equal percentages (17%) either reported very high or low influence of post-implementation support respectively as shown in the table. Only 6% of the respondents thought that the influence of post-implementation support was very low.

4.8.5 Relationship between Post-implementation support and sustainability of water supplies

A scoring strategy was adopted for the respondents' responses on the length of post-implementation support, where a score of 1 was adopted for support provided for "a few months after handing over of the project", 2 for "one year after handing over", 3= "two years after handing over" and 5 =" continuous post-implementation support". These scores were used conduct the Pearson's Product Moment Correlation analysis against the scores for project sustainability and the findings were as shown in Table 4.34.

Table 4.34: Relationship between Post-implementation support period and sustainability of water supplies

		Sustainability of water supplies	Post-implementation support
Sustainability of water supplies	Pearson's (r)	1	.219
	P – value		.139
	Sample size (n)	47	47
Post-implementation support	Pearson's (r)	.219	1
	P – value	.139	
	Sample size (n)	47	47

The PPMC analysis revealed that there was no significant relationship between the length of post-implementation support period and the sustainability of the rural water supplies. This indicates that sustainability of the water supplies was not associated with longer periods of post-implementation support. When a community identifies its needs and adequately participates throughout the project cycle, they take responsibility for the project to ensure long term benefits to the community even without external support. Thus, while some post implementation support is desirable, the community may not require long-term post-implementation support which explains the insignificant correlation between the length of post-implementation support period and the sustainability of the water supply facilities in the study locations.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study sought to answer four questions relating to how each independent variable influences the dependent variable of sustainability of community managed and operated rural water supplies in Kenya. The study was conducted on UNICEF funded projects in Kisumu, Siaya and Busia districts in Nyanza and Western Kenya respectively. This chapter presents a summary of the findings, conclusions and recommendations. The chapter further summarizes the contribution to the existing body of knowledge and gives suggestions for areas of further research arising from the gaps identified.

5.2 SUMMARYOF THE FINDINGS/ANSWERS TO RESEARCH QUESTIONS

Of the 78 questionnaires administered (52 for sampled Water Management Committee members and 26 on households) during the study, 47 of the 52 water management committee questionnaires were returned representing a 90% return rate, while 100% of the household questionnaires were returned. Overall, a 94% response rate was achieved. Fifty four percent (54%) of the household respondents were women while 46% were male. The highest percentage of the household respondents (42%) as well as the WASH committee respondents (49%) were over 40 years of age. There were more household respondents aged less than 30 years (35%) than there were the WASH committee respondents (17%) and more of the WASH committee respondents were aged 30- 40 years (34%) as compared to the household respondents (23%).

An equal number of the WASH committee respondents had primary or secondary level education at 43%, while 6% had college/university level education. At least 9% of the WASH committee respondents did not have formal education. More than 91% of WASH Committee members had some formal education with 49% of these having secondary and college level education.

Of the WASH committee respondents (55%) indicated that their respective water supplies facilities had been operational for less than three years, 32% reported that the facilities had been in operation for 3-4 years, 4% in each case for between 4-5 and 5-6 years and 2% for over six years. At least 2% of the respondents could not remember the age of their facilities. On the extent of sustainability of the facilities, all the household respondents responded in the affirmative, while 96% of the WASH committee respondents had a similar observation, with only 4% of the WASH committee respondents indicating that the water supplies were not sustainable.

5.2.1 Community Participation and Sustainability

The study found that community participation was important to sustainability of rural water supply projects as agreed by 94% of the respondents surveyed. Generally, a combined 64% of the respondents agreed that community participation was important for sustainability at least to a great extent. There was a significant positive correlation between community participation and sustainability of water supplies ($r=0.504$, $p< 0.05$). The correlation was of moderate strength and significant at the 0.05 level, indicating that high levels of sustainability of the water supplies was associated with greater community participation.

5.2.2 Choice of Technology and sustainability

At least 94% of the respondents agreed that technology choice influenced the sustainability of UNICEF supported community managed rural water supplies at least to a moderate degree. The findings indicate that where the respondents rated the choice of technology highly, the water supply project was equality rated to be more sustainable compared to where choice of technology was lowly rated. A Pearson's Product Moment Correlation analysis indicated that there was a significant but weak, positive correlation between choice of technology and sustainability of the water supplies ($r=0.296$, $p< 0.05$). The correlation was significant at the 0.05 level. The more the beneficiaries felt that the technology adopted was the most appropriate augmented by community participation in choosing the technology, the more likely that the water supply project would be sustainable.

