FACTORS INFLUENCING SUSTAINABILITY OF PIPED WATER PROJECT IN NAKURU COUNTY: A CASE OF NAKURU TOWN WEST SUB-COUNTY, KENYA

DISMAS KIPKURUI CHEBETT

A Research Project Report Submitted in Partial Fulfillment of the Requirements for the Award of Degree of Arts in Project Planning and Management of the University of Nairobi.

2017

DECLARATION

This research project report is my original work and has not been presented for a degree in any other University.

Signature……..…… Date……

DISMAS KIPKURUI CHEBETT

L50/79972/2015

This research project report is submitted for examination with my approval as a University supervisor.

Signature: ……..…… Date: ……

Dr. Charles Wafula

Lecturer and Coordinator

ODeL Campus

University of Nairobi

DEDICATION

This Research Project Report is dedicated to my parents William Bartenge and Herodius Ronoh for giving me moral and financial assistance while preparing the proposal.

ACKNOWLEDGEMENT

I want to thank my supervisor Dr. Charles M. Wafula for his instrumental support throughout my research. He was there all the time for consultation and piece of advice. My appreciation also goes to my Lecturers in the whole department for their tireless efforts in enabling me to go through to the coursework successfully, assignments, term papers and examinations. Their patience, hard work and commitment have made everything possible. I remain indebted to you. I acknowledge and appreciate the support and advice of friends and classmates which has been of great value in the course of my study. I also acknowledge University of Nairobi Library.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

AWSR : Annual Water Sector Performance Report

BTU : British Thermal Unit

IHP : International Hydrological Programme

IWR : Institute for Water Resources

G.O.K : Government of Kenya

KPHC : Kenya Population and Housing Census

MDGs : Millennium Development Goals

PRSP : Poverty Reduction Strategy Paper.

PMC : Project Management Committee

SDGs : Sustainable Development Goals

SPSS : Statistical Package for Social Sciences

SAREC : Swedish Agency for Research Cooperation with Developing Countries

UN : United Nations

UNGA **:** United Nations General Assembly

UNESCO : United Nations Educational, Scientific and Cultural Organizations

USAID : United States Agency for International Aid

WASH : Water and Sanitation for Health

WHO : World Health Organisation

WNN : Women News Network

WRI : World Resources Institute

ABSTRACT

The primary purpose of this study was to investigate factors influencing the sustainability of piped water project in Nakuru Town West Sub-County. The Study Sought To Study The Influence of Stakeholder Involvement, Project Management, The Level of Education of Project Management Committee and Availability of Funds in the Sustainability of Piped Water Project. The study used descriptive survey research design targeting a population of 100 respondents comprising project beneficiaries, project management, government officials and experts in water management. The study used a stratified sampling technique to allocate 65% of the respondents from each stratum from the sample. The sample size in this study was 80 respondents comprising 52 project beneficiaries, 12 project management committee, 08 government officials and 08 experts in water management. Questionnaires and interview schedule were used to collect data. The questionnaire was piloted at Eldama/Ravine sub-county among ten (10) respondents who did not form part of the actual study sample. Piloting aimed ensure that the data collection instruments was valid and reliable. Information from the pilot survey was incorporated into the questionnaire before the actual data collection begun. Data collected was analyzed by qualitative and quantitative methodologies using percentages, means and frequency distributions. The study will provide a baseline for future researchers, development agencies and possibly it would add up to the global knowledge on factors influencing the sustainability of piped water project. The responses of the study indicated that Stakeholder Involvement, Project Management, Level of Education of Project Management Committee and Availability of Funds do influence sustainability of piped water projects. It was also found out that lack of adequate consultation with stakeholders among the Project Management Committee who manage the piped water project is also a key factor which influences sustainability. If there is a perceived lack of adequate consultation with stakeholders, community members tend to withdraw their support for the piped water project. The study recommends that stakeholder involvement in the whole project cycle should be enhanced, there should be high level of consultation in the project management of water project, County Government should have adequate budgets for piped water projects designed for sustainability and organizations should strongly support monitoring and evaluation of their water project beside ensuring that community responsible for management and operation of piped water project are well trained in operation and maintenance. Further studies should be conducted on; how gender influences sustainability of piped water project, the influence that community member's disputes have on the sustainability of piped water project and Influence of project location on sustainability of non-piped water project.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Water has been a main issue on the international agenda for the last 30 years, starting with the 1st International Conference on Water (Mar de la Plata, 1977), the International Conference on Water and the Environment (Dublin, 1992) and then 1st World Water Forum (Marrakech, 1997). Water covers about 71% of the Earths' surface. It appears to be enough for living creatures on earth surface for its survival. Approximately,96.5% of the total water biosphere consists of seawater. Besides other water contents, only 2.53% of the total water biosphere is drinkable (Shiklomanov 2003). More than one billion people do not have access to safe drinking water in the World.

In Africa, approximately 300 million people have no access to safe drinking water (USAID, 2009). Africa though has 11% of the world's waters; it has a better water balance since it has 13% of the world's population (UNESCO/IHP, 2001). However, millions of Africans are faced with severe water shortages due to uneven water distribution, poor water infrastructure networks and lack of good political will.

In 2012, 748 million inhabitants (11% of the total world human population) still relied on unsafe piped water resources (United Nations, 2014).The United Nations (UN) Member States, adopted the 2030 Agenda for Sustainable Development, which includes a set of seventeen Sustainable Development Goals (SDGs) to eradicate poverty, fight inequality and injustice, and tackle climate change by the year 2030. This was the onset from the Millennium Development Goals (MDGs). The SDGs will guide global socio-economic development for the next 15 years. Clean water and sanitation are captured in SDG 6, with targets to: Achieve universal and equiTable access to safe and affordable drinking water for all, Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally, Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity, Implement integrated water resources

management at all levels, including through transboundary cooperation as appropriate, Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes, Expand international cooperation and capacity-building support to developing countries in water- and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies and Support and strengthen the participation of local communities in improving water and sanitation management (United Nations General Assembly, 2015).

According to the (Kenya Vision, 2030), the main target on Water and Sanitation is to ensure that improved water and sanitation are available and accessible to all. The total cost of investment and rehabilitation needed in the water supply is estimated at Ksh 1.7 trillion (National Water Master Plan, 2030). According to the (Kenya Water Master Plan, 2030), the available government budget is Ksh 592.4 billion. This leaves a shortfall of Ksh 1.2 trillion. This gap could be plugged partly by increasing sector efficiency, maximising consumer contributions through tariffs, and encouraging private sector funding. The option of tapping into private sector funding, however, presents two challenges. First, commercial lenders view the sector as high risk; and, secondly, commercial interest rates are high. This means there is need to look for a third strategy, hinging on increasing the confidence of financial institutions in the water services sector and also lowering the weighted cost of borrowing from the same institutions. This strategy would involve the use of low-cost funding (concessional loans and grants) for the development of capital-intensive infrastructure. This would, in turn, strengthen utilities' operations, improve their financial performance, and enable them to access commercial financing. In Kenya, the water crisis is interrupting with both social and economic activities throughout the country. Unfortunately, the wave of water shortages is expected to continue. Like the rest of the world, Kenyan water crisis is due to drought, poor management of the water supply, under-investment, inequiTable water allocation, rampant deforestation, pollution of water supply by untreated sewage and huge population. Kenya is restricted by yearly renewable fresh water supply of 647 M^3 per capita and is now classified as a water scarce country (Kenya Water Report, 2005). About

43% of Kenya's population has access to clean and improved piped water sources (World Bank, 2010).

In recent years there has been an increasing focus on, and understanding of, the design and implementation phases of piped water projects as part of efforts to make projects more successful and work more efficiently. Research has been undertaken to try to understand the linkages between project implementation and sustainability (Sara and Katz, 1997). The Government of Kenya (GOK) has been committed to fostering on-going water sector reforms, aimed at water projects achieving both technical and infrastructural viability. According to the National Water Services Strategy (NWSS) (2007 -2015) "Kenya faces enormous challenges in providing sustainable access to safe water which is estimated at around 60% in urban and 40% in rural settings. Missing baseline data and sustainable information systems hinder obtaining a clear nationwide picture and thus, coverage can only be estimated. Therefore, sustainable access to safe water and basic sanitation is still declining in terms of quality and quantity" Some of the reasons explained for lack of sustainability include: old infrastructure, inadequate management and maintenance of existing infrastructure, insufficient sustainability, investments options fast tracking access to the detriment of sustainable investment and informal service provision operating outside a framework of basic standards and regulation. (Ministry of Water and Irrigation, 2007).

In Nakuru County it is estimated that the distance to the nearest water point is from zero to six kilometres. Thirty five percent of the county population take between 1-4 minutes to fetch drinking water. According to (KPHC, 2009) it indicates that about 150,608 households (36.8 per cent) in the county have access to piped water. About 63 per cent have access to poTable water and 80 per cent of household are harvesting rainwater. Malewa Water Project which is situated in Nakuru East is the main source of piped water supply to Nakuru Town West Sub-County.

1.2 Statement of the Problem

In Africa especialy the rural areas, 'water poverty' can ruin lives and livelihoods, Children under the age of five years are extremely susceptible to waterborne diseases, while a broken water pipe in London may be a temporary inconvenience, a failed well in

sub-Saharan Africa was potentially disastrous. This was a catastrophe that was spreading across the continent, where an estimated 50,000 water supply points have collapsed. The root cause was the water community's failure to plan for maintenance of the infrastructure in a systematic way, creating a massive drag on meeting the Millennium Development Goals target on water and sanitation (Cumming, 2008). Projects are designed and implemented for specific goals and to achieve the desired change. Lewis (2004), the defined project as a one-time program with a definite lead time , a defined scope of work, a budget and usually done by a temporary team. Some projects such as water projects require that their services be sustained over time to ensure the continued flow of outputs and hence achievement of the desired change which could be social, cultural or economic. Implementation of most projects may be successful, but their sustainability may remain a challenge. A large number of projects implemented at huge costs often tend to experience difficulties with sustainability. Major donors, such as the World Bank and the bilateral aid agencies have been expressing concerns on this matter (World Bank, 2003). According to several recently conducted studies, while the trend with implementation is showing significant improvement, the post-implementation sustainability is rather disappointing -increasingly, fewer projects are being sustained. This means that while huge expenditures are being incurred by these countries in implementing projects, poor sustainability is depriving them of the returns expected of these investments. The sustainable operation, maintenance and management of piped water supply infrastructure are one of the key challenges in the water sector. Piped Water Supply is a service, and just like any service, it involves manpower, repairs, spare parts, energy and other inputs. These services as argued by Boland and Whittington (2000) are not free, and therefore in order to provide a safe and sustainable water supply, a cost recovery system has to be introduced for the project to be sustainable.

Studies conducted on water project sustainability such as (Ngetich, 2009) indicates that most water projects did not function to the full capacity after external support is withdrawn and recommended that further studies be done on the influence of project location on the sustainability of water projects. Habtamu, (2012) established that most water project decline in performance shortly after external support is withdrawn and

recommended that further studies be done on factors that influence the sustainability of such projects in other rural parts of other countries in Africa in order to bring a generalization of the findings.In Nakuru Town West Sub-County, Piped Water supply has been in existence for close to two decades and continues to provide services to the community however, the project has not optimally delivered as intended thereby exposing the community to waterborne related risks. This study, therefore, is designed to assess the sustainability of piped water project in the Nakuru Town West Sub-County as it relates to stakeholder involvement, project management, level of education of project implementation committee and availability of funds for operation and maintenance.

1.3 Purpose of the Study

The purpose of this study was to examine the factors influencing the sustainability of piped water projects in Nakuru Town West Sub-county, Kenya.

1.4 Objectives of the Study

The following research objectives guided this study;

1. To determine the extent to which stakeholder involvement influence the sustainability of the piped water project.
2. To assess the Influence of Project Management on the Sustainability of Piped Water Project.
3. To determine how the level of education of Project Management Committee influence the sustainability of piped water project.
4. To assess the influence of the availability of funds on the sustainability of piped water project.

1.5 Research Questions

This study was to find out the answers the following research questions;

1. How does stakeholder involvement influence the sustainability of piped water projects in Nakuru Town West Sub- County?
2. How does project management influence the sustainability of piped water projects in Nakuru Town West Sub-County?

3. To what extent does the level of education of project management committee influence the sustainability of piped water projects in Nakuru Town West Sub-County?
4. To what degree does the influence of the availability of funds affect the sustainability of piped water projects in Nakuru Town West Sub-County?

1.6 Significance of the Study

This study was to examine the Factors Influencing the Sustainability of Piped Water Projects in Nakuru Town West Sub-County. The research findings of this study will be relevant to policymakers, project managers, County government and national government as it will provide in-depth information and key issues facing the sustainability of piped water projects in Nakuru Town West Sub-County. The study will provide a baseline for future researchers, development agencies and possibly it would add up to the global knowledge on factors influencing the sustainability of piped water projects. The findings of this study may provide information that could be used by government in the formulation of policies that will promote initiatives (water projects) that are more sustainable.

1.7 Basic Assumptions of the Study

The study assumed that all the stakeholders are aware of the sustainability of piped water project in the county. The study also assumed the respondents will be a representative of the total population under study and that the information they provided is reasonable and justifiable to make general conclusions.

1.8 Limitations of the Study

The researcher encountered the following constraints; some of the respondents felt shy to provide crucial information thinking it was meant for commercial uses but assured them confidentiality. The respondents were not readily available, but the researcher was patient to wait and made several visits to administer the questionnaires from the respondents' places. The time allocated to this study was short. In addition, the period of survey in the field coincided with the activities of some members of the respondents like business trips

and off duties for development workers which made contacts quite difficult with those participants.

1.9 Delimitation of the Study

The researcher carried out his study in Nakuru Town West Sub-County. The study only confined to the factors influencing the sustainability of piped water project in Nakuru Town West Sub-County.

