

**FACTORS INFLUENCING SUSTAINABILITY OF WATER  
SUPPLY PROJECTS IN CENTRAL DIVISION, MACHAKOS  
DISTRICT OF MACHAKOS COUNTY, KENYA.**

**BY**

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**THIS RESEARCH PROJECT REPORT IS SUBMITTED IN PARTIAL FULFILLMENT  
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**DECLARATION**

I declare that this research work is my original work and it has never been presented to any panel at any university or college for purpose of examination.

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## **DEDICATION**

This project is dedicated to my dear husband Josiah Mulwa and children Lillian Ndinda, Moses Mulwa and Oliver kioko. May the almighty bless you.

## **ACKNOWLEDGEMENT**

First and foremost I wish to express my sincere gratitude to the almighty God for enabling me to undertake this study successfully. May his name be glorified forever. I am indebted to many individuals, organizations and institutions for their contribution and support towards the successful completion of this research work. It may not be possible to mention all by name. May you please accept my sincere appreciation and gratitude.

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## **ABBREVIATIONS AND ACRONYMS**

<b>ASAL</b>	Arid and semi Arid lands
<b>BWR</b>	Basic Water Requirement
<b>DDS</b>	Diocesan Development Services
<b>GDI</b>	Governance in Development International
<b>HDR</b>	Human Development Reports
<b>HRBA</b>	Human Rights Based Approach
<b>MDG</b>	Millennium Development Goals
<b>MRPW</b>	Microfinance for Rural Piped Water services
<b>NGO</b>	Non- Governmental Organizations
<b>O&amp;M</b>	Operation and Maintenance
<b>RWS</b>	Rural Water Supply
<b>SPSS</b>	Statistical Percentage for Social Sciences
<b>UNCED</b>	United Nations Conference on Environment and Development
<b>UNDF</b>	United Nations Development Fund
<b>UNICEF</b>	United Nations Children Fund
<b>USAID</b>	United States Agency on International Development
<b>VLDM</b>	Village Level Operation and Maintenance
<b>WEDS</b>	Water Engineering and Development Centre
<b>WHO</b>	World Health Organization
<b>WSP-AF</b>	Water Sanitation Program-African Region
<b>WWD</b>	World Water Development

## **ABSTRACT**

The purpose of the study was to investigate the factors which influence sustainability of water supply projects in Central Division, Machakos District of Machakos County. The study was guided by the main objectives which were to establish the influence of project planning and implementation cycle on sustainability, to ascertain the influence of community management on sustainability, to examine the influence of co-operation of stakeholders on sustainability and to assess the influence of financial management on sustainability of water supply projects. Throughout projects the world water resource is a very important commodity. In ASAL the commodity has only been supplied by which are sustainable. The study investigated the factors which influence sustainability of water supply projects and found out that planning and implementation, community management, cooperation of stakeholders and financial management influence sustainability of water projects. The study also found out that the factors were prevalent in water supply projects in Machakos County. The findings indicated that there were many water supply projects which were non-functional in Machakos district. It was with this understanding that the study was undertaken to investigate the factors influencing the sustainability. The study was specifically to investigate whether the factors influence sustainability in selected projects of the district, five water projects were randomly selected 75 responded from the target population. Descriptive survey design was employed. Qualitative and quantitative methods were both used for the investigations. Questionnaire, interview schedule and documentary techniques were employed for gathering information. Validity and reliability were tested and ascertained with the  $\alpha=0.05$ . Data was analyzed using SPSS. The study revealed that project planning and implementation, community management, cooperation of stakeholders and financial management influence sustainability of water supply projects in the division. These findings imply a lot on the supply of water with respect to project development in order to improve availability and supply of water. The study recommends that proper planning and implementation community management, cooperation of stakeholders and proper financial management should be considered in the events of developing water supply projects in the district. Further studies can be done to investigate effects of poor sustainability of water supply projects. A similar study should be done in other parts of the county to find out if the same result will be realized all in efforts to improve sustainability of water projects.

# CHAPTER ONE

## INTRODUCTION

### **1.1 Background to the study**

Efficient water management will not only contribute sustainable long term economic growing but also poverty reduction, health and security (Saleem 1997). Sustainability of improved water supplies has positive impact such as increased economic growth, increased health and reducing poverty at the community shown that there are several factors, which influence it. The developed countries, international organizations and other well-wishers have made efforts to improve access to water for all by funding water supply projects. These efforts however do not help if the projects fail in a short while. Proper management of improved water supply play vital role in sustainability of components (Abram 1984). Lack of the right skills in management enhances poor sustainability, poor leadership and lack of top management support leads to poor sustainability of water supply.

To achieve a sustainable structure, there is need to have in place policies and legal institutional framework for improved and sound management of water supply projects. Coordination of stakeholders in formulation of sound sustainable mechanisms, leads to a lasting solution and plays a vital role in sustainability development of rural water supply schemes. (UNICEF, 1999) reported that to examine the impact of the water supply system social economically, the full impact should be taken under consideration. The involvement issue caters to some extend the Beijing declaration of 1995 (Dr. Mary Elmendorf (1984). The suffering due to water shortage is severely experienced by women. Women majorly do fetching of water among other household chores. With the hilly terrain of Machakos County and the scarce water points, women cover long distances and use a lot of energy in the search.

Rural households who have no access to safe water sources around their houses (UNICEF, 1999) are losing about three hours per day per household fetching water. Community's health is also at risk, as according to (Admassu et, al, 2002) sometimes women prefer fetching water from unprotected springs, rivers and other sources of it is closely in order to decrease the time spent to

fetch water and from these sources they get water free from payment without worrying about the quality of water and its consequences. Less time spent for fetching water avails chance for girls to attend school well and get time to study in the house. UNICEF (2002) reiterates that in Africa almost forty billion hours are lost every year for fetching water from distance sources.

Energy management is a vital component in sustainability without which water supply projects collapse. In line with UNDP's mission to promote sustainable development around the world, the link between human development and improved access to safe drinking water is ensured by project sustainability. Human Development Report HDR (2006) Beyond scarcity: Power, poverty and the global water crisis. The 2006 World water Development Report, clearly shows that there is much in common between the principles and characteristics of effective water governance and the human rights based approach (HRBA) as well as commonly agreed good. Whenever the water governance is good, there is sustainability of projects, which then confirms the anticipated fulfillment of human right to water.