5.2.3 Skills of Water Management Committees and Sustainability

On the influence of skills of water management committees on sustainability, a cumulative 91% of the respondents agreed that the skills of water management committees influence sustainability of rural water supplies either moderate or highly. With respect to the adequacy of skills of the water management committees, the study found that only 47% of the respondents thought that they had adequate management skills. A Pearson's Product correlation analysis showed there was a significant positive relationship between skills of water management committees and sustainability of water supplies ($r=0.37$, $p< 0.05$). The correlation was statistically significant at the 0.05 level of significance, indicating that WASH committee members who had higher management skills also reported higher levels of project sustainability. Thus, sustainability of rural water supplies is associated with higher managerial skills of the WASH committees.

5.2.4 Post Implementation Support and Sustainability

An equal percentage of 30% of the respondents each agreed that post-implementation support either highly or moderately influenced sustainability of rural water supplies. Thus 60% of the respondents agreed that post implementation is important to some extent. A Pearson's Product Correlation analysis revealed that there was no significant relationship between the length of post-implementation support period and the sustainability of rural water supplies project ($r=.219$, $p< 0.05$) This indicates that sustainability of the water supplies was not associated with longer periods of post-implementation support. However, majority of the WASH committee members at 70% indicated that post-implementation support was required continuously.

5.3 CONCLUSIONS

The study found community participation was important for achieving sustainability of rural water supply projects in the study area. The study further found the participation of women groups and community leaders is desirable for achieving sustainability. More

importantly, both men and women were found to be involved in decision-making on water at the household. This finding suggests changing attitudes on gender based role assignments at the household where decisions on water at the household were traditionally associated with women and girls. The increased participation of men in household water management has significant implications for enhancing future sustainability of rural water supplies. More importantly the study shows sustainability is a sector issue requiring interdependent actions of many stakeholders at all levels including national and regional governments, the private sector, development partners and the community itself. Communities on their own cannot be expected to achieve long term sustainability of rural water supplies without an enabling environment. The sector must take deliberate steps to address itself to sustainability as a sector issue and put in place policy frameworks needed to achieve it.

The findings indicate that where the selected technology is the preferred choice, the water supply project was equally rated to be more sustainable compared to where choice of technology was not the preferred choice or community did not adequately participate in the selection of technology. Project planners must therefore allow for wider consultation and participation in decisions relating to choice of technology for rural water supplies. The weak link between technology and sustainability found is explained by the fact that technology choice is influenced by water source characteristics, settlement pattern of the users, demand, access to spare parts, cost of operation and ability of the consumers to pay for the services. Thus choice of a technology however appropriate in itself alone does not render a project sustainable in the long run for such factors as the source characteristics which have strong influence on selection of technology options are beyond the project and beneficiaries control. Technology is therefore only appropriate to the extent other mitigating parameters are also present.

Sustainability of rural water supplies is associated with high levels of managerial skills of the WASH committees. The high number of members of water management committee members with basic and college level education has increased capacity of water committees to develop and utilize management, operation and maintenance skills required for enhancing sustainability. Those committees who indicated that they had

adequate management skills, also felt that their water supplies were sustainable to a great extent. Committees with higher levels of education and skills network better with their consumers increasing participation of beneficiaries and partner agencies. In addition, such committees can use and make decisions on shared information including use of information technology. Project planners should set new criteria for election of management committees including minimum education levels.

The study shows evidence of increasing participation of men in the collection and management of household water, sharing the burden with women and girls traditionally associated with collection and management of household water. This may be a reflection of changing attitudes and redefinition of long held traditional values arising from increased gender mainstreaming in project planning and implementation in recent years. Project planners should build on this trend by strengthening gender mainstreaming programming approaches as it has important implications for enhancing future sustainability of rural water supplies.

The study found there was no significant relationship between the length of post-implementation support and the sustainability of rural water supplies. This indicates that sustainability of the water supplies was not associated with longer periods of post-implementation support, majority of the water committee members indicated that post-implementation support was required continuously. Training on O&M and management and monitoring were some of the areas respondents identified as requiring post implementation support. Most facilities did not receive any support from external actors after project handover.