1.10 Definition of Significant Terms

Availability of Funds: Is the financing issues related to the sustainability of safe piped water projects.

Project Beneficiaries: Are members of the community who will benefit from government-funded projects.

Project Management: Is the activity of planning, staffing and controlling the sustainability of the piped water projects.

Sustainability of Piped Water Projects: The ability of a project to maintain its operations, services and benefits for the current and future generations.

Stakeholder involvement: Is the participation of the local members of the society in the sustainability of piped water projects.

The Level of Education of Project Management Committee: Is the level at which a person has attained after schooling.

1.11 Organization of the Study

Chapter one of this research project provides the background of the study, the purpose of the study and objectives of the study. Furthermore, included also in this chapter are the research questions, the significance of the study, delimitations of the study and limitations of the study. Besides, basic assumptions of the study and definitions of the main significant terms are also outlined. Chapter two describes the literature review based on the research objectives, theoretical framework and conceptual framework of the study. Chapter three presents the research methodology specifically the research design, target population, sample and sample selection. It also features data collection instruments, in-

struments pretesting, validity and reliability of instruments. Included also in this chapter are procedures of data collection, methods of data analysis and ethical issues in research. Chapter four discussed the research findings that includes the demographic information, findings based on the objectives and finally draws inferences based on these findings. Chapter five provided a summary of the findings, conclusions inferred from the findings and recommendations made based on the findings. Additionally, the chapter will provide areas for future research in the study area.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on factors influencing the sustainability of piped water projects in Nakuru Town West Sub-County, Nakuru County. The section is subdivided into the following sections: Sustainability of piped water projects, the influence of stake-holder involvement, the influence of project management, the level of education of project management committee and the influence of the availability of funds on the sustainability of piped water project.

2.2 Sustainability of Piped Water Project

(PMI, 2013) described a project as a set of coordinated activities with a lead defined scope of the work plan, pursuing a specific goal with constraints on time, scope and resources. (Hodgkin, 1994) noted that the problems for objective quantification of sustainability are the fact that the adjective "sustainable" has strong normative connotations. That is to say, stakeholders that is water users, donors, national governments, local private sector companies and research institutions will have different perceptions of sustainability based on the relative value of achieving the various goals (Hodgkin, 1994). Sustainability of Piped water supply (PWS) projects, and of the benefits they deliver, has been an overriding concern of the water sector. This concern is well-founded. Yearly, Millions of dollars are invested by national governments and international and local donor agencies alike in water project implementation. Despite ever-increasing attempts to solve the problem, many water projects fail to maintain the flow of expected benefits over their intended period. Although there are few, systematic studies of this problem, many practitioners estimate that at any given moment a significant proportion of rural water supply systems in developing countries may be inoperable or abandoned completely. (UN, 2010). Despite there being a universal recognition of the importance of safe water in poverty alleviation and socio-economic development globally, the access to safe drinking water remains low, and this is attributed to many water supply systems not being sustainable. (Smith & Marin, 2005) states that worldwide, about two million people struggle daily for access to safe and sufficient water. In the entire world, Africa is the

region that suffers most from inadequate access to the water supply with only 62% of its population having access to poTable water supply. Furthermore, 55 of the countries in the world whose domestic water supply is below 50 litres per capita per day, 35 of them are in Africa, (Yahaya 2004).

The Republic of Kenya in 2007 estimated that piped water coverage provided by Ministry of Water and Irrigation in 2007 stood at 47% nationally. According to the Ministry of Water and Irrigation, there are approximately 680 piped water systems that provide over 740,000 water connections throughout the nation. Additional 350 community-run water schemes exist in the country. A great percentage of these connections are however inactive due to poor management and maintenance (Republic of Kenya, 2007). Mulwa (2004), points out that sustainability concerns around projects at community level encompasses different dimensions that include; social (ability of a project to restore peoples sense of worth, dignity and self-belief), economic (ability of the local people to identify, procure and use available resources-whether human or material and have no or limited dependency on external), environmental (sustainable use of resources and preservation of the environment-useful in water projects as people will conserve water catchment areas), structural and organizational (an effort of dominant institutions managing projects to become more responsive and sensitive to local needs and aspirations) as well as technological (an effort to develop appropriate technology and promote the use of indigenous knowledge) sustainability. A sustainable project should be able to address all these dimensions.

2.3 Stakeholder Involvement and Sustainability of Piped Water Project

Stakeholders are parties who interact with an organisation, and with whom an organisation's success or failure is dependent on (Addesse, 2008). A stakeholder can also be as an individual(s) or groups who have ownership rights in an organisation and its operations (Andrew, 2006). Nevertheless, a stakeholder is a person or group who can affect or can be affected by the actions, decisions, practices, policies or goals of the organisation (Edward, 2010).Stakeholder involvement was the first expo used as a health-promotion strategy by the World Health Organization (WHO). Stakeholder involvement is a social process that groups with common needs living together in a particular locality

actively identify needs, make decisions, and set up mechanisms to achieve solutions or goals (Adesina, 2010).

Dagmar (2001) established that stakeholders are categorised according to the impact with the most powerful being the managers and owners of the organisation. Booz (2011) pointed out that to involve the managers and the owners of the organization in the management change process, several things need to be done which include: there needs to be a strong case supporting the need for change in the organization; there needs to be consensus among the managers and owners of the organization on the need for change. A plan should be developed to guide the change process, and the managers should provide leadership on the change process. Deborah (2009) states that there are two categories of managers in the organisation: senior managers and middle managers. She also adds that executive managers need to initiate, guide and champion change by ensuring engagement of the rest of the organisation through keeping employees informed about the change process, following through actions and modelling suiTable responses to change. A stakeholder's significance and support depend on the situation and the issues progressing, whereby support needs to be taken into account, stakeholder classification strategies have been developed to attempt to understand each stakeholder's importance to the projection define the most appropriate relationship in management. A stakeholder can be a consumer or a buyer. One model categorises stakeholders based on assessing the stakeholder relationship with the project and the urgency of stakeholders claim on the project leading to a particular managerial action that is (Mitchel & Wood, 1997).

Stakeholder involvement is not a technique, but a strategy, approach or philosophy. There is no "one-way" to do public engagement. What works in one place might not always work somewhere else. It is not only the technique but also the attitude of the people who employ the technique that is important that is (Delli, 1993).There is no standard way for implementing stakeholder involvement, but some approaches can be used singly or in combination to improve stakeholder participation. The execution of particular methods all of which have strengths and weaknesses (NRC, 1996, 1999b) or the unique combination of them depends on the issue or problem, the objective(s), and contexts in which they are practised. A good example of some common approaches includes the following: pub-

lic hearings, citizen advisory committees and the task force, policy dialogues, surveys and finally focus groups.

The many claimed benefits of stakeholder participation have to an extent driven its widespread incorporation into national and international policy. At the same time, disillusionment has grown amongst practitioners, stakeholders, and the wider public, who feel let down when these claims are unrealised. These allegations are under normative and pragmatic arguments for stakeholder involvement in the environmental decision-making. Normative claims focus on benefits for democratic society, citizenship and equity. For example, stakeholder participation reduces the likelihood of marginalisation of those on the periphery of the decision-making context or society. In this way, more relevant stakeholders participate in decisions that affect them, through this active citizenship is improved, thus benefiting a wider community (Martin, 1997). Stakeholder participation increases public trust in decisions, and civil society of participatory processes are perceived to be transparent and consider conflicting claims views that's according to (Richards, 2004).It is argued that through Stakeholder participation, stakeholders get empowered through the co-generation of knowledge with researchers and increase participants' capacity to use this knowledge (Greenwood, 1993; Okali, 1994; Mac Naughten, 1997; Wallerstein, 1999).

Stakeholder engagement is one of the most significant factors that influence the implementation of project and sustainability. The level of community support determines whether a project will become established, how quickly and successfully it will consolidate and how it responds and adapts to meet changing needs. Effective community participation may lead to social and personal empowerment, economic development, and sociopolitical transformation based on (Kaufman & Alfonso, 1997). Mc Common (1993), observed that real participation by community members, including youth, is the key since community members control the project. The professional partners as well build the community's capacity to make informed decisions and take collective action. Public involvement is closely linked with empowerment. Empowering stakeholders replicates an enhancement in democratic governance. Empowerment in simple terms means to enable, to allow or to permit. It can be conceived as both self-initiated and initiated by others (Murrell, 1990). Empowerment is also an act of building, developing and increasing

power through cooperation, sharing and working together (Murrell, 1990). Empowerment also refers to the development of an efficient support system (Solomon, 1976).

According to Mark Owitz and Lawler (1990), timeliness is achieved through enhancing communication between the managers and the workers as well as between employees across different units. A loophole or flaw can be reported in time due to participation. Participation empowers the committee member, their ownership or stake in the project. Therefore increasing efficiency and productivity thus enhancing satisfaction and motivation towards implementation of projects. Responsiveness is improved; effort and inputs are more likely to be targeted at perceived needs so that output from the project is used appropriately. Improved sustainability and sustainable impact are realised owing to active engagement. This takes place because committee members are committed to undertaking the task after external support has been stopped and active participation has supported to develop skills and confidence. Improved transparency and accountability is achieved if more and more project members are given information and decision-making ability. Enhanced equity is probably to occur if all the stakeholder's needs, interests and abilities are taken into account (Nyandemo, 2012).

Denison (1940), elaborated on a large number of benefits of participating in a project after Kanther made important contributions in participation from 1988 to 1989. According to Denison (1990), participation in information and knowledge sharing between the managers and the workers is crucial since they are the ones who are contiguous to the products being produced or output of the project. Stakeholders being the closest can devise efficient processes and strategies for the same project. There is also increased efficiency that comes out from participation. Those who are at the ground level give inputs for improved efficiency thus enhance the quality of project output and curtailing the cost during project implementation. Water projects failure possess a problem that can be self-perpetuating. (Vanloon and Droogers, 2002) in their study on Water Evaluation and Planning System in Kitui, points out that bad experience on unsuccessful water projects in the past alienate people and make them likely to be hostile towards future initiatives. Projects implemented with funding limited to short-term goals undermine capabilities of a local institution to sustain itself in long-term. Hence in the case of water projects,

stakeholder involvement, their education and training on the technology used and how to use the water system and location of the water project are paramount for sustainability.

Kenya has experienced some stakeholder involvement problems, especially in rural areas, where massive development projects are proposed and introduced in communities with little or no consultation with the people and stakeholders. At times individuals, especially politicians propose massive development projects, which obviously display inadequate needs assessment and planning at completion (UNDP, 2004). At other times, huge national and regional projects are initiated and a lot of emphases placed on the material aspects of development especially visible and fiscal, without considering the central place of the people as a key resource, which needs to be nurtured and actively involved in shaping their own destiny.

2.4 Project Management and the Sustainability of Piped Water Project

Project management entails planning, organising, motivating, and controlling resources to achieve specific goals of a given project. The ephemeral nature of projects stands in contrast with business operations, which are repetitive, permanent, or semi-permanent functional actions to generate commodities or services. Practically, the management of these two organs is usually completely different, and as such requires the development of extraordinary technical skills and management strategies (Schultz & Slevin, 1987).

Harrison and Lock (2004), defines project management as the attainment of project goals through people and encompassing the organisation, planning, and control of resources assigned to the project. Project management support for projects, or indeed for any implementation, has long been considered of great significance in differentiating between their final success and failure (Schultz & Slevin, 1987).Management consists of the interlocking functions of creating corporate policy and organising, planning, controlling, and directing an organisation's resources to achieve the objectives of that policy. Besides machines, materials, and money as factors of production, management is often included. The primary purpose of the Directorate includes both marketing and innovation (Drucker, 2005). Project management does not rely on top-level management for authority, direction, and support, but eventually the means for implementing top management's plans, or goals, for the organisation (Beck, 1983). Further, Manley (1973), indicated that

the level of management support for a project would result in a significant difference in the clients' extent of ultimate acceptance or resistance to that project or product. Management's support of the project may involve modalities such as allocation of adequate resources (financial, personnel and time) as well as the project manager's confidence in their support in the event of shortages.

Stuckenbruck (1981), argued that project consists of sequential phases which are very vital in project planning because it provides a baseline for budgeting, workforce and allocation of resources and for scheduling project landmarks.The criteria of the dividing project into phases may differ somewhat from organisation to organisation, and from product to product, but the steps are primary. Patzak (1990), discussed that the starting point for the analysis of the phenomenon project is to look at a process that is the process of transferring an initial state into a desired final state. In the state of output, all more or less intended outcomes of the process 'project execution' are available having been produced during the whole process. These outputs are concrete (products, organisations, etc.) or abstract (plans, knowledge, experiences and emotional states) or both. They may be differentiated into; Outputs during the process (e.g. satisfaction of personnel, a gain of experience) and outputs at the end of the process (final products and state of knowledge).So, it is evident that the whole process output is much more than the product that is the object to be produced in the project under consideration. Management should be much concerned with all aspects of process output. ICE (1990) recognised the need for a systematic approach to planning projects by pointing out that to work efficiently, it is fundamental that a scheme of activities is first decided by those directly responsible for the implementation. With such planning, the work can be broken down into phases of events, and an orderly sequence or programme of implementation evolved. Without a Programme, the implementation can only be incomplete and random. The drawing up of a Programme at the beginning of the work does not mean, of course, that it is drawn up once and for all and cannot be changed. The exact reverse is the case.

Patel and Morris's (1999) described the project life cycle (span) as an accurate one. The sequence of phases through which the project will evolve will significantly affect how the project is structured. There should be evaluation and approval points between phases often termed 'gates'." Thus a structured project lifespan plays a key role in the control

strategy for the evolution of a project. Unlike scheduled bar charts and flow diagrams, the project lifespan phases represent significant changes as the project progresses through succeeding levels of maturity. These include changes in; rising levels of detail in management decision-making, required management style, and required management skill sets. Control points, constituting significant milestones at which concrete deliverables are expected, segregate these high-level strategic phases. Furthermore, these points in time are treated as "gates". The idea of gates implies that the project does not proceed beyond them unless and until the required phase deliverable has been carefully reviewed and found satisfactory.