Programming principles such as inclusion, participation and ownership are key to water governance. Millennium development Goals (MDGs) states it that improved access to water supply and sanitation is fundamental to the elimination of poverty and the achievement of its goals. In the past three decades, the activities towards sustainability have adopted participatory approach that acts in response to demand, building capacity of operation and sharing costs, involving community members all through, developing a sense of communal ownership and using appropriate manageable technology. This has shown good improvement towards sustainability and is working to date.

Financial management is very vital in projects sustainability and its failure definitely leads to failure of the project.

All in all, the above mentioned factors i.e. management, creation of awareness, political interference and financial support influence sustainability of water supply in the world, Kenya and specifically Machakos County where the demand for water is more than supply and where most of the project collapse.

## **1.2 Statement of the Problem**

Water is a necessity and all households need a reliable source for it. There are many uses of water in all households. According to Gleik (2006) the minimum requirement for the human body is between 3 and 10 liters per day. He also states that the requirement will also depend on climate, workload and environmental factors. In addition to body consumption, there are also farm and domestic use of water. Despite the continuous efforts, which have been made to provide water supply projects, the commodity is still not enough for all. USAID (2009) in its report stated that more than one billion people do not have access to safe drinking water and three hundred million people do not have access to safe drinking water in Africa only. ADF(2005) also found out that Africa has the lowest total water supply coverage of the continents in the world.

Many parts of Kenya happen to lie on the Arid and semi arid areas. Machakos lies on the semi arid area. It has little rain reception the people therefore have to make efforts to have other sources of water to supplement the little amount received through the rainfall. Despite the continuous efforts that have been made to provide water supply projects, problems have emerged that defer sustainability of the water projects. Many of these problems emanate from the nature of the environment, limited resources, and poor management skills. The problems that needs to be addressed includes means of living with the changing environment, proper management, financial systems, ensuring proper monitoring and evaluation of the water supply projects. For success the sources needs to have sustainability. Knowledge of the factors, which influence sustainability of water supply projects, can create a positive impact to sustainability of the water supply projects. Out of this, the study will establish the factors, which influence sustainability of water supply projects in Central Division Machakos District of Machakos County.

## **1.3 Purpose of the study**

This study investigated factors influencing sustainability of water supply projects in Central Division Machakos District.

#### **1.4 Specific objectives of the study**

The study was guided by the following objectives,

1. To establish the influence of the project preparation and implementation cycle on sustainability of water supply projects.
2. To ascertain the influence of community management on sustainability of water supply projects.
3. To examine the influence of co-operation of stakeholders on sustainability of water supply projects.
4. To assess the influence of procurement and financial management on sustainability of water supply projects.

#### **1.5 Research questions**

1. What influence does the project preparation and implementation cycle has on sustainability of the water project.
2. What influence does the community management has on sustainability of the project?
3. How would you rate the influence of co-operation of stakeholders on sustainability of water supply projects?
4. How influential is procurement and high financial management to sustainability of water supply projects.

#### **1.6 Significance of study**

The study is important for future researchers, as it will provide clear picture of future study. It will assist the community in strategizing on how they can have sustainable water supply projects. The government will achieve its objective of providing clean and sufficient water being a basic need to its citizen in the District. NGOs will earn knowledge on how to fund sustainable projects in their endeavor to better the lives of the challenged people. The study will also be vital as a knowledge tool to any researcher or organization who would want to know the factors, which influence sustainability of water projects

### **1.7 Limitations of the study**

Several limitations were encountered and they hindered the researcher from performing the research perfectly. Best and Kahn (2000) observed that limitations are those conditions beyond the control of the researcher that may place restrictions on the conclusion of the study and their application to other institutions. Lack of adequate research time made the researcher not to get all the information. Financial constraints hindered the researcher from undertaking his study well. It was hard to cover large number of respondents, which resulted to some questionnaires not being responded to. Diversity of the area led to poor coverage of the area. Responds did not answer the questions well due to lack of the knowledge. The respondents interpreted some information as confidential hence did not answer some questions in the questionnaires hence fail to provide information. To counter these limitations: questionnaire method of data collection was used to counter expense in time and money. Sampling was used to deal with the problem of diversity. The questionnaires used were in simple language and anonymous to counter language barrier and confidentiality of information respectively.

### **1.8 Delimitations of the study.**

This study was delimited to the sustainable water supply projects of Central Division, Machakos District in Machakos County since it was the only way of reaching the community members. Since the study was conducted in Central Division of the District where most projects are in urban areas, the findings may not be generalized to projects in the rural areas.

### **1.9 Assumptions of the study**

This study was done assuming that the sample represents the population of the study. This kind of sample should be proportional and directly related to the study. It was also assumed that the data collection instrument had validity and reliability. It was able to measure or collect the required data, i.e. the data should be relevant to the study. It should also be reliable in that it should be stable in the measurements. In relation to the respondents, it was assumed that they would answer questions correctly and truthfully, the assumption was so even on the sensitive financial questions involved which may be shunned in the thinking that it may unearth hidden truths at the expense of some people's comfort. Again, the respondents will be assumed literate to ease understanding and answering of the questions.



In preparation for cases of no assumption, the researcher ensured that the most convenient methods of sampling were employed for a good sample. Pretest was done on the data collection instruments to ensure that they are valid and reliable. On the respondents freedom the researcher will emphasized on the anonymity of all respondents they used the interview method of data collection to ensure elaboration where need be. Either highly skilled interviewee were used to ensure successful data collection.

#### **1.10. Definition of significant terms**

**Sustainability of water supply projects** is the ability of a water project to meet the demand of the community without contradicting the satisfaction of the future generations.