5.4 RECOMMENDATIONS

Increasing community participation in project design and implementation is associated with sustainability of rural water supplies in Kenya. Increased community participation increases sense of ownership of projects among the community members. Programme and project designers must make provision for community participation right from the start of the project. This includes making funding available for the community

processes including social mobilization, organization and training of the communities. Sustainability is a sector issue that requires the collective efforts of all stakeholders to achieve. The sector must put in place the enabling environment including policy and legal frameworks for accountability necessary for achieving sustainability.

Selecting appropriate technology is a primary concern of every project manager, for without technology safe sources cannot be exploited. Project designers must take into account all parameters mitigating selection of technology including source characteristics, demand and adequacy of source and cost of operation and maintenance before making choices. Such factors as affordability, access to spare parts and quality of water are also important factors that influence long term sustainability of facilities. Planners must involve target communities in comprehensive analysis of the above parameters so that beneficiaries can appreciate their responsibilities clearly from the beginning.

Skilled water management committees are fundamental to achieving sustainable rural water supplies. Managing water supplies involves complex operations, processes and decisions in addition to coordination challenges with multiple stakeholders. Skills of water committees must therefore be continuously increased including setting minimum education and skills levels for effective participation in water committees. Incentivizing water committees should also be considered as a strategy for attracting and retaining people with skills as volunteerism in the long run is unsustainable. Such incentives may include participation in learning exchange visits, regional or national level recognition awards for community service, gifts such as bicycles/motor cycles after a certain period of successful service at the facility and repeat trainings.

Post implementation support is not strongly associated with sustainability of rural water supplies although some level of support is desirable. Many rural water supplies managed by communities do not collect enough revenue to meet their operation and maintenance costs and future replacement of facilities/capital equipment. Nor do these facilities receive subsidies from government like their urban company operated systems. Setting tariffs to cover operation, maintenance and future replacements costs will make water unaffordable by these communities. The alternative will continue to

undermine long self- reliance of communities and sustainability of rural water supplies. The sector must address itself to this reality and define what level of sustainable services may be expected from unsubsidized rural water supplies. A sector analysis and policy direction on standardizing and regulating tariffs chargeable at rural water supplies is urgently required to enhance accountabilities of service providers and define desirable service levels for people living in rural areas of Kenya.

5.5 SUGGESTIONS FOR FURTHER STUDIES

The study recommends further review and study of the policy and legal framework necessary for achieving sustainability of rural water supplies. The regulatory framework for an enabling environment for the creation of accountability among water management committees is currently absent. Further research on areas requiring post implementation support is also recommended as many rural water facilities begin to experience challenges after the third year of implementation.

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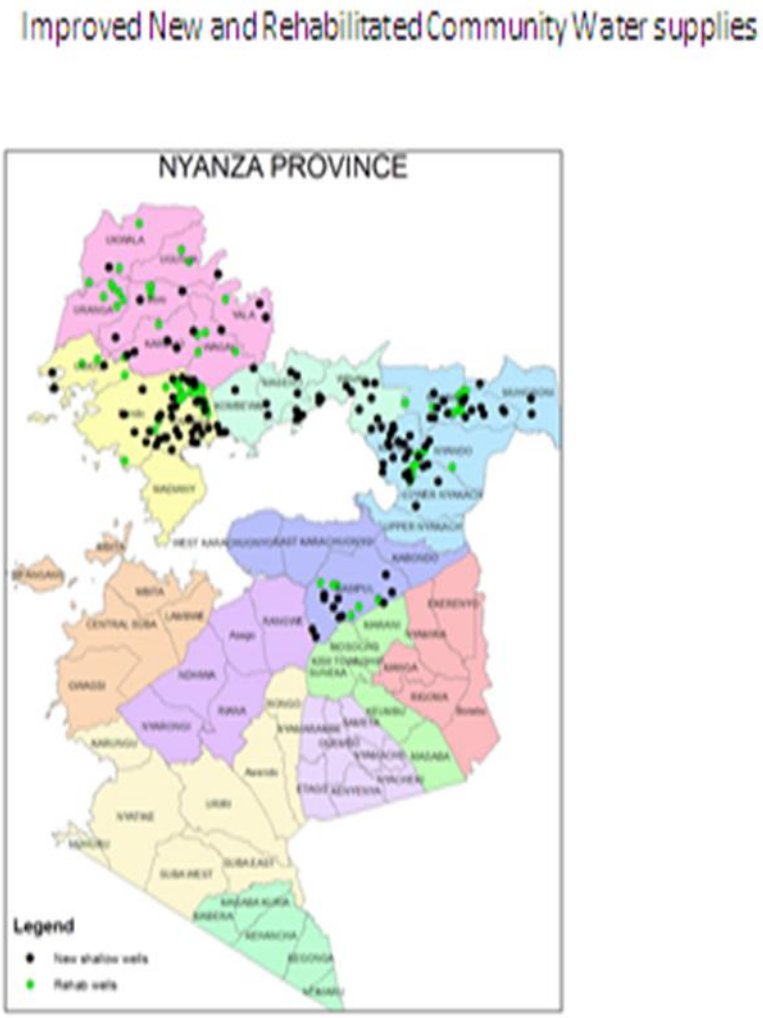
6. APPENDICES