Laufer and Howell (1999), stated that the project manager's major role is to manage his/her team's decision-making and not to make his own decisions. Various researchers have stressed the need for different types of skills necessary for a project manager to ensure that the project is completed. Their findings are either based on their experiences or on empirical researches. Spitz (1982), established through empirical research that the priority of skills of a project manager varies depending on the phase in which the project currently exists and further also tried to assess the skills needed in each of the project stages.

The terms project manager, project coordinator, construction manager, project administrator, project controller are used quite interchangeably, and all of them appear to have very similar kind of role, but the intensity of their job requirements and expectations from them vary based on (Kerzner, 2002). Certain typical responsibilities of both project manager and project coordinator like coordinating and integrating of subsystem tasks; assisting in determining technical and workforce requirements, schedules and budgets; and measuring and analysing project performance regarding technical progress, plans and budgets are common. However, a project manager is supposed to play a stronger role in project planning and control. While a project manager is also responsible for; negotiating, coming up with bid proposal, establishing project organisation and recruitment of workforce; and providing overall leadership to the project team. Also, to profit-making and new business development, a project coordinator is seldom entrusted with these responsibilities. In fact, the project coordinator's role is to augment the project managers'

visibility for larger projects (Forsberg & Cotterman, 1996). A project coordinator is chartered as a representative of the project manager who proactively ensures future events will occur as planned. The signal problem points and comes up with mitigation measures.

According to Forsberg and Cotterman (1996), Project Coordinator's function is to; know how the organisation operates, Expedite help to the project and support agencies, Provide independent assessment of project information and status to the project manager, ensure planning and milestones are satisfied and ensure control procedures are being adhered to. Past studies have also recognised the relevance of a project coordinator and authors have tried to distinguish the duties of a project manager from that of a project coordinator based on (Forsberg 1996, Kerzner 2002). EC (2012) study identified lack of effective project management as the cause of cost, time and schedule overruns. Frimpong & Crawford (2012) revealed that PM tools and techniques play an important role in the effective management. This study was an effort in this direction by focusing on human and technical

2.5 Level of education of Project Management Committee and the Sustainability of Piped Water Project

Surveys carried out in Guatemala showed that in the event of highly educated persons overseeing the projects in the electoral units they were bound to succeed massively based on (Adan, 2012). The success of the projects depends on the ability of the committee members to positively engage the target beneficiary groups pro-actively and have them buy the vision of the projects. These minimised instances of strife and misgivings attributed to lack of clear understanding of the activities at hand. It also deterred the situation of failure to understand the essence of the projects based on (Adan, 2012). These brought to the fore enhance capacities of the individuals tasked with the mandate of project administration as an attribute which heavily swayed the direction that the plans took regarding completion and accountability to the end users.

The focus of most project management education in the context of universities has been on the technical skills deemed essential to achieve project success that being primarily the iron triangle of time, cost, and quality based on (Atkinson, 1999).Efficacy of commu-

nication and transformational leadership skills is vital to project management based on (Prabhakar, 2005; Hyvari, 2006). El-Sabaa, (2001) adds that human skills of project managers have the greatest influence on project management practices and technical expertise the least. It is because it is people who deliver successful projects using their knowledge and creatively, not through the mere use of techniques or hardware. One of the biggest challenges for project managers is to manage people that require the severe use of relationship management skills based on(Bourne et al., 2004).

Ives (2005), while recognising the power and flexibility that project management brings to organisations, points out the constraints and challenges that are associated with the project manager responsibilities. Project management involves a natural propensity for conflicts that arise from the fixed budget and schedule constraints. Considering these complex relationships in projects, Peled (2000), suggests that the role of project manager is broader than the sole management of project processes. Managing project successfully, therefore, require soft skills including interpersonal ability, technical competencies, and cognitive aptitude, along with the capability to understand the situation and people and then dynamically integrate appropriate leadership behaviours based on (Baroudi and Pant, 2008).

According to a recent survey, one technology company anecdotally indicates that 90-95 percent of its documented performance issues annually is concerned with such soft skills as leadership, teamwork, management and communication, with only the remaining 5-10 percent concerned with technical project processes that are based on (Muzio, Thomas and Peters, 2007). Hebert (2002), echoes this further that the role of project manager involves 50 percent strategy and understanding of the dynamic environment, 40 percent management and only 10 percent technical applications. Many researchers appreciate the importance of soft skills.

Oladipo (2012), points out that majority of local governments' projects today are manned by officials who do not possess the requisite leadership and managerial skills to deliver the gains of democracy to the people. To engage effectively, citizens not only need an awareness of their roles and responsibilities but knowledge and skills on how to execute the responsibilities. The capacity building consists of developing knowledge, skills and operational capability so that individuals and groups may achieve their purposes (Omolo,

2009). Katz and Kahn (1978), have suggested that an effective project manager should have necessary the following skills: technical skills, human relationships skills, and conceptual skills. Technical skills include the power to apply knowledge in a given field such as engineering,medical or finance. Human relationships skills involve the ability to communicate effectively and to maintain a harmonious working group. Capacity to motivate employees falls into human relationships skills category. Finally, conceptual skills include the ability to perceive the project as a programme by keeping a global perspective and not thinking of only one aspect at once. Kerzner (2002), defines team building skills as the ability to incorporate persons from various disciplines into an effective team, and he finds that team building as one of the core competencies for the program manager. A project manager is a person formally appointed to manage a project with specific accountability for achieving defined project objectives within allocated re-sources. The role of a project manager is very critical to the success of a project and recognising this; some studies have been carried out to find the relevant characteristics of a project manager.

The model suggested by Katz and Kahn (1978), has led to some debates on the extent to which a project manager needs technical skill. It is understandable to have a technical expert as a project manager in case of a small project that involves knowledge of only one small specialist area, for larger projects involving multiple disciplines searching for a technical expert may not be a wise option (Goodwin, 1993). This is not to say that technical skills are not needed at all for big projects, but the emphasis should be more on managerial skills of a project manager. Technical expertise in more important projects is required to understand the full implications of the project, which a project manager obtains as expert advice on as and when basis. Some researchers are also of the opinion that project manager should not be a technical expert due to the apprehension that project manager would engage himself in many technical details and may not be able to do justice to other dimensions of the project based on (Katz 1974, Goodwin 1993, Kerzner 2002).

El-Sabaa (2001), analysed the relative importance of the three skill groups advocated by Katz and Kahn. Human skill emerged to be an essential project manager skill. Conceptual and organisational skill with represents a second important project manager skill.

Technical skill appeared the least necessary project manager skill relatively. Odusami (2002), concludes through the analysis of a questionnaire survey conducted by the clients, consultants and contractors. that the most important skill for the client regarding an effective project leader is decision-making; for a consultant, the most important skill is leadership and motivation, and for the contractors, communication is the most important skill.

A project coordinator with monitoring and forecasting skill can keep a close watch on schedule and cost of the project and appraise the project manager of any deviation from the same. Subsequent with his follow-up skill he can push his team members to correct the deviations to bring the project back on time and cost requirement. Safety, health and welfare of staff are one of the critical contract requirements and project coordinator's concern for the same cannot be underestimated. Record keeping all the crucial events is also an important function, and it helps in reducing the disputes in future. The challenge facing a future project coordinator is the development and successful application of the essential expertise to attain the goals of the project. Some of these skills can be acquired in schools and colleges, while others may be acquired on the field. Kerzner (2002), suggested experiential learning, on the job training, formal education and specialised courses, professional training and seminars as ways to impart skills to a project manager.

2.6 Availability of Funds and the Sustainability of Piped Water Project

Webster (2000), pointed out that project funding is one of the key determining factors in the sustainability and full effectiveness of a project. A study by Bosch (2010), argued that risk identification and allocation is a primary aspect of project finance in project implementation. The study noted that a plan might get exposed to some of the technical, environment-related, economic and political risks, especially in developing countries and emerging markets. Financial institutions and project sponsors may conclude that the risks inherent in project development and operation are unaccepTable. Project sponsors in these industries get complimented by some experts companies that operate in a contractual network with the other that allocates risk in a way that allows financing to take place hence boosting the implementation of such projects. The funding of projects must be

distributed among many parties, to spread the risk related to the project while on the other hand ensuring profits for each party involved.

According to Folifac and Gaskin (2011) provision of poTable water supply services involves costs which are incurred in the design, construction and operational stages of any water supply system. However, the magnitude of these costs is utility specific and would depend in part on the type of technology used, management practices, and the geology. The costs associated with poTable water provision can be classified according to the sub-units of operation (Whittington, 2003) which consists of production costs such as reservoir, tanks, pumps and treatment plants; transportation costs for instance major pipelines and pumping facilities; distribution costs which include connection costs, metering and local reticulation; and administrative costs such as billing, collection and consumers relation.

Several studies carried out in Kenya on project implementation and sustainability done by (Munyiri, 2013 and Otundo, 2012) indicate that availability of funds plays a vital role in ensuring project execution and sustainability. They further suggest that there should also be periodic auditing of the project funds and allocate resources to projects to enhance efficiency and effectiveness.Seaga, (2001) defined budget as cycles of expenditures and revenues over the life of the project. Proper planning of finances is primary to the sustainability of a project. A professional and transparent approach to budget planning will help persuade investors, financiers and national or international donors to make financial resources available based on (Philip et al., 2008).The budget has mainly two functions. First, it estimates, as realistically as possible, the cost of completing the objectives identified in the project proposal. The sponsoring agencies will use the budget details to determine whether the project is economically feasible and realistic. Secondly, the budget provides a means to monitor the project's financial activities over the life of the project. In this way, it is possible to determine how closely the actual progress toward achieving the objectives is being made relative to the proposed budget (University of Virginia, 2010).According to the European Commission(2009), Costs are classified into two categories that are direct and indirect costs. Direct costs are all those eligible costs which can be attributed directly to the project and are identified by the beneficiary as such, by its accounting principles and its usual internal rules. An example of direct costs

are; personnel costs, travel and subsistence allowances, consumable and supplies, vehicles and durable equipment. Indirect costs are all those eligible costs which cannot be identified by the beneficiary as being directly attributed to the project, but which can be identified and justified by its accounting system as being incurred in direct relationship with the eligible direct costs attributed to the project (*EC,* 2009). Indirect costs, also called overheads, Facilities and Administrative Costs, typically are costs of operating and maintaining buildings (electricity/gas/water bills), grounds and equipment, depreciation, general and departmental administrative salaries and expenses and library costs. The donor usually gives rules for determining the overhead in a funding programme, so be sure to find out what percentage, if any, the funding source will allow for indirect costs, and determine which portion of your budget the percentage applies to (EPA, 2010). Sometimes indirect costs are a percentage of the total direct costs, or of the personnel costs, or of the salary and wages item alone.

2.7 Theoretical Framework

Some of the theoretical paradigms which guided this study include:

2.7.1 Sustainability Concept

The concept of sustainability gained wider use after the World Commission on Environment and Development published a report titled "Our common future" (Brundtland,1987) which defined sustainability as "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs". According to IFAD strategic framework 2007 -2010 (IFAD, 2007) sustainability amount to: Ensuring that the institutions supported through projects and the benefits realized are maintained and continue after the end of the project. This definition acknowledges that assessment of sustainability entails determining whether the results of the project will be sustained in the medium or even longer term after the project has been handed over to the beneficiaries. The term sustainability integrates social, environmental and economic responsibilities.

Economic models propose to sustain opportunity, usually in the form of capital. According to the classic definition formulated by 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. Social spending on the poor or on environmental protection, while perhaps justifiable on other grounds, takes away from this investment and so competes with a commitment to sustainability. With another view of capital, however, the economic model might look different. If we do not assume that "natural capital" is always interchangeable with financial capital, argue Herman Daly (1996) and other proponents of ecological economics, then sustaining opportunity for the future requires strong conservation measures to preserve ecological goods and to keep economies operating in respect of natural limits. These considerations complement an ecological model. From a different perspective of the relation between opportunity and capital, spending on the poor might be regarded as a kind of investment in the future. According to the economist Amartya Sen's "development as freedom" dictum (1999), we create options for the future by creating options for today's poor because more options will drive greater development. In this political model of sustainability, sustaining opportunity for the future requires investing in individual dignity today. This approach complements the political model.

Ecological models propose to sustain biological diversity and ecological integrity. That is, rather than focusing on opportunity or capital as the key unit of sustainability, they focus directly on the health of the living world (Rolson, 1994). Within this model, there are two major ways of deciding which ecological goods to sustain. From an anthropocentric point of view essential natural resources should be sustained, as should those ecological systems and regenerative processes on which human systems rely. From an ecocentric point of view species should be sustained for their intrinsic value, as should ecological systems as generators of creatures with intrinsic value. In policy, as noted above, strong and weak views may converge.

Political models propose to sustain social systems that realize human dignity. Concerned with the way in which local and global environmental problems jeopardize human dignity, these models focus on sustaining the environmental conditions of a fully human life. Environmental justice and civic environmentalism represent one strategy of this model; by focusing on environmentally mediated threats to human life they point to necessary ecological goods or sustainable environmental management schemes (Ageyman, 2005).

Other strategies within this model, such as agrarianism or deep ecology, involve more substantive visions of the human good. Ultimately, these models recommend sustaining the cultural conditions needed to realize ecological personhood, civic identity, or even personal faith through ecological membership (Plumwood 2002, Wirzba 2003). One subset of the political model takes a pragmatist's approach and suggests that we must maintain conditions for keeping open the debate about sustainability. In this view sustaining a political system of deliberative democracy effectively requires sustaining ecological and economic goods along with political goods like procedural rights. Note, however, that both the quality and quantity of those goods is regulated by the needs of the political system, which thereby constrains sustainability commitments.