**Cooperation of Stakeholders** Cooperation from Direct and indirect beneficiaries of a development project

**Independent Variables** Key issues involved in a study.

**Intervening Variables** concepts which interfered with the research process

**Dependent variable** the goal of the study

#### **1.11 Organization of the study**

The study is organized as follows: chapter one which is introduction consists of background to the study, statement of the problem , purpose of the study , objectives of the study, research questions significance of the study , limitations of the study , delimitations of the study and definition of significance terms. Chapter two includes: introduction, sustainability, preparation and implementation cycle, community management, cooperating of stakeholders, financial management, theoretical framework and conceptual framework .Chapter three; research methodology includes: introduction, research design, target population and sampling procedure, research instruments, instruments validity, reliability of instruments, data collection procedure and data analysis techniques. Chapter four will consist of the report after analyzing the data while chapter five provides the findings, conclusions recommendation and suggestions for further research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter covered the available existing literature related to the factors influencing sustainability of water supply projects. It particularly focused on the influence of project preparation cycle, community management, coordination of stakeholders and political interference on sustainability of water supply projects. It also tackled the convenience of monitoring and evaluation to sustainability of water supply projects as well as the importance of procurement and financing of the same.

#### **2.2 Sustainability of Water Supply Projects.**

Abrams, (1998) defines sustainability as whether or not something continues to work overtime in this context sustainability of water projects. The term sustainability and sustainable can be found repeatedly throughout government policy documents and the mission statement of external agencies in the rural water supply sector in Africa according to a research undertaken at the water engineering and development centre [WEDS] under DGD-funded knowledge and research project guidelines for sustainable hand pump project in Africa there are many definition of sustainability. On sustainable they state that a sustainable project is the one in which the existing water sources are not exploited but are naturally replenished.

Facilities are maintained in conditions which ensure reliable and adequate water supply, the benefit of the supply continue to be released by all users over a prolonged period of time and the time of delivery processed demonstrates a cost effective use of resources that can be replicated. Harvey and Reed (2007) pointed out several community issues like perceived lack of ownership, lack of education on water supply and sanitation, poor management system and limited demand are related to low sustainability rates of water supply systems. Well (1998)states that insufficient water facilities, poor physical structures, low reliability of the services and facility designs, distance and time needed to collect water and low awareness about their users are some of the factors that affect continued functioning of the rural water supply system and is corrected with

institutional, social, technical, environmental and financial dimension . The challenges may be so destructive causing serious scarcity of the water. A report by USAID (2009) has it that more than one billion people do not have access to safe drinking water and three hundred million people do not have access of safe drinking water. ADF (2005) states clearly that Africa has the lowest total water supply coverage of the other continents in the world.

This means that the people living in Africa should tirelessly work towards filling the gap of access to water. In Kenya, most of the improved water suppliers are not well functional thus making it more difficult to sustain the existing structure. In developing countries national and regional governments, local and international NGOs and other concerned organizations invest large sum of money every year for the implementation of rural water supply projects (Gebrehiwot 2006).

### **2.3 Preparation and implementation cycle and sustainability of water projects**

The main purpose of implementation should be satisfaction of demand. For a project to be planned and implemented, the demand by the user (community) should be the key issue. Therefore, Preparation and implementation should aim at satisfying the demand by the members of the community. According to Gizachew (2005) demand is defined as the quantity and quality of water, where community members will choose to consume at a given price. In demand responsive approach, beneficiaries should feel the need for safe drinking water supply, in order to search for safe drinking water supply projects. Water projects are more or less demand responsive to the degree that beneficiaries make choices and carry out resources in support of their choices (Gebrehiwot, 2006).

Involving the users in planning, implementation, operation, protection and maintenance of water supply systems meaningfully is the key to sustainability. Davis and Liyer (2002) have it those community members contributions might take the form of money, labour, material, equipment or participation in project-related decision making and meetings.

For a project to succeed it should be well planned according to the demand and the resources available. It should also be well implemented according to the design and be implemented in the right steps and with the required technical knowhow. Lastly, the operation should also be effective for the project to be self-sustainable. Those three phases of a project should be well done with the right results at each phase. Due to wide spread trend in the developing countries of devolution of responsibility for water schemes from government, villagers, planning and design being the key step in a project should be an initiative of the community.

These ensure community that is patient once enhancing ownership of the project by the community. According to Cartel et al (1999) the widespread failure of the water suppliers have been attributed to a number of flaws in the project; the intervention was not desired by the community, the capital and/or recurrent costs are too high for the community, lack of ownership result in neglect of maintenance and repairs, the promised benefits don't materialize, education programs are too short and trained members of the community move away or lose interest.

Those should be use of appropriate technologies which are low cost, easy to maintain, simple to use and readily available to maintain the community level plan of the project. This does not mean that the community provides the technology but it means that the technology applied should not be too high beyond reach of the members of the community. Where it is impossible then awareness on the bit should be created among the members of the community. Appropriate technologies are integral to the concept of village level operation and maintenance (VLOM) which emerged in the water decade of (1981-1990). Successful planning and implementation requires proper operation, which goes hand in hand with maintenance hence always perceived as operation and maintenance.

Harvey & Reed (2006) it is common practice for village water schemes to be managed by a village committee of some sort. The creation of which is intended to enable communities to have a major role in the project, to have a sense of ownership over the scheme and to ensure its ongoing operation and maintenance. The operation and maintenance intensity varies with the

cultural factors, social economic factors and type of water in supply in terms of quantity, quality and availability.

Gleick (2006) stated the international acceptable standards for the water requirement for basic needs, community required to as basic water requirement (BWR). BWR is defined as water requirement in terms of quantity and quality for the four basic needs of drinking water, Human hygiene, Sanitation service and modest household needs. The standard is defined by world health organization (WHO) guideline as 20 liters per capita per day (Admassu et al, 2002) the effective operation and maintenance (O&M) of rural water supply system is crucial element for sustainability of the water project, must require financing and resources are also required.

The community management of water supply system on operation and maintenance (O & M) is not successful, if financing resources are not available for frequent support and are not provided (Binder 2008). Here budgeting is required and it should be for sufficient funding. Binder (2008) stated that increasing a budget allocation for rural water supply systems is very important, but it is not only thing to meet the challenges of achieving the millennium development goals (MDGs) enhancing the capacity of operators related to the choice of appropriate institutional management is also mandatory to achieve the millennium development goals (MDGs). The success of the activities of the project should be assured through Monitoring and evaluation.