APPENDIX I: Map of the Study area



APPENDIX 1I: Questionnaires for WASH Committees

Research Questionnaire for a study on factors influencing sustainability of rural water supplies in Kenya.

This questionnaire seeks to establish the various determinants of project sustainability that influence the sustainability of UNICEF funded community water projects in Lake Victoria South and Lake Victoria North Water Service Board regions. The items in the questionnaire are for academic research purposes only. All information given will be treated with utmost confidentiality. You are not required to fill in your names.

Instructions

Please fill in the blanks or Tick (√) where appropriate to provide the information requested.

Region…….Name of Data Collector…….....……Date…….....…….

Name of Water Supply…….....…….

Contact Telephone of the interviewee…….....…….

Section A:

General Information: Please tick one.

1. Your Age: a) Under 30 years ☐ b) 30-40 years ☐ c) Over 40 years ☐

2. What position do you hold in the committee?

A) Chairperson ☐ b) Secretary ☐ c) Treasurer ☐

d) Other,

Specify…….....……

3. What is your education level?

a) No formal education ☐ b) Primary level ☐ c) Secondary ☐

d) college/University ☐

4. Type of water facility
    a. Protected shallow well ☐
    b. Borehole ☐
    c. Surface water supply ☐
5. Power source for the facility
    a. Hand pump ☐
    b. Electricity ☐
    c. Diesel powered generator ☐
    d. Solar power ☐
    e. Other (please specify)…….....….....

Section B:

Sustainability and water supplies: Please select one

6. When was the facility developed?
    a. Under three years ☐
    b. Between three and four years ago ☐
    c. Between four and five years ago ☐
    d. Between five and six years ago ☐
    e. Other (please specify)….....…….....….....

7. Is the facility functional?
    a. Yes ☐
    b. No ☐
8. If no, for how long?
    A- One Week ☐
    B- Two Weeks ☐
    C- Three weeks ☐
    D- One Month ☐
    E- Other, please specify…….……..

9. Give the reason for facility not operating?
    a. Broken down equipment ☐
    b. Electricity disconnected ☐
    c. No fuel for the equipment ☐
    d. No one to operate ☐
    e. Other (please specify)

    …….……

10. Do you think your water supply is Sustainable? Yes ☐ No ☐
11. If yes, to what extent? (Rank 1 - 5)
    5 - A very great extent ☐
    4 - A great extent ☐
    3 - Sometimes good, sometimes bad ☐
    2 - To a low extent ☐
    1 - To a very low extent 1 ☐

12. If no, please explain.....

.....

.....

13. What do you think influences sustainability of the facility? Tick all that apply.

a) Community participation ☐ b) Technology used ☐

c) Skills of the Water Committee ☐

d) Post implementation support ☐

f) Other,

explain…….....…….....

Section C:

Community participation and sustainability: Please select one

14. To what extent do you think the community participated in the planning and implementation of this project? (Rank 1 - 5)

5. To a very great extent ☐
4. To a very good extent ☐
3. To some extent ☐
2. To a low extent ☐
1. Not involved ☐

15. Do you think community participation is important for sustainability of your project?

Yes ☐ No ☐

16. If yes, to what extent? (Rank 1 - 5)

5. To a very great extent ☐
4. To a very good extent ☐

3. To some extent ☐
2. To a low extent ☐
1. Not important ☐

17. If No, Please explain.....

18. Who in the community should participate?
    a) Water User Association ☐
    b) Women Groups ☐
    c) Licensed Water Service Provider ☐
    d) Community leaders ☐
    e) Other (please Specify)…….....…….