2.7.2 Community Participation Theory and Sustainability of Piped Water Project

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

2.7.3 Technology Choice and Sustainability of Water Project

Many studies and reports have documented the influence or effect of choice of technology on sustainability of piped water project (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 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 sustainability. 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 sustainability. Settlement pattern of a community also influences the choice of water supply technology and sustainability. 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 sys-

tem and a diesel powered system will be influenced by the size and depth of the ground water and demand or population to be served.

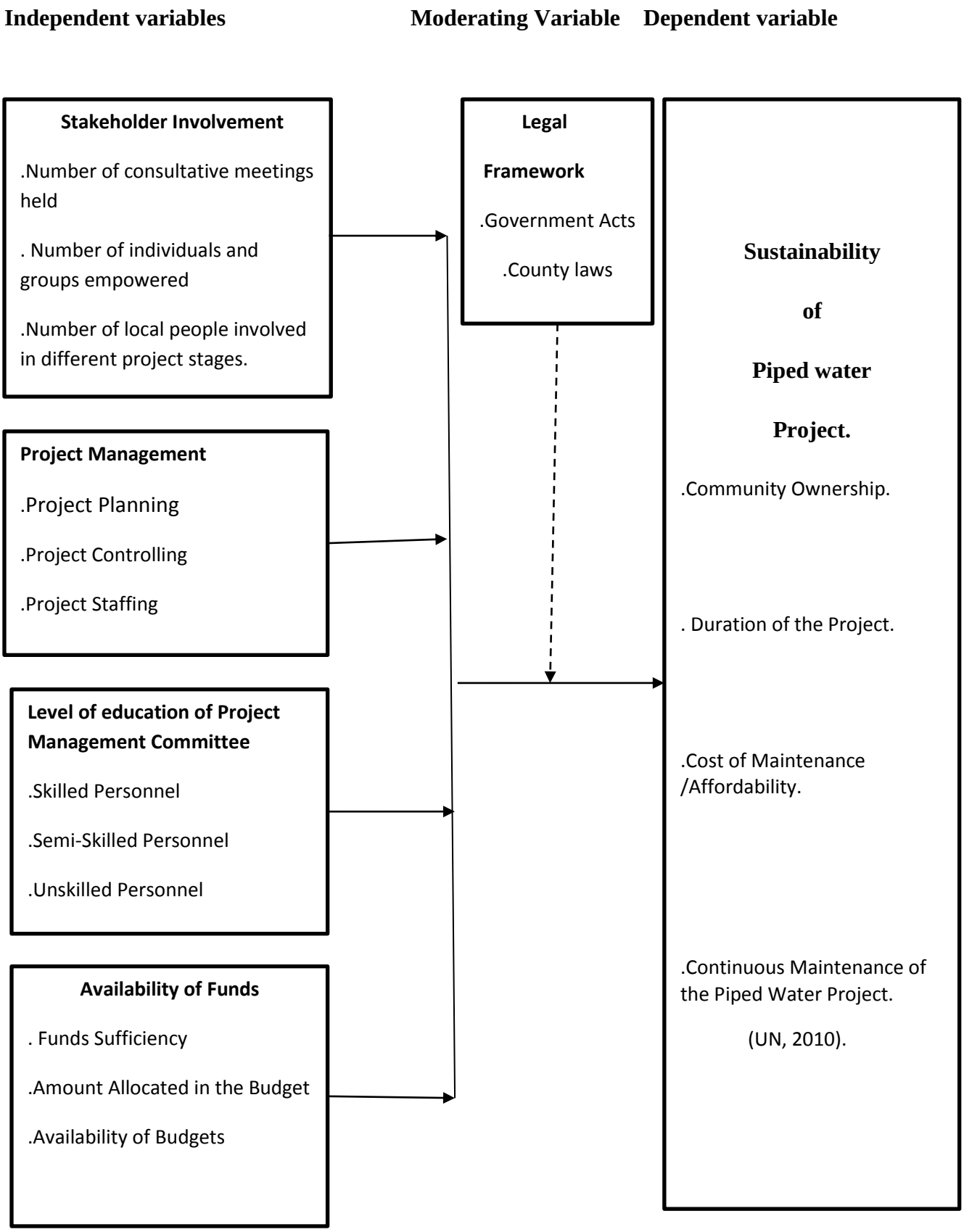
2.7.4 Post Implementation Support and Sustainability of Water Project

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 deconcentrated 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 (Rosensweiged 2001; Lockwood 2002).

2.8 Conceptual framework

This section shows the relationship between independent and dependent variables on how they interrelate to successful project sustainability. A conceptual framework is a scheme of` variables, a researcher operationalize in order to attain the set objectives (Oso and Onen, 2000). The conceptual framework was developed through explaining and ascertaining the relationships and interconnectivity of the objectives of the study.

Figure 1 Conceptual Framework



The framework being adopted by this study views stakeholder involvement, project management, the level of education of project management committee and the availability of funds as the critically influencing sustainability of water projects. The framework further identifies the moderating variables that may influence sustainability of water projects. Some of these variables include the existing legal framework including Government acts and County Acts. Based on the conceptual framework, stakeholder involvement includes some consultative meetings to be held, the number of groups being empowered and some local people to be involved in different project stages. Secondly, the influence project management which involves planning, controlling and staffing. Thirdly, the level of education of project management committee includes skilled, semi-skilled and unskilled. Lastly, availability of project funds includes funds sufficiency, availability of budgets and amount of money being allocated in the budget.

2.9 Gaps in literature review

The general assumption among Project Managers is that a project is completed in time, within the agreed budget and the set quality, and then the project is deemed to be complete and successful. Hartman (2000), claims that a successful project is one that makes all stakeholders happy. However, Harrison and Lock (2004), argues that Hartman point of view is a good one that must be borne in mind although, in several instances, real success or failure cannot be measured just by the three primary objectives alone. Each stakeholder group will hold a different point of view as to which objectives should be valued or balanced. Kerzner (2013), asserts that the definition of project success has been modified to include completion of the allocated period, within the budgeted cost, at the proper performance or specification level. Also, with the acceptance by the customer with a minimum mutually agreed upon scope changes, without disturbing the main workflow of the organisation and without changing the corporate culture.

Belassi and Tukel (1996), suggest a framework that addresses many of the drawbacks in the literature and groups the factors into the four areas related to the project; factors related to the project manager and the team members; factors related to the organisation, and factors related to the external environment. The four groups provide a comprehensive set in that any factor itemised in the literature, or even specific areas of consideration,

should belong to at least one group. The framework not only brings advantages by grouping critical factors but also assists project managers to understand the intra-relationships amongst the factors in different groups.

2.10 Summary of Literature Review

From the reviewed literature, it is evident that some factors influence the sustainability of piped water projects. For this study, the factors that will be considered are those reported in the literature to be critical in influencing sustainability of piped water projects. The study will focus on the influence of stakeholder involvement including number of consultative meetings held, number of groups empowered and number of local people involved in different project stages; the influence project management which involves planning, controlling and staffing ; the level of education of project management committee including skilled, semi-skilled and unskilled and the availability of funds including funds sufficiency , availability of budgets and amount of money being allocated in the budget.

CHAPTER THREE
RESEARCH METHODOLOGY

Introduction

This chapter presents the procedures that was used to conduct the study, focusing on the research design, the target population, sample size, sampling methods, research instruments, data collection and data analysis.

3.2 Research Design

The research design is a conceptual structure within which research is conducted and constitutes a blueprint for the data collection, measurement and data analysis (Kothari, 2004). According to (Mugenda and Mugenda, 2003) research design is the scheme outline or plan that is used to generate answers to research problems. It provided a plan that specifies how the research was executed in search a way that it acts as the research questions (Mugenda, 2007). Descriptive survey research design is appropriate for this study. (ILO, 2010) describes a descriptive survey research design as a systematic research method for data collection from a representative sample of individuals using instruments composed of closed-ended and open-ended questions, observations, and interviews. It is one of the most widely used non-experimental research designs in various disciplines to significant amounts of survey data collected from a representative sample of individuals sampled from the targeted population.

3.3 The Target Population

The target population of the survey was 100 respondents comprising 65 project beneficiaries, 15 project management committee, 10 government officials and 10 experts in water management.

Table 3.1 Total Population

Stratum	Total Population (N)	Population Percentage (%)
Project Beneficiaries	65	65
Project Management Committee	15	15
Government Officials	10	10
Experts In Water Management	10	10
Total	**100**	**100**

Source: Nakuru County, 2013

3.4 Sample Size and Sampling Procedures

Sampling is a process of selecting a given number of subjects from a defined population as representative of that population. Any statement made about the sample should also be true of the population (Orodho, 2002). Sampling may also be defined as the selection of some part of an aggregate or totality by which a judgment or inference about aggregate or totality is made (Kothari, 2006).The sampling technique for this study is simple random sampling to select the required sample where each sample size has an equal chance of being selected.Though it is always maintained that the rule of thumb is to obtain as big sample as possible, the resources and time being a major constraint the following formula will be used to determine the sample size.

3.4.1 Sample Size

A sample is the portion of the population that is tested for investigation. It is also small group taken from a larger population composed of members under study (Bryman, 2012). According to (Mugenda and Mugenda, 2003), a sample size should be 10% and 30% of the target population, and in this study, the researcher uses a sample of 10% for descriptive studies.

Table 3.2 Sample Size

Stratum	Sample Size (S)	Sample Percentage (%)
Project Beneficiaries	52	65
Project Management Committee	12	15
Government Officials	08	10
Experts in Water Management	08	10
Total	***80***	***100***

Source :Krejcie & Morgan, 1970

3.4.2 Sample Selection

In this study, simple random sampling technique was adopted to select respondents from the various groups of respondents. The groups that formed the sample include project beneficiaries, Project Management Committee Members and the experts in water management. The study attempted to test 65% of the respondents in each subgroup.

3.5 Data Collection Instruments

The questionnaire and interview schedule was employed for data collection in this study because a lot of information is collected over a concise period. Each item in the questionnaire was made to address a specific objective, research questions of the study (Mugenda and Mugenda, 2003). The questionnaire was used since it is cost effective and especially true for studies involving a large sample size. The questions are in two categories, namely structured and unstructured. The unstructured questions require some explanation according to what is necessary according to research objectives. Information obtained through questionnaires is free from biases as the researcher cannot influence the respondents, therefore, more accurate and valid data can be obtained (Kothari, 2008).Questionnaires and interview schedules was the tools for data collection. The questionnaire was to collect data because it offers considerable advantages in the administration. It also presents an even stimulus potentially scores of people

simultaneously and provides the investigation with a natural accumulation of data. (Gay,1992) affirms that questionnaires give respondents freedom to express their views or opinion and also to make suggestions. It is also anonymous. Anonymity helps to produce more straightforward answers than is possible in an interview. Thus the questionnaires was used to collect data from the target population.

3.5.1 Pilot Testing

According to (Naoum, 1998) good research practice starts with a pilot study at Elda-ma/Ravine sub-county before the actual study.(Liaw and Goh, 2002) stated that a pilot study is not mandatory in research design, but it is a usual practice before an actual study. The researcher tested the constructed questionnaires with a small representative sample identical to, but not including the group in the survey. Ten experts in water management were interviewed as a means of pre-testing the questionnaire. The main reasons were to determine whether the questions are measuring what they are supposed to measure, check the wording and sentence construction if the respondents were interpreting the questions clearly and whether the questions were provoking

3.5.2 Validity of Instruments

A valid instrument measures the concept in question accurately. To ensure validity, the researcher will use accurate measuring instruments, standardise data collection proce-dures by guiding the respondents appropriately and carrying out piloting to determine the usefulness of instruments, clarity in terminology, the focus of questions, relevance and applicability, the time required and methods for analysis. The findings of the pilot study and the respondents' comments will be used to improve the quality of the questionnaires so that they adequately address the concept of the study (De Vos,1998).

3.5.3 Reliability of Instruments

A questionnaire with a high reliability will receive similar answers if it is done again or by other researchers (Bryman and Bell, 2007). Utilizing pilot test data, the reliability is determined through the Cronbach alpha coefficient analysis. It recommends a reliability coefficient of $\alpha = 0.70$ and above. Cronbach alpha provides a good measure of reliability

because holding other factors constant the more similar the test content and conditions of administration are, the greater the internal consistency reliability.

3.6 Data Collection Procedure

Data was collected through a self-administered questionnaire for the respondents. The researcher obtained approval from the University and a permit from the National Council for Science and Technology to conduct the study. After that, the researcher contacted the offices at Nakuru County headquarters before the start of the study. The researcher booked appointments and personally interviewed the government officials, project management committee and experts in water management.

3.7 Data Analysis

After data was collected; the researcher conducted data cleaning, which involved identification of incomplete or inaccurate feedback, which was corrected to improve the quality of the replies. Then the entry of the data was done. The data generated was analysed and presented using frequency Tables, means, and percentages with the help of SPSS computer software. Results is presented in tabular format with explanations after every Table.

3.8 Operational Definition of Variables

This section defines variables regarding objectives, their measurable indicators with associated measures, measuring scale and data analysis processes. The breakdown is based on each objective and is depicted in Table 3.3.