According to Casley and Kumar (1997), the United Nations ACC Task Force on rural Development (1984) Rossi and Freeman (1993) and OECD (1986) Monitoring is an internal activity of program management, the purpose of which is to determine whether programs have been implemented as planned. Assessment frameworks rely on both simple data manipulation and on the use of statistical methods, such as regression analysis, to interpret data. Whilst being more scientifically rigorous, the latter approach is more complex and inevitably removes the focus of the investigation away from the community, and even out of the country completely. The techniques used to assess the extent of RWS project sustainability have become progressively more participatory over the years.

There has been lack of systematic back-up support for the communities after the systems are constructed and few countries have adequate institutional frameworks to provide such support where such support arrangements do exist, they focus on largely technical aspects of O&M and tend to be overburdened. In most of the projects, it is not done and where it is done minimal is done due to lack of funds.

According to World Bank (2003), assessment frameworks rely on both simple data manipulation and on the use of statistical methods such as regression analysis, to interpret data. Whilst being more scientifically rigorous, the latter approach is more complex and inevitably removes the focus of the investigation away from the community and even out of the country completely.

Thus in many cases the projects are assessed by observing the outcome of the project where results are rarely documented. Based on worldwide evidence from WS&S projects, health benefits will accrue to individuals, especially those living in substandard environments, if their behaviors result in increased quantities of clean water being consumed and used for hygienic purposes and if they are protected from exposure to unsanitary wastes (Okun, 1987; Esrey et al,1990).

#### **2.4 Community management and sustainability of Water Projects**

Management involves organization of resources available to achieve a certain goal. In this context to increase access to water per capita according to (Saleemi 1997), management connotes integration and coordination of all resources in order to achieve the desired objectives. In water, it may involve varied resources including Human resources, natural resources and financial resources. Management here entails clear objectives, leadership availability and allocation of resources.

It is common practice for village water scheme to be managed by a village committee of some sort: the creation of which is intended to enable communities to have a sense of ownership over the scheme and to ensure its ongoing operation and maintenance (Harvey & Reeds 2006).

According to UNICEF (1999) and USAID (2009) if the operation and maintenance program of a water project is designed by the community, the program will function much better (empowerment of the communities than when the program is designed by outsiders (project team and all stakeholders) be competent and committed).

Empowerment of the communities involved in the management, leads to the positive participation in the sustainability. Coordination of stakeholders in formulation of sound sustainable mechanisms, leads to a lasting solution. Empowerment of the communities involved in the management, leads to positive participation by the community members in planning, implementation, development and maintenance of rural water supply systems

Kenya has a strong culture of self help which has been harnessed for many development activities especially in the rural areas. According to a report by World Bank (World Bank 2000) for the eight million Kenyans who have access to improved water in rural areas, 30% are served by management water supply schemes. They often have water communities or caretakers and have held in the construction of their systems. Neither are the communities inexperienced as managers generally: they manage their own households, agricultural systems, religious or cultural events as well as relations with their state. Institutions often exist for deliberation and negotiations as do leadership structures. The process that enhanced management capacity of a community takes time and care, both during and beyond lifetime of a project. To take time and care is obviously expensive but will pay – off in the long run as the water supply systems become more sustainable and communities become self-sufficient in operating and maintaining them (Isaac Oega 1999).

Management capacities of the community in the improved water supply state that everybody has the role to play. However, there are some key issues that need to be addressed. The relationship between the water committee and community that is often disrupted because of lack of communication, misunderstanding of the rules of the executive, lack of accountability of the management of the systems. There are often issues like:- water conflict between the rich and the poor in the community, the need to involve all groups in conflict management, the need for clear and transparent roles and regulations, the rules of outside agencies such as donors and the

government, the need to monitor system. To avoid and determine water fees problem in continuity of the management when the new committee members are elected and how to overcome those problems.

<http://www2.irc/manager/kenya.html>.

The groups' financial sustainability is helped by their ability to set their own financial tariffs. Accurate clear financial accounts are important to maintain trust among members.

According to WSP – AF ( 2000) financial discipline together with each groups authority to set its own tariffs and to set and approve annual budget, enables income to cover all the operating and maintenance costs. Dissatisfaction with the accounts is always a major cause of leadership conflict in many groups. Technical sustainability depends upon members maintaining their level of interest from the construction stage through to the operation and maintenance stage members established, basic maintenance systems, set tariffs and arrange mechanisms for collecting the income (Osinde R) has it that issues of recruitment/hiring procurement, constructing and audits are crucial in determining the transparency and accountability levels of both the water service boards and the water service providers.

World Bank (2000) in case of the better managed schemes the members of the group, management committee members and staff and all receive detailed and extensive training on features of water suppliers, finance and accounting, budget preparation and record keeping, staff supervision, operating and maintaining work. This training improves performance by all and sometimes reducing unnecessary conflict in the projects.

## **2.5 Cooperating of stakeholders and sustainability of Water Projects**

There should be strong cohesion for cooperation and hence success of a project. In Kenya the self-help schemes serve a slightly different type of community group, not necessarily everybody living in a particular area. WSP – AF (2002) has it that in each case the strong cohesion within the group generates clarity of purpose and sense of ownership, which in turn improve the sustainability of the system. Where there is ownership there is commitment and protection. According to (Gebrehiwot, 2006) water projects are more or less demand responsive to the degree that beneficiaries make choices and carry out resources in support of the choices.



The stakeholders who have a sense of ownership will definitely denote them towards the success of the project hence protect it. According to Alexia Haysom (2006) in the event of a failure in the water supply the villagers do not make any attempt at repairs as it is not perceived to be their responsibility.

The ministry of water and irrigation in Kenya has made efforts time and again to enlighten the community on the importance of their participation in the water issues including the projects of the same, citing the CPC which has empowered the members of the community. According to CPC (2007) CPC is an approach developed to enhance the capacity of the communities to apply for, implement, manage, and maintain their own water.

## **2.6 Financial management and sustainability of Water Projects**

It entails settings of tariffs and managing the money in the operation and maintenance costs. Sometimes also for extension of the project GDI (2000) states that a core challenge facing the WSS sector is financing. The question of affordability and willingness to pay is usually not negotiated at the most public-private partnerships are being entered into or during establishment of institutional arrangements. In Kenya, there has been limited government financing of rural water supply projects. Rural piped water projects in the past two decades have relied heavily on inputs from their users, a phenomenon which has led to a very vibrant self-help movement in the sector MRPW- WSP (2007). These community projects are run on a commercial cost recovery basis. Donor funds have focused on construction of new systems.