19. Suggest what can be done on community participation to enhance sustainability of your water facility?.....
    .....

Section D:

Choice of Technology and sustainability

20. Was the technology choice appropriate for the water facility? Yes ☐ No ☐
21. Do you think technology influences sustainability of your project? Yes No No☐
22. Was the community involved in deciding the choice of technology used in your water facility? Yes ☐ No ☐

23. If Yes, to what extent? (Rank 1 - 5)
    5 - To a very great extent ☐

4 - To a great extent ☐

3 - To some extent ☐

2 - To a low extent ☐

1 - No involved ☐

24. If No, Please explain……..……

.....

.....

25. Do you think this is the most appropriate technology for the facility?

Yes ☐ NO ☐

26. If yes, to what extent? (Rank 1 - 5)

5 - To very very great extent ☐

4 - To a very great extent ☐

3 - To a great extent ☐

2 - To a low extent ☐

1- Not at all ☐

27. If no, why?

Explain.....

.....

.....

28. What do you think should be done to the current technology to enhance sustainability of the water facility?.....

.....

.....

Section E:

Skills of water Committees and sustainability: Please select one

29. Who manages your water facility?

A. Water Committee

B. Women Group

C. Licensed Water Service Provider

D. Other, Please specify……

30. Do you think you have adequate skills to manage the water facility? Yes ☐ ☐

No

31. If yes, to what extent? (Rank 1 - 5)

5 -To a very great extent ☐

4 - To a very great extent ☐

3 -To a great extent ☐

2 -To a low extent ☐

1 - Not at all ☐

32. What kind of training have you had?

Operation & Maintenance ☐

Management ☐

Book Keeping ☐

Other, specify……..

33. What can be done to enhance your skills to better ensure sustainability of your water

facility?.....

.....

.....

Section F:

Post Implementation Support and sustainability. Please select one

34. Do you get any post implementation support from funding agency/partner

Yes ☐ No ☐

35. If yes, please state type

a. Community sensitization and organization ☐
b. O&M training ☐
c. Supply of spare parts ☐
d. Monitoring and guidance ☐
e. No external support ☐
f. Other (please specify)…….....……..

36. From which agencies do you get post implementation support?

a. District Water Office ☐
b. Regional Water Service Board ☐
c. Donor ☐
d. NGO partner ☐
e. Other (please specify)…….....……

37. For how long is post construction support required?

a. A few months after handing over of project ☐
b. One year after handing over ☐
c. Two years after handing over ☐
d. Continuously ☐
e. Other (please specify)…….....…….....

38. What kind of post implementation support do you need? Please state;

.....

.....

.....

39. To what extent do each of the following affect sustainability of UNICEF supported community managed rural water supplies: **Please circle one for each**

(i) Community participation Very low Low Moderately High Very High

(ii) Technology Choice Very low Low Moderately High Very High

(iii) Skills of committee members Very Low Low Moderately High Very High

(iv) Post implementation support Very Low Low Moderately High Very High

Appendix III: Household Questionnaires

Research Questionnaire for a study on factors affecting sustainability of rural water supplies in Kenya.

This questionnaire seeks to establish the various determinants of project sustainability that influence the sustainability of UNICEF funded community water projects in Lake Victoria South and Lake Victoria North Water Service Board regions. The items in the questionnaire are for academic research purposes only. All information given will be treated with utmost confidentiality. You are not required to fill in your names.

Instructions

Please fill in the blanks or circle where appropriate to provide the information requested.

Region……Name of Data Collector……Date…….

Name of Water Supply……..

Contact Telephone of the interviewee……..

Section A:

General Information: Please circle one.

4. Your Age: a) under 30 years, b) 30-40 years, c) Over 40 years
5. Sex Male ☐ Female ☐

Section B:

Water Supply and Sustainability

3. Do you think your water supply is Sustainable? Yes ☐ No ☐

4. If yes, to what extent? (Rank 1 - 5)

5 - A very great extent ☐

4 - A great extent ☐

3 - Sometimes good, sometimes bad ☐

2 - To a low extent ☐

1 - To a very low extent 1 ☐

5. If no, please explain.....

.....