Table 3. 3 Operational Definition of Variables

Objective	Type of variable	Indicators	Scale of Measurement	Analysis Technique
To study the influence of stakeholder involvement in the sustainability of piped water project.	**Independent:** -Stakeholder involvement	- Number of consultative meetings held. -Number of individuals and Groups empowered. -Number of local people involved in different project stages.	-Nominal -Ordinal	-Standard deviation -Mean
	Dependent: -Sustainability of Piped Water Project	-Community ownership - Duration of the project -Cost of maintenance /Affordability -Continuous maintenance of the piped water project.	-Nominal -Ordinal	- Standard deviation -Mean
To study the influence of project management on the sustainability of piped water project.	**Independent:** -Project Management	Practice of : -Project Planning -Project Staffing -Project Controlling.	-Nominal -Ordinal	- Standard deviation -Mean
	Dependent: -Sustainability of Piped Water Project	-Community ownership - Duration of the project -Cost of maintenance /Affordability	-Nominal	- Standard deviation

		-Continuous maintenance of the piped water project.	-Ordinal	-Mean
To study the influence of level of education of project management committee on the sustainability of piped water project.	**Independent:** -Level of Education of Project Management Committee	-Unskilled Personnel -Semi-skilled Personnel -Skilled Personnel	-Nominal -Ordinal	- Standard deviation -Mean
	Dependent: -Sustainability of Piped Water Project	- Community ownership - Duration of the project -Cost of maintenance /Affordability -Continuous maintenance of the piped water project.	-Nominal -Ordinal	- Standard deviation -Mean
To study the influence of the availability of funds on the sustainability of piped water project.	**Independent:** -Availability of funds	-Funds sufficiency -Amount allocated in the budget -Availability.of budgets.	-Nominal -Ordinal	- Standard deviation -Mean

	Dependent: -Sustainability of Piped Water Project.	- Community ownership - Duration of the project -Cost of maintenance /Affordability -Continuous maintenance of the piped water project.	-Nominal -Ordinal	- Standard deviation -Mean

3.10 Ethical Consideration

Ethics has been defined as that branch of philosophy which deals with one's conduct and serves as a guide to one's behaviour (Mugenda and Mugenda, 1999). In conducting this research, the researcher will follow ethical guidelines to ensure that there is no physical or emotional harm to the respondents. The respondents will be assured that strict confidentiality will be maintained in dealing with the responses. Respondents will be made to understand the aim of the study and the importance of the information they will provide. They will also be informed that they are free to withdraw whenever they deemed fit and assured of confidentiality and that information got from them will be used for intended purpose only; this will be guaranteed by ensuring anonymity where respondents are required to disclose their identity.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents data on the responses of this research. Collected data is presented in form of Tables and figures to facilitate comparisons. Explanations are also given on the contents of Tables and figures. The population of the study were parties involved in the sustainability of piped water project in Nakuru Town West Sub-County. This study entailed a target population of 52 respondents who were carefully selected using stratified sampling technique.

4.2 Questionnaire Return Rate

In this study the questionnaire return rate was 96.15% as the questionnaires issued to the respondents that is project beneficiaries.

Table 4.1 Questionnaire Return Rate

Target Category	Number Targeted	Number Responded	Return Rate (%)
Project Beneficiaries	52	50	96.15

The study targeted 52 Project Beneficiaries, representing 96.15%. This response rates were sufficient and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. This commendable response rate was due to extra efforts that were made via personal calls, appointments booked and visit to respondents 'offices to remind them to fill-in and return the questionnaires.

4.3 Demographic Profile of Respondents

The demographic profile of respondents was grouped into the demographic data of Project beneficiaries. This was based on their gender, age, level of education, marital status and work experience where they were asked to indicate on the questionnaire and results presented in Table 4.2.

4.3.1 Respondents by Gender

The study sought to establish the gender of the respondents who participated in the survey. The findings are shown in Table 4.2

Table 4.2 Distribution of Respondents by Gender

Gender	Frequency	Percent
Male	19	38
Female	31	62
Total	**50**	**100**

According to the findings, majority of the respondents were female (62%) while the male respondents were 38%. The findings in Table 4.2 indicates that majority of the Project Beneficiaries are female who play a vital role in the sustainability of piped water project.

4.3.2 Respondents by Age

The study sought to establish the age of the respondents who participated in the survey. The findings are shown in Table 4.3

Table 4.3: Distribution of Respondents by their Age

Age bracket	Frequency	Percent
Below 25 Years	05	10
26-35 Years	07	14
36-45 Years	10	20
46-55 Years	21	42
Over 55 Years	07	14
Total	**50**	**100**

The findings indicate that a majority of the respondents in the region were of the age group 46 - 55 years (42%) while the least age group was below 25 years (10%).

4.3.3 Respondents by their level of Education

The study sought to establish the level of education of the respondents who participated in the survey. The responses is presented in the Table 4.4

Table 4.4: Distribution of Respondents by their Level of Education

Level of Education	Frequency	Percent
PhD	02	04
Masters	08	16
Degree	28	56
Diploma	10	20
Certificate	02	04
Total	**50**	**100**

The findings show that 04% of the respondents had attained PhD, 16% of the respondents had attained Masters' Degrees, 56% of the respondents had Bachelors' Degree, 20% had attained Diploma and 04% had certificates. The study therefore revealed that most of the project beneficiaries had requisite academic qualifications to discharge their duties and meet the demands of their positions in the sustainability of piped water projects.

4.3.4 Respondents by their Marital Status

The study sought to establish the marital status of the respondents who participated in the survey. The responses is presented in the Table 4.5

Table 4.5: Distribution of Respondents by their Marital Status

Marital Status	Frequency	Percent
Single	07	14
Divorced	06	12
Married	32	64
Widowed	05	10
Total	**50**	**100**

The study involved respondents of different marital status. The highest percentage was married (32%), and the least was that of the widowed (05%).

4.3.5 Respondents by their Work Experience

The study sought to establish the work experience of the respondents who participated in the survey. The responses is presented in the Table 4.6

Table 4.6: Distribution of Respondents by their Work Experience

Work Experience	Frequency	Percent
1 Year and Below	04	08
2-5 Years	08	16
6-9 Years	12	24
10-15 Years	18	36
16 Years and above	08	16
Total	**50**	**100**

From the findings, majority of the respondents (76%) have worked in various institutions and sectors for over five years, 08 % of the respondents have less than year work experience and 16% have between 2-5 years' work experience.

4.4 Stakeholder Involvement and Sustainability of Water Project

This study sought to examine how stakeholder involvement influence the sustainability of piped water projects in Nakuru Town west Sub-county. The study looked at the Number of consultative meetings held, number of individuals and groups empowered and number of local people involved in different project stages. The respondents were asked to rate their degree of agreement or disagreement with statements that relate to a wide range of these aspects. A Likert-scale was used on a scale of 1-5, (Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree).

Table 4.7: Distribution of Respondents According to Stakeholder Involvement

Stakeholder Involvement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Number of meetings held	04	08	04	26	08
Individuals and groups Empowered	06	11	03	25	05
Local People Involved	05	06	03	26	10
Mean	**3.52**		**3.24**		**3.60**
Std. Dev	**1.18218**		**1.25454**		**1.22890**

Table 4.7 shows that there is low consultation with stakeholders in regard to sustainability of piped water projects. The responses indicate that 52% of the respondents disagreed and 16% strongly disagreed that there were consultative meetings held with stakeholders in regard to sustainability of piped water project. The responses also indicate that 16% of the respondents strongly agreed and 08% of the respondents agreed that there were consultative meetings held with stakeholders in regard to sustainability of piped water project while 08% of the respondents had no idea whether there were consultative meetings with stakeholders in regard to sustainability of piped water project.

In regard individuals and Groups Empowered in the community to enhance effective sustainability of piped water project, the responses indicate that 50% of the respondents disagreed and 10% of the respondents strongly disagreed that there were no individuals and Groups Empowered in the community to enhance effective sustainability of piped water project. The responses also indicate that 22% of the respondents strongly agreed and 12% of the respondents agreed that there are individuals and Groups Empowered in the community to enhance effective sustainability of piped water project while 06% of the respondents had no idea whether there are individuals and Groups Empowered in the community to enhance effective sustainability of piped water project.

In regard to the number of local people involved in different project stages to enhance effective sustainability of piped water project. The responses indicate that 52% of the respondents disagreed and 20% of the respondents strongly disagreed that there is low involvement of local people in different project stages enhance effective sustainability of

piped water project. The responses also indicate that 10% of the respondents strongly agreed and 12% of the respondents agreed that there is involvement of local people in different project stages to enhance effective sustainability of piped water project while 04% of the respondents had no idea whether there are individuals and Groups Empowered in the community to enhance effective sustainability of piped water project.

4.5 Project Management and Sustainability of Piped Water Project

This study sought to examine how project management influenced the sustainability of piped water projects in Nakuru Town west Sub-county. The study looked at the Project Planning Process, Project Controlling and Project Staffing. The respondents were asked to rate their degree of agreement or disagreement with statements that relate to a wide range of these aspects. A Likert-scale was used on a scale of 1-5, (Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree). Table 4.8 below shows the responses of the study.

Table 4.8: Distribution of Respondents According to Project Management

Project Management	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	
Project Planning Process	04	08	03	26	09	50
Project Controlling	06	10	02	25	07	50
Project Staffing	05	09	02	26	08	50
Mean		**3.56**	**3.34**	**3.46**		
Std. Dev		**1.19796**	**1.128746**	**1.24884**		

Table 4.8 shows that there is low inclusiveness in the project planning process by the project management to enhance effective sustainability of piped water project. The findings indicate that 72% of the respondents disagreed and 18% of the respondents strongly disagreed that there is low inclusiveness in the project planning process by project management to enhance effective sustainability of piped water project. The responses also indicate that 16% of the respondents strongly agreed and 08% of the respondents agreed that there is inclusiveness in the project planning process by the project management to en-

hance effective sustainability of piped water project while 06% of the respondents had no idea whether there is inclusiveness in the project planning process by the project management to enhance effective sustainability of piped water project.

In regard to project controlling by the project management to enhance effective sustainability of piped water project, the responses indicate that 50% of the respondents disagreed and 14% of the respondents strongly disagreed that there is low project controlling by project management to enhance effective sustainability of piped water project. The responses also indicate that 20% of the respondents strongly agreed and 12% of the respondents agreed that there is project controlling planning by the project management to enhance effective sustainability of piped water project while 04% of the respondents had no idea whether there is project controlling by the project management to enhance effective sustainability of piped water project.

In regard to project staffing to ensure sustainability of piped water project, the findings indicate that 52% of the respondents disagreed and 16% of the respondents strongly disagreed that there is low project staffing to ensure sustainability of piped water project. The responses also indicate that 10% of the respondents strongly agreed and 18% of the respondents agreed that there is adequate project staffing to ensure sustainability of piped water project while 08% of the respondents had no idea whether there is project controlling by the project management to enhance effective sustainability of piped water project.

4.6 Level of Education of Project Management Committee and Sustainability of Piped Water Project

This study sought to determine to what extent does the level of education of project management committee the influence sustainability of piped water projects in Nakuru Town west Sub-county. The study looked at the skilled personnel, semi-skilled personnel and unskilled personnel. The respondents were asked to rate their degree of agreement or disagreement with statements that relate to a wide range of these aspects. A Likert-scale was used in a scale of 1-5, (Excellent, Very Good, Good, Average and Poor).Table 4.8 below shows the responses of the study.

Table 4.9: Distribution of Respondents According to Level of Education of Project Management Committee

Level of Education of PMC	Excellent	Very Good	Good	Average	Poor	Total Respondents
Traits of Personnel	05	16	20	07	02	50
Timeliness Skills	04	05	16	20	05	50
Planning Skills	03	07	28	04	08	50
Analytical Skills	07	22	15	05	01	50
Facilitating Skills	06	10	24	06	04	50
Resource Mobilisation Skills	00	00	16	17	17	50
Communication Skills	01	13	29	03	04	50
Motivating Skills	00	03	23	11	13	50
Mean	**2.7**	**3.34**	**3.14**	**2.42**	**2.84**	**4.02**	**2.92**	**3.68**
Std. Dev	**0.97**	**1.06**	**1.05**	**0.93**	**1.06**	**0.82**	**0.85**	**0.97**

According to Table 4.8, the responses indicate that the personnel coordinating water project In Nakuru Town West Sub-County have good traits. The responses indicate that 82% of the respondents agreed that project management committee is good in analytical skills, 14% of the respondents indicated that project management committee had average analytical skills to ensure effective sustainability of piped water project. The responses also indicate that 04% of the respondent's indicate project management committee had poor skills to ensure effective sustainability of piped water project.

In regard to planning skills of the project management committee have to ensure effective sustainability of piped water project, the responses indicate that 76% of the respondents agreed that project management committee is good in planning skills, 08% of the respondents indicated that project management committee had average analytical skills to ensure effective sustainability of piped water project. The responses also indicate that 16% of the respondent's indicate project management committee had poor skills to ensure effective sustainability of piped water project.

In regard to analytical skills of the project management committee have good to ensure effective sustainability of piped water project, the findings indicate that 86% of the respondents agreed that project management committee is good in analytical skills, 12% of the respondents indicated that project management committee had average analytical skills to ensure effective sustainability of piped water project. The responses findings also indicate that 02% of the respondent's indicate project management committee had poor skills to ensure effective sustainability of piped water project.

In regard to Resource utilisation skills of the project management committee had to ensure effective sustainability of piped water project, the responses indicate that 80% of the respondents agreed that project management committee is good in Resource utilisation skills, 12% of the respondents indicated that project management committee had average Resource utilisation skills to ensure effective sustainability of piped water project. The responses also indicate that 08% of the respondent's indicate project management committee had poor Resource utilisation skills to ensure effective sustainability of piped water project.

In regard to communication skills of the project management committee have to ensure effective sustainability of piped water project. The responses indicate that 86% of the respondents agreed that project management committee is good in communication skills, 06% of the respondents indicated that project management committee had average communication skills to ensure effective sustainability of piped water project. The responses also indicate that 08% of the respondent's indicate project management committee had poor communication skills to ensure effective sustainability of piped water project.

In regard to motivating skills of the project management committee have to ensure effective sustainability of piped water project. The findings indicate that 78 % of the respondents agreed that project management committee is good in motivating skills, 18% of the respondents indicated that project management committee had average motivating skills to ensure effective sustainability of piped water project. The responses also indicate that 04% of the respondent's indicate project management committee had poor motivating skills to provide effective sustainability of piped water project.