Financing to maintain unsustainable projects. These finances come from different sources like central government, donors or external support agencies, municipal government (local authorities), user associations. The issue of political -will to support long-term support arrangements is closely related to financing. . As part of human rights approach to water, one of the most significant obstacles to access is lack of political will and corruption evidence.

In most cases private-public project on water maybe faced by political challenges because many government might be reluctant in investing resources 'invisible' costs such as post-project support. Although the World Bank documents do address the issues of post-project support,

these are not yet enough information about anyone country comes to clear conclusion about the impacts of such support.

This supports the feeling that investing scarce government resources in concrete and pipes is much less of a political risk .Interference in program management of institutional support, mechanisms at the local level where such support are based on municipal government and therefore more liable to political favourism as been recognized as one of the key constraints for such set ups (lock, wood and Trevelt in Rosensweig ed (2001).

In many countries, the frequent personal changes resulting from the successive election of opposing political parties can have a severe impact especially on capacity building. Effort when individual civil servant can be on the job one term might also fail to complete development initiated by the outgoing and start new ones aiming at outdoing them.

Even where it contributes later the district is forced to include the full costs of the district water and sanitation terms in its budget where the local government is maintained to support service functions, the tiers of the government often face many financial constructions. External aid is not reliable either as according to Rosensweig ed (2001) over reliance on external donor can lead to questions of sustainability for the entire support system itself as has been the case in Honduras with the circuit rider model. For instance,

Kenya does not support rural water supply system. Many funding Organizations are in favor of the private sector rule of complementing the public sector efforts in the probation of support services. Their funding is often included in the designs of loans to facilities and encourages private sector participation for the duration of the projects. However, the only works where the party involved have sustained willingness; community beneficiaries to pay for the post project goods, services, and the project teams' commitment. To date there is insufficient empirical evidence to support these broader assumptions about the potential rule of the private sector in post- project support services.

Financial management is a very important link in project sustainability. According to W S P-AF (2002) in Kenya, the schemes have proportionately more household connections and higher user charges, which the users can afford because the water is used for agriculture as well as domestic consumption the users also set their own tariffs annually, based on their knowledge of the systems financial position provided they are well managed the schemes are likely to achieve sustainability. Sound financial management is exemplified by the use of metering and sanctions against consumers who do not pay.

## **2.7 Theoretical framework**

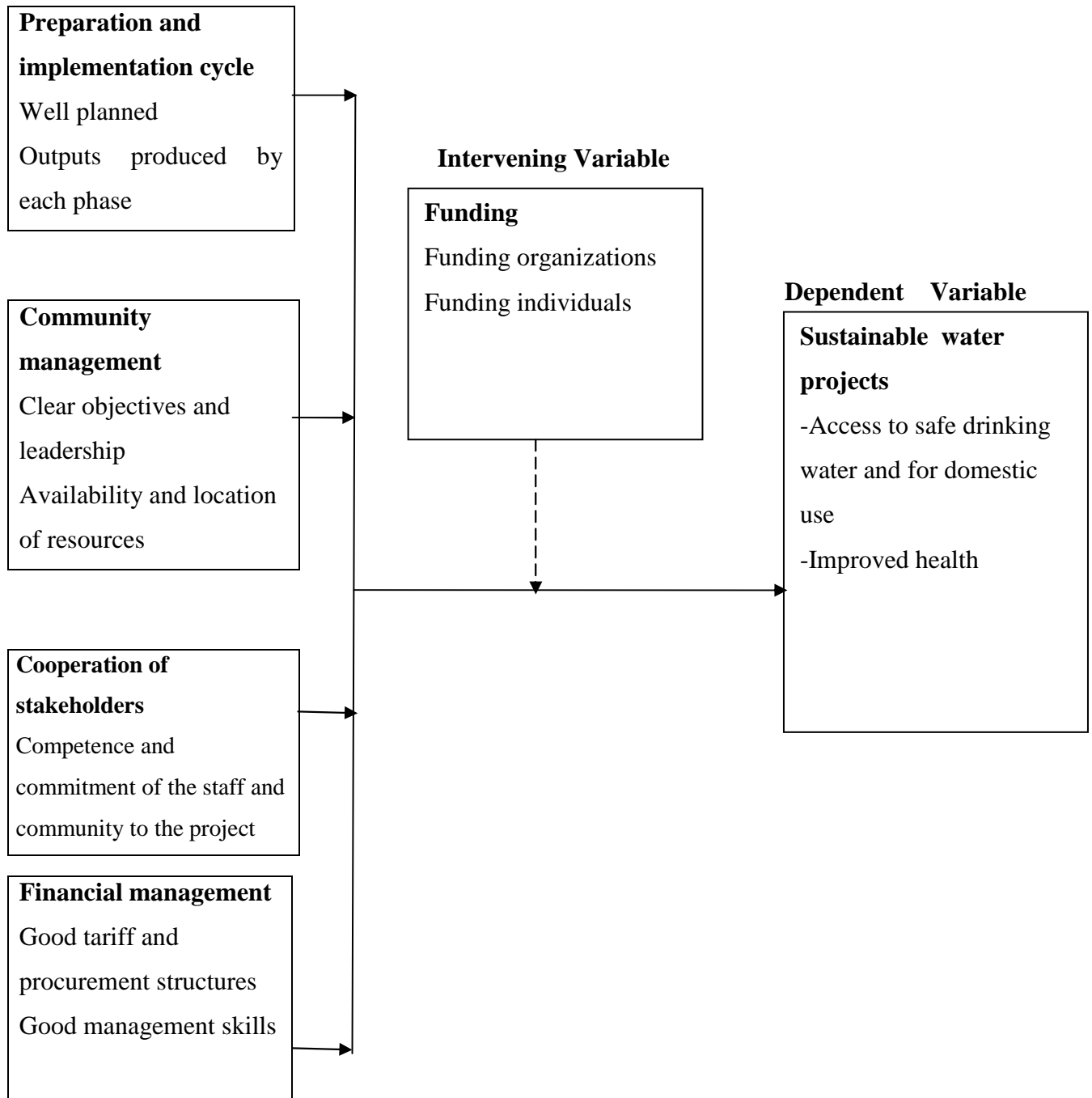
This study will be guided by the systems theory of organizations the interpretive/constructivists' theory developed by Jean Piaget. It was used in Edmund Husserls & White Diltheys study of interpretive understanding called Hermeneutics. Researchers who use it use the term more generally to interpret the meaning of something from a certain standpoint situation.