.....

6. Where do you get your water when facility is not operational?
   a. River/open well ☐
   b. Buy from vendors ☐
   c. Alternative facility ☐
   d. Other (please specify).....

7. How often does facility break down?
   a. Once every two weeks ☐
   b. Once a month ☐
   c. Once every three months ☐
   d. Other, please specify ……

8. How fast is facility restored when it breaks down?
   a. A week ☐

b. Two weeks ☐
c. Three weeks ☐
d. A Month ☐
e. Other (please specify)…….....…….

9. How well do you think your facility is managed? (Rank 1 - 5)

5 - Very Very well ☐
4 - Very well ☐
3 - Some whatwell ☐
2 – Poorly Managed ☐
1 - Not managed at all ☐

10. What can be done on community participation to enhance sustainability of the facility?.....
.....
.....
.....

Section C:

Community participation and sustainability

11. Do you think the community participated in the planning of this project? Yes ☐ ☐ No

12. If yes, to what extent did the community participate?

5- To a very very great extent ☐
4 – To a very great extent ☐
3 – To a great extent ☐
2 – To a low extent ☐
1 – Not at all ☐

13. Who do you think should be involved in the community? WASH Committees ☐ Women Groups ☐ Community leaders ☐ All Community members ☐

14. Who makes the decisions about water in the community? Men ☐ Women ☐

Section D

Technology Choice and Sustainability

15. Are you happy with the technology used for operating your water Facility? Yes ☐ No ☐

16. Do you think it has enabled the sustainability of your water facility? Yes ☐ No ☐

17. What do you recommend about the technology to better enable sustainability of your water facility?

……

……

……

……..

Section E

Skills of the WASH Committees and Sustainability

18. Do you think the WASH Committee has the necessary skills to manage your water facility sustainably? Yes ☐ No ☐

19. What kind of skills do you think are important for the WASH Committees to have to manage the facility well? Please list.

……

……

……

…….

Section F

Post Implementation Support and Sustainability

20. Do you think post implementation support to your facility by donors and government is important for achieving sustainability of your water facility? Yes ☐ No ☐

What kind of post implementation support should be given to your facility by partners to enhance sustainability? List all

……

……

……

……

APPENDIX IV: List of Research Project Sites

1. Selected projects in Kisumu

	Name of Project	Type of Project	Location
1	KABIERO	Construction of New Shallow Well	North Central Seme
2	KAKWELU	Construction of New Shallow Well	North West Kisumu
3	KAWANGA	Construction of New Shallow Well	East Kochieng
4	Korando Faith Widows & Orphans	Construction of New Shallow Well	Central Kisumu
5	NDUMA	Construction of New Shallow Well	Kawino South
6	OLAL OGWANG	Construction of New Shallow Well	Kombura
7	Siala	Construction of New Shallow Well	East Seme

8	WADU EN WADU	Construction of New Shallow Well	Central Kolwa

2. Selected Project sites in Siaya

	Name of Project	Type of Project	Location
1	GOT REGEA	Construction of New Shallow Well	North Gem
2	KANYILAJI	Construction of New Shallow Well	West Gem
3	KONJING UNIT	Construction of New Shallow Well	Yala Township
4	Masumbi	Protection of Existing Well	North Alego
5	NYAMAJE	Construction of New Shallow Well	
6	Pal pal	Protection of Existing Well	CentraAlengo
7	SEGERE RAWA	Construction of New Shallow Well	
8	Urianda	Construction of New Shallow Well	

3. Selected sites in Busia District

No	Project Name	Type	Location
1	Bugunja	Shallow well	Odiado
2	Bulako	Shallow well	Township
3	Busangai	Shallow well	Odiado
4	Hakati	Shallow well	Bunyala Central
5	Khareka	Shallow well	Namboto
6	Lwakoko	Shallow well	Khajula
7	Maumau	Shallow well	Khajula
8	Muvumilivu	Shallow well	Namboto
9	Ogalo, W/P	Shallow well	Marachi East
10	Sikinga	Shallow well	Odiado