4.7 Availability of Funds and Sustainability of Piped Water Project

The study sought to establish availability of funds on the sustainability of piped water project. The study looked at the sufficiency of funding, amount allocated in the budget and availability of budgets. A Likert-scale was used on a scale of 1-5, (Very Good, Good, Minor, No Effect and Not Sure).Table 4.9 below shows the responses of the study.

Table 4.10: Distribution of Respondents According to Availability of Funds

Availability of Funds	Very Great	Great	Minor	No effect	Not sure	Total Respondents
1.Sufficiency in funding	04	07	21	15	03	50
2.Amount allocated in the budget	02	05	14	23	06	50
3.Availability of budgets	07	09	13	21	08	50
Mean	**3.12**		**3.52**		**3.56**	
Std. Deviation	**1.00285**		**0.97395**		**0.97227**	

According to the responses, 08% of the respondents indicated that sufficiency in funding influenced sustainability of piped water project to a very great extent and 14% indicated that sufficiency in funding influenced sustainability of piped water project to a great extent,42% indicated that sufficiency in funding has minor effect sustainability of piped water project, 30% of the respondents indicated that amount allocated in the budget had no effect on sustainability of piped water project and 06% indicated that sufficiency in funding are not sure whether it has influence on sustainability of piped water project.

In regard to the amount allocated in the budget influence sustainability of piped water project, 04% of the respondents indicated that amount allocated in the budget influenced sustainability of piped water project, 10% indicated that amount allocated in the budget influenced sustainability of piped water project to a great extent, 28% indicated that amount allocated in the budget had minor effect sustainability of piped water project, 46% of the respondents indicated that amount allocated in the budget had no effect on

sustainability of piped water project and 12% indicated that amount allocated in the budget were not sure whether it had influence on sustainability of piped water project.

In regard to availability of budget influence sustainability of piped water project, 14% of the respondents said that availability of budget influenced sustainability of piped water project to a very great extent,18% indicated that availability of budgets influenced sustainability of piped water project to a great extent, 16% indicated that availability of budgets had minor effect sustainability of piped water project, 42% of the respondents indicated that availability of budgets had no effect on sustainability of piped water project and 16% indicated that availability of budgets were not sure whether it has influence on sustainability of piped water project.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the findings of this study, discusses the findings, and gives the conclusion on the factors that influence sustainability of piped water projects in Nakuru Town West Sub-County. It also outlines the recommendations for improved piped water project sustainability in the Su-County and recommendations for further research.

5.2 Summary of the Findings

This study sought to examine the factors that influence sustainability of piped water project, so as to propose alternative strategies for enhancing sustainability in Nakuru Town West Sub-county and entire Nakuru County at large.

5.2.1 Piped Water Project Sustainability

There is inconsistency in supply of water by Piped Water Project attributed to lack of adequate stakeholder Involvement, Poor Project management, poor skills of project management committee and insufficient funds. This agrees with the statement of the problem that Piped water project in Nakuru Town West Sub-County portray both intermittency and continuity is sometimes be-felled by embezzlement of water funds, low capacities and lack of ownership. As shown in Table 4.6, large percentage of the respondents (76 %) had a work experience of over five years. Also most of them have knowledge about what sustainability of the piped water project entailed.

5.2.2 Influence of Stakeholder Involvement on Sustainability of Piped Water Project

Stakeholders are vital to the sustainability in that they input to the design, implementation and sustainability. The beneficiaries being the main stakeholders get to learn in the process the operations and maintenance and knowledge base for supply chain. Stakeholder Involvement enhances ownership of the project by community members which promotes effective contributions by community members hence sustainability. Stakeholder Involvement forms the basis for community empowerment as observed by Mazibuko, (2007). Stakeholder Involvement leads to higher rates of resource acquisition and yields better results, higher levels of volunteerism and a brighter community spirit that moti-

vates Community Members to own the piped water project and this enhances its sustainability.

5.2.3 Influence of Project Management on Sustainability of Piped Water Project

Project management influences in terms of ease of operations and minimal cost on trainings and damages that may occur by ensuring inclusive planning processes , adequate project controlling and adequate project staffing. Project management is part of project since inception, this ensure there is continuity when there is handover to operator. Operators are always the water management committees.

5.2.4 Influence of Level of Education of Project Management Committee on Sustainability of Piped Water Project

Level of Education of Project Management Committee is very paramount in Sustainability of Piped Water Project because more learned management committee inputs to the sustainability of piped water project and most often runs smoothly due to ease of understanding.

5.2.5 Influence of Availability of Funds on Sustainability of Piped Water Project

During post-implementation of Piped water project sufficient funds must be there for the water project to be operated and maintained as planned. During operations, the project should be able to fund its operations' and maintenance. Operations and maintenance of piped water projects costs money and must be done to enhance sustainability. The funds are insufficient and projects are done in phases sometimes. The county however discourages funding for project that is complete, as it should maintain itself. Availability of Funds becomes crucial for this to be achieved and this therefore calls for County Government to ensure there is adequate funds to ensure sustainability of piped water project.

5.3 Discussions of the Findings

The findings of the study have been discussed according to the four variables of the study namely; community participation, community training, technology used to extract water and distance between the user and the water point.

5.3.1 Stakeholder Involvement

It is evident from the responses that stakeholders are not involved in the sustainability of piped water project in Nakuru Town West Sub-county. The findings revealed that stakeholder involvement influenced sustainability of Stakeholder Involvement in Nakuru

Town West Sub-County to very great extent. The findings concur with the findings of Rimbera (2012), Mbajiwe (2009) and Vincent (2012) who found out that stakeholder involvement is a very paramount factor in community water project if they are to be sustainable. The findings also revealed that project facets at which stakeholder involvement greatly influence piped water project sustainability were; project initiation, implementation and monitoring & evaluation. This implies that stakeholders need to be involved in piped water project at all levels of the project in order to enhance their sustainability and this agrees with the findings of Ibrahim (2011) which revealed that stakeholder involvement at all stages of the project is one of the major factor that influence implementation of sustainable piped water project in Kenya. Kumar (2002) asserted that stakeholder involvement is a key instrument in creating self-reliant and empowered communities and this enhance ownership of community initiatives hence their sustainability.

5.3.2 Project Management

The study established that there is inadequate Project Management in regard to the sustainability of piped water project .there is inadequate project planning process , project staffing and project controlling. The study also found out that there is no sufficient technical expertise to manage the project; there is no sufficient human resource for sustainability of the project; the community is not satisfied with the overall project management of the piped water project.

The findings are corroborated by Weinberg (2008) who said that piped water project is complex and require multifaceted project management practices. A project manager (PM) has to manifest not only project management related skills but also technical and expertise as required by the project (Thite, 2001). Project management activities include but are not limited to defining project scope and requirements gathering, managing resources and relevant training issues within a project, advising about technical architecture, identifying specific and general project management practices and escalation procedures, estimating project schedule and budget, ascertaining and managing risks within a project and preparing risk mitigation (Kirsch, 2000).

5.3.3 Level of Education of Project Management Committee

The responses of the study revealed that Level of Education of Project Management Committee had a great influence on the sustainability of piped water project. The responses of the study further revealed that level of Education of Project Management Committee in Nakuru Town West sub-county influenced sustainability of piped water project to a very great extent as some of the piped water project were not operating after breakdown. These findings concur with those of (Steve and Khan, 2004) who argues that acquiring skills and training by PMC on sustainability of water project is a key to achieving ownership of piped water project and building capacity necessary for operations and maintenance. Training project management committee on the water technology used in piped water project is very relevant in ensuring proper handling, use and maintenance of the facility. These responses are also in agreement with observations made in other studies. According to (Sahlin, 1998) and (Zimmerer, 1998), a project manager should be competent in the science of project management and also have technical competence in some aspects of the work being performed on a project. Meredith and Mantel (2009) further have the opinion that a project manager should be both generalist and facilitator and should have a reasonably high level of technical competence in the science of the project. Gido (2009) further notes that it is also essential for every member of the project team to clearly understand the goals and objectives of the water projects at every stage of the project implementation.

5.3.4 Availability of Funds

The study deduced that sufficiency of funding was of paramount importance in the sustainability of piped water projects and this was evident in how the respondents rated this factor. Piped water project require financial resources to ensure longevity and proper system functioning. To meet this challenge, amount allocated in the budget should be utilized appropriately to ensure effective sustainability of piped water project. Operating and maintaining a sustainable system of funds collection is critical for sustainability of piped water project to be achieved. Sustainability of piped water project cannot take place effectively without funds. To ensure there is adequate funds there is need to have budgets for proper budgeting of the operation and maintenance costs of the piped water project. Amount allocated in the budget affects the sustainability of piped water project directly.

This implies that a fair percentage of the project's funds were being raised by the project beneficiaries to maintain whenever there is breakdown. This trend is expected to increase the capacity of the project beneficiaries to manage the project and enhance their feeling of ownership thus increase sustainability. These responses are in agreement with a study by Water Supply and Sanitation Performance Enhancement Project (2003) which recommended that government and international community should not be expected to finance all expenditures required in the life of water system.

5.4 Conclusions of the Study

The study concludes that Stakeholder Involvement, Project Management Level of Education of Project Management Committee and Availability of Funds influences the sustainability of piped water project Nakuru Town West Sub-county. The findings of the study deducted that all these factors influenced sustainability of piped water Project but the extent of influence varied from one factor to another and Stakeholder Involvement and project Management had the greatest influence of 69 % while Level of Education of the Project Management Committee is the least with 62%.

The stakeholder involvement aspect of the project as perceived by the survey respondent is negative. The mean derived from the Stakeholder Involvement case summaries indicates that a total of 69% of the total respondents affirmed that they are not involved in the sustainability of piped water Project. Stakeholders play a vital role in the sustainability of piped water project because when they are involved in all the aspects of the project cycle, they will own the project hence its sustainability will be achieved.

The study concludes that Project Management practices influence sustainability of piped water project. The mean derived from the Stakeholder Involvement case summaries indicates that a total of 69% of the total respondents affirmed that they are not involved in the sustainability of piped water Project. Lack of adequate project planning, project staffing and project controlling in the project management may jeopardize the proper management of the project. Although presence of a committed Project management committee and level of beneficiary participation and ownership is strong, the longer-term sustainability of the piped water project appears to be threatened due to weakness in the institutional capacity in project management, most specifically the financial aspects .This may have negative implications on the ability to ensure cost of long term sustainability.

The study concluded that the Level of Education of Project Management Committee as perceived by the survey respondent is positive and it is a clear indicator that project management committee have relevant education and skills which is necessary for sustainability of piped water project. The mean derived from the Level of Education of Project Management Committee case summaries indicates that a total of 62% of the total respondents affirmed that the Project Management Committee have relevant skills and education in regard to the sustainability of piped water Project. High level of education of project management committee gives them ability to understand the basics and importance of sustainability of piped water project.

The study also concluded that availability of funds influences the sustainability of piped water project. The mean derived from the availability of funds case summaries indicates that a total of 68% of the total respondents affirmed that there is inadequate funds in regard to the sustainability of piped water Project. Availability of Funds as perceived by the survey respondent is negative and it is a clear indicator that there is inadequate funds meant for sustainability of piped water project. Operating and maintain piped water project becomes difficult without sufficient funds. Availability of adequate funds ensures smooth running of operations and maintenance of piped water project.

5.5 Recommendations

Project sustainability is of paramount importance for any project and especially for piped water project and for that matter, community members should be made aware of the need of water project to serve not only their generation, but also future generations, hence take the necessary measures to ensure this.

1. Stakeholder Involvement has for long been identified as a tool of helping rural as well as urban dwellers to focus their energy and mobilize resources in order to solve their own problems. When community members identify, plan and share tasks involved in project with professionals, and are involved in decision making on the activities that affect their lives, projects initiated are more likely to achieve their objectives. Community members make projects gain a great support and ownership from community members and this assures sustainability of piped water project and should be encouraged in all community water project.

2. Project management committee must therefore involve all the stakeholders at all levels of the project cycle as this will build ownership of the project, Community members must be trained and educated on how to operate and maintain piped water project so that its continuity is not affected by breakdown, community members must contribute towards the choice of the site for the water point.
3. Level of Education of Project Management Committee is very paramount in Sustainability of Piped Water Project because more learned project management committee inputs to the sustainability of piped water project and most often runs smoothly due to ease of understanding. County Government should ensure that project management committee have adequate skills necessary for operating and maintaining sustainability of piped water projects.
4. The Nakuru County Government should allocate funding towards the sustainability of piped water project. Operation and maintenance of any water project need funds therefore county government should allocate sufficient funds to the same in order to avoid rendering the project dysfunctional or unsustainable on breakdown as they wait on well-wishers to contribute funds who may not be available.

5.6 Suggestions for Further Studies

Further research should be done on the same topic of sustainability on the following:

1. How gender influences sustainability of piped water project.

2. The influence that community member's disputes have on the sustainability of piped water project

3. Influence of project location on sustainability of piped water project.

REFERENCES

Adèr, H.J. & Mellenbergh, G.J. (2008). *Advising on research methods: a consultant's companion.* Huizen, the Netherlands: Johannes van Kessel Publishing.

Agyeman, Julian. (2005). *Sustainable communities and the challenge of environmental justice*. New York: New York University Press.

Anastas, J.W. (1999). *The research design for social work and the human services. Chapter 5, Flexible Methods: Descriptive Research.* New York: Columbia University Press

ADF (African Development Fund) (2005) *Rural Water Supply and Sanitation Admassu, Mengesha, Abera Kumie, Misganaw Fantahun (2002) Sustainability of Drinking Water Supply Projects in Rural of North Gondar,* Ethiopia, Ethiopian J.Health Dev. 2003; (3):221-229.