The prepositions of the theory are: - that knowledge is socially constructed by people active in the research process. Scwandt (1994) has it that the researcher should attempt from the point of view of those who live it. This research is a product of the values of researchers and cannot be independent of them. Thus opts for a more personal, interactive Mode of data collection. As applied to the study the theory holds that project preparation and implementation, community management, co-ordination of stakeholders, financial management, monitoring and evaluation together with political interference would influence sustainability of water projects. This is true considering the fact that knowledge is socially constructed. Thus if management understands that project preparation and implementation, community management, co-coordinating of stakeholders, financial management, monitoring and evaluation together with political interference influence sustainability of water projects then the interpretive/ constructivists theory is the most suitable for the study.

However due its limitations the researcher needs to prepare well. In their efforts to make the research a success the researcher will ensure that the interrelationships between parts of the system are well understood, that all people involved have an idea of what needs to be accomplished and that there is cohesion among all participants.

## 2.8 Conceptual framework.

### Independent variable



**Fig 1 Conceptual Frame work**

Sustainability of water projects is vital for the success of the projects. Project preparation and implementation will call for management of the implemented projects. Co-coordinating of stakeholders will create ownership for the project hence assures security of the project. Financial management will then be put in place to cater or the financing of the project. Monitoring and evaluation will be applied to test effectiveness o the project. Political Will shall be sought for the support of the project. Finding organizations will moderate the project while global warming and poverty may intervene. Sustainability of the projects will be achieved at the end for the projects objectives to be realized.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter describes the research methodology adopted by the researcher. It attempts to illustrate the research methods adopted in gathering information and presentation of data collected. This chapter therefore focuses on the research design, population of the study, sample size, data collection and data analysis method used by the researcher.

#### **3.1 Research design**

In this study, Descriptive survey design was employed. It is concerned with the analysis of the relationships between non manipulated variable and the development of generalization, (Best Kahn 2009). The design was also used to determine the attitudes, perceptions and characteristics of the respondents using questionnaires for collecting data on factors influencing sustainability of water supply projects in central Division Machakos District.

#### **3.2 Target population**

A population of 250 beneficiaries of five water projects out of the total 24 projects of the Division was targeted. According to Diocesan Development Services DDS annual report (2009) central Division has 24 water supply projects. The five projects were selected due to their sustainability. Target population is that which the researcher may want to generalize in the study (Mugenda 1999) Beneficiaries of the projects in the entire area share common believe and values and they operate and manage their water projects in a similar manner. Most people from the District have same problems of water shortage and lack of clean drinking water. This is mostly due to lack of sustainability in water supply projects.

#### **3.3 Sample size and Sampling procedure**

Five water projects of central Division were selected. The sample size was 75 respondents sampled from the target population of 250 respondents. The 75 responded were drawn as follows; 3 members of the executive committee, 10 ordinary community members and 2 community leaders all drawn from each of the five water supply projects. To identify the sample,

the following methods were used. Stratified sampling method was used since the population under study was homogeneous i.e. made of one ethnic group Moreo (1996). The method was suitable since it gave more estimates that are precise and will give every project equal chances of being selected. Then the researcher used simple random sampling method to select the community members to interview.

A sample size is a part of the total persons involved on the basis which judgment is made. Five projects were chosen from the total projects. 3 committee members, 2 leaders from each of the five sampled projects were selected together with fifty (50) members from all the projects. The sample size was 15 committee members from sampled projects, 10 area leaders from the areas and fifty members of the sampled projects. Seventy-five respondents were therefore interviewed.

### **3.4 Methods of data collection**

This refers to methods used to gather information and the procedures used for administering them in the in the field. Both primary and secondary sources were used. The primary source of the information was on two instruments namely; Questionnaire and the interview schedule.

Questionnaires are written brief forms comprising of a set of questions used to gather information from a sample population .Questionnaires were used to collect data for this study because they were more efficient for they require less time to prepare, they are less expensive and permits collection of data from a wide population Gay [1992].The questionnaire contained both open and closed ended questions. The questionnaire had two parts with one part on demographic questions while the other contained questions on sustainability of water projects in the community. They were administered by hand to the respondents. They were collected back after one week and information obtained. Much information was obtained since the questionnaires had open ended questions. The one week period which was given enabled the responded to give sufficient and a well thought information. Respondents gave information freely since their identity was not sought. However the questionnaires consumed a lot of time to prepare and the information obtained was not clarified or elaborated.

Interview schedule was also used for the study. It entails oral administration of the questionnaires. The schedule supplemented the questionnaires mainly to seek clarification of important issues relevant to the study. The interview was administered verbally and the respondents gave information face to face. This method provided clarified information which was more trustworthy as it was individual and not discussed. The method was reliable since the interviewer clarified the question getting the intended information .Further probing provided more information. Prescreening ensured the right respondents. The interviewer adjusted to the language of the interviewee making them more comfortable to give information. Nevertheless interview schedule was challenging as interviewees were reluctant to visit the project sites alone. It also required skilled labor hence it was expensive.

Last but not least was documentary. They are periodic newspapers which give selected news in depth. Some documentary reports which reflected the project activities proved to be important for the study. They enabled the researcher to prepare adequately. Websites /internet were used in communication on the developments of the projects. The methods were not time consuming although they required skilled labor.

### **3.5 Instrument validity**

Validity of an instrument is the extent to which it does measure what it is intended to measure Coolican (1996).This is how well a test measures what it is intended to measure. Validity can also said to be the degree to which results obtained from an analysis of data actually represent the phenomenon under investigations Orodho (2004).The researcher tested both face and content validity of the questionnaire .Face validity refers to the likelihood that a question was misinterpreted .According to Wilkinson (1991).Pre –testing a survey is a good way to increase the likelihood of face validity. Piloting is the process of trying to find out in the field the questionnaire to be used Kombo and Tromp (2006).This was done to a selected sample similar to the actual sample which the researcher planned to use in the study. Two schools that were not in the final study list of the schools sampled for the study were randomly selected for pilot study. The purpose of piloting the research instrument was to improve on reliability. The pilot study was thus used to identify those items were modified accordingly, thus increasing face validity.