Adesse Consulting Group. (2008), *Managing your Stakeholders*, Retrieved on July 4th, 2013fromhttp://www.adesse.com/resources/documents/Articles/managing_stakeholders.

Andrew, L. & Friedman, S.M. (2006). *Stakeholders: Theory and Practice*, London UK, Oxford University Press.

Atkinson, R. (1999), "*Project management: cost, time and quality, two best guesses and a phenomenon, it is time to accept other success criteria,"* International Journal of Project Management, Vol. 17 No. 6, pp. 337-42.

Awuah, E., Nyarko, K.B., Owusu, P.A., & Osei-Bonsu, K. (2009). *Small town water quality*. *Desalination, 248,* 453-459.

Baroudi, B. and Pant, I. (2008), "*Project management education: the human skills imperative", International Journal of Project Management, Vol. 26, pp. 124-8.*

Beck, D. R.,(1983). *Implementing Top Management Plans Through Project Management in Project Management Handbook,* ed. Cleland, D. I., and King, W. R. (Van Nostrand Reinhold. New York.

Belassi, W., and Tukel, O. I. (1996). *A new framework for determining critical success/failure factors in projects.* International Journal of Project Management Vol 14 No 3, 141 - 151.

Boland, J. and Whittington, D. (2000). *Water Tariff Design in Developing Countries: Disadvantages of Increasing Block Tariffs and Advantages of Uniform Price with Rebate Designs*. World Bank Water and Sanitation Program, Washington, D.C.Bosch, M. (2010). *"South Africa Banks on Lasting World Cup Legacy."*.

Bourne, L. and Walker, D. (2004), "*Advancing project management in learning organisations,"* Learn Organization, Vol. 11 No. 3, pp. 226-43.

Bredero, E. A. (2003). *"Participation and accountability in development management."* Journal of Development Studies (2): 1-29.

Brundtland, G. (1987). *Our common future:* World Commission on Environment.

Cooper, D. R. & Schindler, P. S. (2001). *Business research methods.* New York: McGrew-Hill Companies.

Cumming, O. (2008).*Tackling the Silent Killer: The case for sanitation*. The United States of America.

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: SAGE Publications.

C.R. Kothari, (1985), *Research Methodology: Methods and Techniques* .Wiley Eastern, New Delhi.

Dagmar, R. (2001). *Stakeholder Management*, Retrieved on July 7th, 2013 from http://www.themanager.org/pdf/Stakeholder%20Management.pdf

Daly, Herman E. (1996). *Beyond growth: The economics of sustainable development*. Boston: Beacon Press.

Davis, P. and B. Baulch (2003). *"Parallel Realities: Exploring Poverty Dynamics Using Mixed Methods in Rural Bangladesh."* Journal of Development Studies **47**(1): 118-142.

Dawson Catherine, (2002) *Practical Research Methods*, New Delhi, UBS Publishers' Distributors.

Deborah, S. (2009). *Organizational Effectiveness: The leader's role in responding to change with agility*. Retrieved on July 4th, 2013 from http://www.right.com/thought-leadership/e-newsletter/responding-to-change-withagility-the-leaders-role.pdf

Delli Priscolli, J. (1993). *Why the federal and regional interest in public involvement in water resources development. Pp. 61-69 In J. L. Creighton, Jerome Delli Priscoli and C. Mark Dunning (eds.), Public Involvement Techniques: A Reader of Ten Years Experience at the International Conference on Water and the Environment, 1992. "The Dublin Statement and Report of the Conference."* Geneva, Switzerland: World Meteorological Organisation.

Dension .N Sifuna (1990). *Development of Education in Africa the Kenyan experience Nairobi Initiatives LTD.*

DFID (Editor) (1998): *Guidance Manual on Water Supply and Sanitation Programmes. London: Water, Engineering and Development Centre (WEDC) for the Department for International Development (DFID).* URL [Accessed: 04.01.2011].

Edward, F. (2010), *Strategic Management: A Stakeholder Approach*, London UK: Cambridge University Press.

El-Sabaa, S. (2001), *"The skills and career path of an active project manager," International Journal of Project Management,* Vol. 19 No. 1, pp. 1-7.

EPA (Editor); *U.S. ENVIRONMENTAL PROTECTION AGENCY (Editor) (2010): Tips on Writing a Grant Proposal.* URL [Accessed: 08.05.2010].

EUROPEAN COMMISSION (Editor) (2009): *Guide to Financial Issues relating to FP7 Indirect Actions. Seventh Framework Programme.* URL [Accessed: 08.05.2010].

European Commission DG XVI (2012), '*Understanding and Monitoring the Cost-Determining Factors of Infrastructure Projects', A User's Guide, Brussels.*

Falkenmark M, Lindh G. (1993). *Water and economic development. Pages 80-91 in Gleick P, Ed. Water in crisis: a guide to the world's freshwater resources.* Oxford (UK): Oxford University Press.

Forsberg, K., Mooz, H., and Cotterman, H. (1996) *Visualizing project management.*Wiley, New York.

Fotso, J., Ezeh, A.C., Madise, N.J., & Ciera, J. (2007). *Progress towards the child mortality millennium development goal in urban sub-Saharan Africa: the dynamics of population growth, immunisation, and access to clean water. BMC Public Health, 7,* 218.

Frimpong, Y, Oluwoye, J & Crawford, L (2003) *Causes of delay and cost overruns in 1156 construction of groundwater projects in developing countries: Ghana as a case study.* Journal of Project Management, 21,321-6.

Gebrehiwot M. (2006) *An Assessment of Challenges of Sustainable Rural Water Supply: The Case of Of la Woreda in Tigray Region. MSc Thesis, Regional and Local Development Study (RLDS).* A.A.U. Ethiopia.

Gido, J., and Clement, J. P. (1999). *Successful Project Management.* Cincinnati: South Western College Publishers.

Goodwin, R.S.C. (1993) *Skills required of effective project managers." Journal of Management in Engineering,* ASCE, 9(3), 217-226.

Government of Kenya (GOK), *Ministry of Water and Irrigation (2009). Annual Water Sector Review (AWSR). (2009)* Nairobi: GOK.

Government of the Republic of Kenya, (2008) *Kenya Vision 2030: A Globally Competitive and Prosperous Kenya, First Medium Term Plan, 2008-2012 (Nairobi, Kenya: Government of the Republic of Kenya, Office of the Prime Minister, Ministry of State for Planning); also referred to as Kenya"s Poverty Reduction Strategy (PRSP).*

Gleick PH. (1993a). *Water in crisis.* New York: Oxford University Press.

Greenwood, D.J., Whyte, W.F., Harkavy, I., (1993). *Participatory action research as a process and as a goal. Human Relations 46, 175–192.*

Harrison, F., & Lock, D. (2004). *Advanced Project Management: A Structured Approach*. Aldershot England: Gower Publishing Ltd.

Harvey, P.A. and R.A. Reed (2007). *Community-Managed Water Supplies in Africa: Sustainable or Dispensable?'* Community Development Journal 42(3): 365.

Harvey, P. and B. Reed (2002). *Rural Water Supply in Africa: Building Blocks for Handpump Sustainability.* Loughborough, WEDC Publications, Loughborough University.

Hebert, B. (2002), *"Tracking progress",* CMA Management, pp. 24-7.

Hyvari, I.,(2006), "*Success of projects in different organisational conditions",* Project Management Journal, Vol. 37 No. 4, pp. 31-41.

IFAD. (2007). *Strategic Framework.* Rome.

Institute for Water Resources. *IWR Research Report 82-R-1. Alexandria,* VA: Institute for Water Resources, U.S. Army Corps of Engineers.

*International Conference on Water and Sustainable Development (*Paris 1998).

Ives, M. (2005), "*Identifying the contextual elements of project management within organisations and their impact on project success",* Project Management Journal, Vol. 36 No. 1, pp. 37-50.

Jha, K.N. (2004) *Factors for the success of a construction project: an empirical study, Unpublished PhD Thesis, Department of Civil Engineering, Indian Institute of Technology,* Delhi, India.

Karanja, Gichuki and Fissiha Tefera, (1990) *Soil and Water Conservation in Kenya: Bibliography with Annotations* (Nairobi, Kenya: The University of Nairobi, Department of Agricultural Engineering; and Stockholm, Sweden: Swedish Agency for Research Cooperation with Developing Countries (SAREC)).

Katz, R.L. (1974) *Skills of an effective administrator.* Harvard Business Review, September/ October, 90-102.

Katz, D., and Kahn, R.L. (1978). *The Social Psychology of Organisations.* John Wiley, USA.

Kerzner, H. (2002) *Project Management: A systems approach to planning, scheduling, and controlling.* CBS Publishers & Distributors, New Delhi.

Kaufman, M. and Alfonso, H. D. (Eds.) (1997) *Community Power and Grassroots Democracy. The transformation of social life*, London: Zed Books.

Kenya Water for Health Organization, (1985) *Women and Water in Kenya* (Nairobi, Kenya: Kenya Water for Health Organization).

Kerlinger, F. N. (1986). *Behavioral research: A conceptual approach.* New York: Holt, Rinehart and Winston.

Kirsch, (2000). *Familiarity, complexity, and team performance in geographically distributed software development*. Organization Science 18(4) 613- 630.

Kothari, C.R.(1985) *Research Methodology- Methods and Techniques*, New Delhi, Wiley Eastern Limited.

Kothari, R. (2006). *Research Methodology*: *Methods and Techniques*, New Dehli: New Age International Publishers.

Komives, K., B. Akanbang, R. Thorsten, B. Tuffuor, W. Wakeman, E. Larbi, A. Bakalian and D. Whittington (2008). *Post-construction support and the sustainability of rural water projects in Ghana.* 33rd WEDC International Conference. Accra, Ghana.

Kumar, Ranjit, (2005) *Research Methodology-A Step-by-Step Guide for Beginners (2nd.ed.),* Singapore, Pearson Education.

Kharbanda, O.P., J.K.Pinto, (1997). *What Made Gertie Gallop?* New York: Van Nostrand Reinhold.

Khwaja, Asim Ijaz (2004). *Is Increasing Community Participation Always a Good Thing?*Journal of the European Economic Association.

Krejcie, R.V. & Morgan, D.W. (1970). *Determining sample size for research activities. Educational and Psychological Measurement,* 30, 607-610.

Laufer, A., Woodward, H., and Howell, G.A.(1999) *Managing the decision-making process during project planning.* Journal of Management in Engineering, ASCE 15 (2),79-84.

Lockwood, H. (2012). *"From policy to practice in rural water - 'it's the money stupid'."* Retrieved 7 February 2012, from http://waterservicesthatlast.wordpress.com/2012/02/07/from-policy-to-practice-in-srural-water-its-the-money-stupid/.

MacNaughten, P., Jacobs, M. (1997). *Public identification with sustainable development – investigating cultural barriers to participation. Global Environmental Change:* Human and Policy Dimensions 7, 5–24.

Manley. J. H., (1973). *Implementation Attitudes: A Model and a Measurement Methodology. In Implementing Operating Research and Management Science*, ed. Schultz. R. L. and Slevin, D. P. Newyork: Elsevier.

Mar de Plata, (1977). *The UN Conference on Water- Argentina*

Martin, A., Sherington, J. (1997). Participatory research methods: implementation, effectiveness and institutional context. Agricultural Systems 55, 195–216.

Meredith J. R., and Mantel S. J., (2009). *Project Management: Management Approaches*.

rd ed., New York: Wiley.

Metwally, A.M., Ibrahim, N.A., Saad, A., & Abu El-Ela, M.H. (2006). Improving the roles of rural women in health and environmental issues. *International Journal of Environmental Health Research, 16(2),* 133-144.

Ministry of Water and Irrigation. (2007). *The National Water Services Strategy (2007 - 2015).*Nairobi: GOK.

Mitchell, R. K., Agle, B. R. and Wood, D. J. (1997). *Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Counts. Academy of Management Review*. 22, No 4, pp 853 – 886.

Mogaka, Hezron; Samuel Gichere; Richard Davis; and Rafik Hirji, (2006) *Climate Variability and Water Resources Degradation in Kenya: Improving Water Resources Development and Management* (Washington, DC: The World Bank, World Bank Working Paper, No. 69).

Morris, P.W.G and G.H Hough, (1987). *The Anatomy of Major Projects*. Chichester: John Wiley and Sons Ltd.

Mugenda, 0. M. and Mugenda, A. G. (1999). *Research Methods; Quantitative and Qualitative Approaches,* Nairobi. Acts Press.

Mulwa, F. W., (2004). Demystifying Participatory Community Development, Eldoret: Zapf Chancery.

Munyiri, J. K (2013). *Factors Influencing Implementation of Economic Stimulus Projects in Kitui Central and Kitui West Constituencies in Kitui County, Kenya*. Unpublished Masters Dissertation, University of Nairobi.

Murrell, J. (1990). *Political analysis*. New York: Pitman.

Muzio, E., Fisher, D.J., Thomas, E.R. and Peters, V. (2007), "*Soft Skills Quantification (SSQ) for project manager competencies",* Project Management Journal, Vol. 38 No. 2, pp. 30-8.

McCommon, C. (1993). *Community Management of Rural Water Supply and Sanitation Services; Water and Sanitation for Health (WASH:* Technical Report. Washington DC: United States Agency for International Aid (USAID). 67.

NETSSAF (Editor) (2008): *NETSSAF Participatory Planning-Approach. A tutorial for sustainable sanitation planning. Network for the Development of Sustainable Approaches for Large-Scale Implementation of Sanitation in Africa.* URL [Accessed: 29.03.2010].

Ngetich, R. C. (2009). *Assessment of Factors Influencing Projects Sustainability; the Case of Community Water Projects in Keekonyokie Central Location of Kajiado North District, Kenya.* . Unpublished Thesis of University of Nairobi.

Njeru, Gitonga (2010) *"Kenya: Climate Change Water Crisis Impacts Hospital Maternal Care,"* Women News Network (WNN), July 13th; available at http://womennewsnetwork.net/2010/07/13/kenyamaternalh2o/.