Content validity refers to whether an instrument provides adequate coverage of the topic. Expert opinion literature searches and pre-testing of open ended questions to help to establish validity (Wilkinson1991). The researcher prepared the instrument in close consultation with her supervisors and ensured that the items in the questionnaire cover all the areas under investigation Best and Kahn (1993) pointed out that content validity of the research instrument is enhanced through expert judgment. The researcher's supervisor experts helped to assess the validity of instrument.

### **3.6 Reliability of the instruments**

Reliability measures the stability of research instruments across two or more attempts. Mugenda and Mugenda (2003) define reliability as measure of the degree to which research instruments yield consistent results or data after repeated trials. To test for reliability of the questionnaire, the researcher used a pilot study technique. The questionnaire was administered to a similar population and after two weeks was administered to the same group again and on comparing the responses of both cases they were similar. The data obtained from the analysis of data actually represented the phenomena under study.

### 3.6 OPERATIONAL DEFINITION OF VARIABLES

Variable	Type of variable	Indicators	Measure	Scale of measurement	Data analysis techniques	Tools of analysis
Sustainable water projects	Dependent	<ul style="list-style-type: none"> <li>- Good management</li> <li>- Access to safe drinking water</li> <li>- Reduction of poverty</li> <li>- Improved health</li> </ul>	Dimension of success	Nominal	Frequencies, percentages	Descriptive
Preparation cycle & implementation	Independent	<ul style="list-style-type: none"> <li>- Well planned</li> <li>- Demand responsive</li> <li>- Output produced at each level</li> </ul>	Relationship of project preparation and implementation	Nominal ordinal	Frequencies, percentages	Descriptive
Community management	Independent	<ul style="list-style-type: none"> <li>- Clear objective and leadership</li> <li>- Availability of allocation and resources</li> <li>- Ownership</li> </ul>	How many	Ordinal Ratio	Frequencies, percentages	Descriptive
Coordinating stakeholders	Independent	<ul style="list-style-type: none"> <li>- Sense of ownership</li> <li>- Competence and commitment to project</li> </ul>	How many	Nominal Ordinal	Frequencies, percentages	Descriptive
Financial management	Independent	<ul style="list-style-type: none"> <li>- Adequate tariffs, cost recovery operation and maintenance</li> </ul>	Efficiency and effectiveness of the structures	Nominal Ordinal	Frequencies, percentages	Descriptive

**Fig2: Operational definition of variables**

### **3.7 Methods of data analysis**

Data collected was analyzed both qualitatively and quantitatively. Quantitative data was analyzed by the use of descriptive statistics and presented as frequencies and percentages using Statistical Package for Social Sciences (SPSS). Qualitative data was analyzed by organizing and coding data into themes or topics and then establishing the relationship among the themes or topics. The findings were used to write recommendations.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents data collected from various respondents. The data is based on the objectives of the study which includes establishing the influence of the project preparation and implementation on the sustainability of water supply projects. Ascertaining the influence of community management and coordination of stake holders on sustainability of the projects and lastly, assessing the influence of financial management on the sustainability of the projects.

#### 4.2 Sustainability of the water projects

**Table 4.1: Response of sustainability of water projects**

<b>Responses</b>	<b>No. of Respondents</b>	<b>Percentages</b>
Yes	62	93.93
No	4	6.06
<b>Total</b>	<b>66</b>	<b>100</b>

Out of the 75 questionnaires issued to the respondents 66 were returned being 88% of the targeted population. Out of the 66 respondents, 62 represented by 93.93% were satisfied that the project is self sustaining meaning that the project is giving the respondents good services. 4 out of the 66 sampled responded that the project is not well sustained meaning that it is not running smoothly. The 4 respondents who viewed their projects as unsustainable were from the same village implying that they may be a group whose view may have been influenced in a way. Otherwise the findings indicate that the sampled projects are sustainable since it was the most common view by the majority respondents

### 4.3 Preparation cycle and implementation.

The first step in a project execution is planning and implementation which gives an idea of what is to be planned. In relation to this step, respondents were asked to give the duration of time taken in their projects planning and implementation. Give the people who were mostly involved in the preparation and to view the planning of their projects whether excellent, very good, good, fairly or poorly done. Responses got implied that the projects were planned and implemented well, the beneficiaries were involved in planning and that many of the projects were well planned.

**Table 4.2 Periods taken in planning and implementation.**

<b>Period</b>	<b>No. of Responses</b>	<b>Percentage</b>
<b>2 Months</b>	5	7.57
<b>4 Months</b>	7	10.60
<b>20 years</b>	9	13.63
<b>2 years</b>	41	62.12
<b>Total</b>	<b>66</b>	<b>100</b>

For preparation and implementation respondents were asked to give the period taken in the activities. The findings were that, 7.57% asserted that they took at least two months. 10.60% responded that it took four months 13.63% responded that it took 20 years while the majority of the respondents 62.12% said that it took 2 years. Since this responses were got from the 5 sampled projects which had been viewed as sustainable, it should be understood that project planning and implementation is done best in a period of around two years.

**Table 4.3: People involved in the planning of the water supply projects**

<b>Source</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Administrative officer	2	3.03
The community	50	75.75
The committee	3	4.54
The donor	10	15.15
Opinion leaders	1	1.51
<b>Total</b>	<b>66</b>	<b>100</b>

About people who were mostly involved and who determined the major planning decisions like the project site. Majority of the respondents represented by 75.75% gave the community, 6.06% gave the donor, 4.54% gave the committee, 3.03% gave the administrative officers and opinion leaders. This showed that most of those projects were demand driven. A demand driven in that they consider the needs of the beneficiary.