NRC. (1999b). *New Strategies for America's Watersheds.* Washington, D.C.: National Academy Press

Okali, C.,Sumberg, J., Farrington, J.,(1994). *Farmer Participatory Research.* Intermediate Technology Publications, London.

Otundo, M. (2012). *Factors influencing effective implementation of projects in public secondary schools in Nyamira District*. Retrieved from http://irlibrary.ku.ac.ke/ir/handle/123456789/5271.

Owen T. and Bar-Nun A. (1995) *Comets, impacts and atmospheres.* Icarus 116,215-216.

Patel, M. B. and Prof. P.G. W. Morris (1999), *Guide to the Project Management Body of Knowledge, Centre for Research in the Management of Projects*, University of Manchester, UK, p52.

Patzak, G.,(1990). *Project Management Paradigm: A System Oriented Model of Project Planning, in Dimensions of Project Management*, edited by H. Reschke& H. Schelle, Springer- Verlag, Berlin, pp26-27.

Peled, A. (2000), "*Politicking for success: the missing skill", The Leadership and Organisation Development Journal*, Vol. 21 No. 1, pp. 20-9.

Pimentel D, Harman R, Pacenza M, Peearsky J, Pimente! M. (1994). *Natural resources and an optimum human population.* Population and Environment 15: 347-369.

Postel S. (1985). *Water: rethinking management in an age of scarcity.* lnterciencia 10: 290-298,322.

Post-War National Development Report approved for publication by the Institution of Civil Engineers, Great Britain, 1944.

Postel S. (1992). *Last Oasis: facing water scarcity.* New York: W. W. Norton and Co.

Philip, R.; Anton, B.; Bonjean, M.; Bromley, J.; Cox, D.; Smits, S.; Sullivan, C. A.; Niekerk, K. Van; Chonguica, E.; Monggae, F.; Nyagwambo, L.; Pule, R.; Berraondo Loepez, M. (2008): *Local Government and Integrated Water Resources Management (IWRM) Part III: Engaging in IWRM – Practical Steps and Tools for Local Governments.* Freiburg: ICLEI European Secretariat GmbH. URL [Accessed: 17.04.2012].

Plumwood, Val. (2002). *Environmental culture: The ecological crisis of reason*. New York: Routledge.

Prabhakar, G.P. (2005), *"Switch leadership in projects: an empirical study reflecting the importance of transformational leadership on project success across twenty-eight nations,"*Project Management Journal, Vol. 36 No. 2, pp. 53-60.

Project Management Institute, (2004). *Guide to the project management Body of Knowledge*. Newton Square, PA: PMI.

Raskin, P. (1997). *Water futures: assessment of long-range patterns and problems. In the Comprehensive assessment of the freshwater resources of the world*. Stockholm, Stockholm Environment Institute.

Republic of Kenya, (2007). *National Water Services Strategy: 2007 2015*. Ministry of Water and Irrigation, Nairobi.

Righter K. and Drake M. (1999) *Effect of water on the metal-silicate partitioning of siderophile elements: A high-pressure and temperature terrestrial Magnum ocean and core formation.Earth Planet.* Sci. Left.

Rolston, Holmes, III. (1994). *Conserving natural value*. New York: Columbia University Press.

Rosenberg, A., K. Hartwig and M. Merson (2008). "*Government–NGO collaboration and sustainability of orphans and vulnerable children projects in southern Africa."* Evaluation and Program Planning **31**(1): 51-60.

Sara, J., & Katz, T. (1998). *Making Rural Water Supply Sustainable: report on the impact of Project rules.* UNDP World Bank Water and Sanitation Program.

Rimbera, P. K. (2012). *Determinants of Water Projects Sustainability: A case of Water Projects in Kieni East Division, Nyeri County Kenya*. Unpublished Thesis of University of Nairobi.

SEAGA (Editor) (2001): *Project Cycle Management Technical Guide.* Rome: FAO. URL [Accessed: 05.09.2010].

Seckler, D., Amarasinghe, U., Molden, D., de Silva, R. & Barker, R.(1998). *World water demand and supply, 1990 to 2025: scenarios and issues.* Research Report No. 19. International Water Management Institute. 52 pp

Solomon, B. 1976. *Black Empowerment*: Social Work in Oppressed

Schultz, R. L., and Slevin, D. P. (1987). *Strategy and Tactics in a Process Model of Project Implementation*.

Shiklomanov IA. (1993). *World freshwater resources. Pages 13-24 in Gleick P, Ed. Water in crisis: a guide to the world's freshwater resources.* Oxford (UK): Oxford University Press.

Shiklomanov, I. A., & Rodda, J. C. (2003). *World Water Resources at the Beginning of the Twenty-First Century.* Cambridge, United Kingdom: Cambridge University Press.

Stuckenbruck, Dr. L. C.,(1981). *The Implementation of Project Management,* Project Management Institute, PA, Wiley, pp2-3.

The UNESCO 2001 *Convention on the Protection of the Underwater Cultural Heritage*

The International Conference on Water and the Environment, Dublin 1992

The UN Conference on Water (Mar de Plata, Argentina 14 al 25 March 1977

The UN Summit on Environment and Development (Earth Summit, Rio de Janeiro, 1992)

Thite, (2001). The Purchasing Power Parity Puzzle. *Journal of Economic Literature*, 34: 647-668

UNESCO. (1995). *Discharge of selected rivers of Africa. Studies and Reports in Hydrology No. 52.* Paris, UNESCO Publishing. 166 pp.

UNIVERSITY OF IDAHO (Editor) (2010): *Grant Proposal Budget Preparation.* URL [Accessed: 08.05.2010].

UNDP (2004). *Human Development Report. New York.* UNDP. USA.
USAID (2009) *Environmental guidelines for small-scale activities in Africa:* Chapter 16 water and sanitation.

USGS. (1983). *National Water Summary - Hydrologic Events and Issues. Water Supply Paper 2250.* Washington, DC, US Geological Survey.

USWRC. (1968). *The Nation's Water Resources. Washington, DC, Water Resources Council,* US Gov.Print. Office.

USWRC. (1978). *The Nation's Water Resources 1975-2000. Second National Water Assessment.* Washington, DC, Water Resources Council, US Gov. Print. Office.

United Nations. (2014). *The Millennium Development Goals Report 2014*. New York.

Vanloon, A.and P. Droogers, (2001). *Water Evaluation and Planning System, Kitui-Kenya.* Future Water Science for Solutions.

Van Rooijen, D.J., Biggs, T.W., Smout, I., & Drechsel, P. (2009). *Urban growth, wastewater production and use in irrigated agriculture: a comparative study of Accra, Addis Ababa and Hyderabad. Irrigation Drainage Systems, 24,* 53-64.

Wallerstein, N., (1999). *Power between the evaluator and the community: research relationships within New Mexico's healthier communities.* Social Science and Medicine 49, 39–53.

Water and Sanitation Program. (2007). *Citizen Report Card for Water in Urban Areas.* Nairobi, Kenya.

Water and Sanitation Program. *Sustainable Management of Small Water Supply Systems in Africa. Water and Sanitation Program;* Nairobi, Kenya: 2010. http://www.wsp.org/wsp/sites/wsp.org/files/publications/Sustainable_Management_of_small_water_supply_systems_in_Africa_English.pdf.

Weinberg, (2008), *Improving Leadership Effectiveness: The Leader Match Concept*, 2nd Ed., Wiley, New York,U.S.A

Wirzba, Norma. (2003). *The paradise of God: Renewing religion in an ecological age*. New York: Columbia University Press.

World Bank (2009). *Country Status Overview of Water Supply and Sanitation Kenya,* Consultation Draft Nairobi.

World Bank (2010). *AMCOW Country Status Overview II:* Kenya Briefing March. Nairobi: World Bank.

World Health Organization. (2006). *Meeting the MDG piped water and sanitation target: the urban and rural challenge of the decade.* Retrieved from http://*www.who.int/water_sanitation_health/monitoring/jmpfinal.pdf*

World Water Forum: 1st Forum of Marrakech (1996).

APPENDICES

APPENDIX I: INTRODUCTORY LETTER

Dismas Kipkurui Chebett,
P.O BOX 311-00507,
Nairobi.-Kenya.

Through the Dean,
University of Nairobi,
Department of Extra-Mural Studies,
Nairobi-Kenya.

Dear Respondent,

RE: DATA COLLECTION FOR RESEARCH PROJECT

I kindly wish to bring to your attention that as a requirement for my Masters of Art in Project Planning and Management programme, I intend to conduct a research study on the "*Factors Influencing Sustainability of Piped Water Projects: A Case of Nakuru Town West Sub-County.".*

The data for this study will be collected through questionnaires and interview schedule, and all the data will be treated with strict confidence.

Your cooperation will be highly appreciated.

Yours faithfully,
Sign: _____
Dismas Kipkurui Chebett

L50/79972/2015

APPENDIX II: QUESTIONNAIRE FOR PROJECT BENEFICIARIES

You are invited to participate in this research on Factors Influencing Sustainability of Piped Water Projects: A Case of Nakuru Town West Sub-County. Thank you for your willingness to participate.

INSTRUCTIONS:

1. The information given on this questionnaire will be held in strict confidence and will be used only for the study.

2. If any of the questions may not be appropriate to your circumstance, you are under no obligation to answer.

Section A: Background Information- tick (√) where applicable.

1. Gender

   Male [ ]

   Female [ ]

2. Age Bracket

   25 years and below [ ]

   26 - 35 years [ ]

   36 - 45 years [ ]

   46 - 55 years [ ]

   Over 55 years [ ]

3. Highest Level of Education

   Certificate [ ]

   Diploma [ ]

   Degree [ ]

   Masters [ ]

   PhD [ ]

4. Marital Status

   Single [ ] Divorced [ ] Married [ ] Widowed [ ]

5. Work Experience

1 year & below	[ ]
2 - 5 years	[ ]
6 - 9 years	[ ]
10- 15 years	[ ]
16 years & above	[ ]

Using the scale below, please indicate your level of agreement to the following propositions on stakeholder involvement and the sustainability of piped water projects.

5 – Strongly Agree; 4 - Agree; 3 - Neutral; 2 – Disagree; 1 – Strongly Disagree

		5	4	3	2	1
6	There is adequate consultation with stakeholders in regard to the sustainability of piped water projects.					
7	Individuals and groups are empowered in the community to enhance effective sustainability of piped water projects.					
8	Local people are involved in different project stages to enhance effective sustainability of water projects.					

9. What stakeholder involvement measures do you suggest that need to be put in place to ensure sustainability of piped water projects?

_____

_____

_____

_____

_____

_____

_____

Section C: Project Management and the Sustainability of piped water projects. Using the scale below, please indicate your level of agreement to the following propositions on project management and sustainability of piped water projects.

5 – Strongly Agree; 4 - Agree; 3 - Neutral; 2 – Disagree; 1 – Strongly Disagree

		5	4	3	2	1
10	Planning process by the project management is inclusive thereby enhancing sustainability of piped water projects					
11	There is adequate control by the project management to enhance the sustainability of piped water projects.					
12	There are adequate staff to ensure sustainability of piped water projects.					

13. What project management measures do you suggest that need to be put in place to ensure sustainability of piped water projects?

_____

_____

_____

_____

_____

_____

_____

_____

Section D: level of Education of Project Management Committee and the Sustainability of Piped Water Projects. Using the scale below, please indicate your level of agreement to the following propositions on project management and sustainability of piped water projects. Legend: 1: Excellent 2: Very good 3: Good 4: Average 5: Poor

		1	2	3	4	5
14	How do you describe the traits of the person coordinating the said project					
15	Planning skills					
16	Analytical skills					
17	Resource utilisation skills					
18	Communication skills					
19	Motivating skills					

20. What level of education of project management committee measures do you suggest that need to be put in place to ensure sustainability of piped water projects

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Section E: Availability of funds and the Sustainability of piped water projects. Using the scale below, please indicate your level of agreement to the following propositions on project financing and implementation of government-funded projects.

21. To what extent you would rate the following factors influence on the sustainability of piped water projects?

Very Great = 5; Great = 4; Minor = 3; No Effect = 2; Not sure = 1

		5	**4**	**3**	**2**	**1**
22	Sufficiency in funding					
23	Amount allocated in the budget					
24	Availability of budgets					

25.What funding measures do you suggest that need to be put in place to ensure sustainability of Piped Water Projects

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION

APPENDIX III: INTERVIEW SCHEDULE FOR GOVERNMENT OFFICIALS, PROJECT MANAGEMENT COMMITTEE AND EXPERTS IN WATER MANAGEMENT

This interview schedule seeks information on "*Factors Influencing Sustainability of Piped Water Projects in Nakuru County: A Case of Nakuru Town West Sub-County.*". All the information you give will be treated with confidentiality and for academic purposes only.

1. To what extent does Stakeholder Involvement influence sustainability of piped water projects?
2. What kind of civic education has your county developed regarding the sustainability of piped water projects?
3. Have the stakeholder involvement standards affected the accountability of the projects undertaken by the county in any way?
4. To what extent does project management influence the sustainability of piped water projects?
5. Of what importance is project management in the sustainability of piped water projects?
6. Have the levels of education of the project management committee members influenced the standards of the projects in any way?
7. How can the project management committees be facilitated to undertake their mandates in a better manner?
8. Are there provisions to ensure that the project management committee members meet the requisite standards about the academic levels?
9. To what extent does availability of funds influence the sustainability of piped water projects**?**
10. In your own view, is the funds allocated to the county enough to cater for the sustainability of piped water projects?

TABLE FOR DETERMINING SAMPLE SIZE

Table for determining needed sample size *S* of a randomly chosen sample from a given finite population of *N* cases such that the sample proportion *p* will be within ± .05 of the population proportion *P* with a 95 percent level of confidence.

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*