**Table 4.4: Respondents view on the planning of the project**

<b>Views</b>	<b>Responses</b>	<b>Percentage</b>
Excellent	3	4.54
Very Good	37	56.06
Good	18	27.27
Fair	6	9.09
Poor	2	3.03
<b>Total</b>	<b>66</b>	<b>100</b>

Respondent's views on their projects planning effectiveness were sought. Effectiveness of good planning is indicated by timely completing of the tasks and good production among other indicators. They responded in this manner, excellent 4.54%, poor 3.03% very good 56.56%, fair 9.09% and the rest 27.27% chose good. Again it means that a successful project should be well planned 81.22% respondents viewed that the project

was fairly and poorly planned meaning that it is not done to the required standard while the majority 78.78% held views that the planning of the project is good meaning that it is to the required standards. The negative response was spread over the different sub locations involved in the study showing that all the projects had ignorable negative response.

#### **4.4 Community management**

Community management entails a committee made of members of the project. There was evidence of community management since some of the residents indicated that they were committee members. To ascertain the influence of community management on sustainability of water projects, the respondents were asked to rate the management of their projects. They were also required to choose the owners of the project from a number of possible owners. The results found showed that the projects were managed by the community and were well managed. This therefore indicates sustainability as an evident of community managed projects.

**Table 4.5: Community management rating by the respondents**

<b>Rating</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Excellent	4	6.06
Very good	38	57.57
Good	16	24.24
Fair	7	10.60
Poor	1	1.51
<b>Total</b>	<b>66</b>	<b>100</b>

Respondents were asked to rate the management of their projects whether excellent, very good, good, fair or poor. 6.06% rated it as excellent, 57.57% said that it was very good and 24.24% rating it as good. 50% of the interviewees interviewed regarded the management of their projects as good majority comparing it with others in their minds. With 87.87% of the respondents rating it between good and excellent then there should be no doubt that community management improves sustainability of water supply projects. 8 respondents making 12.12 % of respondents gave their positions in the projects as committee members (in the sample analysis). This showed that the management is done by the community members. Majority of the respondents rated the leadership by the management committee as very good. This then implies that sustainability is common state found in projects which are managed by the community. It is therefore important to consider community management as a factor influencing sustainability.



**Table 4.6: Responses on the ownership of the project**

<b>Ownership</b>	<b>Frequency</b>	<b>Percentage</b>
Community	40	66.66
Government	14	21.21
Church	12	18.18
Chairman	0	0
<b>Total</b>	<b>66</b>	<b>100</b>

40 respondents i.e. 66% said that the project was owned by the community while other 18.18% said that it is owned by the Church. 21.21% said that it was owned by the Government and none respondents that it was owned by the Chairman. Majority of the respondents chose the community as the owners of the project with minority across the board choosing the government and the church as the owners. This is a clear indication that community owned projects are likely to be sustainable.

#### **4.5 Cooperation of stakeholders**

The respondents response in all the issues related to coordinating of stakeholders showed that in those five projects efforts were done to ensure that the stakeholders are coordinated and fully involved. They seemed to concur that the projects were accepted by the stakeholders 83.33% interviewees responded that their projects were straightaway accepted by the members except for a minimal 16.66% who gave personal reason like long distance from their residence and personal differences among them. In the questionnaire methods used to convey information about the meetings were enquired. Respondents were also asked to rate the convenience of the methods used to the pass information. The findings indicated that in most of the projects communication was done to the stakeholders and that it was effectively done.

**Table 4.7: Methods used to convey information on meetings.**

<b>Methods</b>	<b>Frequency</b>	<b>Percentage</b>
Chiefs Barazas	22	33.33
Churches	34	51.51
Letters	3	4.54
Verbally	7	10.60
<b>Total</b>	<b>66</b>	<b>100</b>

On methods used to convey information about the meeting most of the respondents choose churches with few others choosing chiefs Barazas among others. 51.51% were for churches, 33.33% were chiefs Barazas 4.54% choose letters while 10.60% choose verbally. Social facilities which are also owned by the community were mostly preferred hence highly relied on for conveying of information. This information then confirms that churches and chiefs Barazas are the methods of communication mostly used that members are comfortable with the methods since they highly responded that they are convenient and that there is no violence in the projects since none of the respondents choose violence as a method of solving misunderstandings

**Table 4.8: Convenience of the methods used to convey information**

<b>View</b>	<b>Frequency</b>	<b>Percentages</b>
Very convenient	23	34.84
Convenient	43	65.15
<b>Total</b>	<b>66</b>	<b>100</b>

Convenience of the communication methods was also researched on and they responded in the following manner, very convenient 34.84% convenient 65.16%. Diplomacy was highly selected as the method used in seeking for address on misunderstanding it was selected with a frequency of 73.33% ignorance was selected by 33.33% and non of the respondents selected violence.

#### 4.6 Financial management

To investigate on the financial status of the projects a question on whether the projects generate any income through water sales was asked. To investigate further the question on whether the projects owned bank accounts was asked. For information on whether there is good management of the projects finances it was enquired whether the members ever access the financial records and whether repairs are well done by the right people. The results revealed that there was generation of income in all the projects, that the projects owned bank accounts but there seemed to be disagreement on whether they access bank account records.

**Table 4.9: Does your project generate some income through water sales**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Yes	66	100
No	0	0
<b>Total</b>	<b>66</b>	<b>100</b>

The data above shows that there is generation of income through water sales. All the respondents i.e. 100% agreed that in the projects there is generation of income through water sales. This therefore is an indication that a project can earn income well through water selling and the beneficiaries support it.

**Table 4.10: Does the water project own a bank account**

<b>Response</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Yes	58	87.87
No	8	12.12
<b>Total</b>	<b>66</b>	<b>100</b>

The researcher also enquired whether the water projects owned bank accounts and they responded as follows. Those for yes that the projects own accounts were 87.87% and

those who refuted that the projects own bank accounts were 12.12%. This response implies that even though there are water sales in all the projects in some there might be no transparent handling of the income generated. However majority who are from all the sampled projects agree that their projects owned accounts.

**Table 4.12: Do members have access to the financial record.**

When asked whether the members had access to the financial records, again there was disparity.63.63% agreed that they had access while a close proportion of 36.36% responded that they have no access .This again implies minimal transparency in either all or some of those projects. However when asked on the repairs of the systems on breakdown majority agreed a skilled personal does it.2.72% responded that it is done by a skilled personel,21.21% chose somebody from outside who may be the skilled personnel while only 6.06% chose a member of the committee. These data implies that maintenance is well done except for the few 6.06% and that there is good if not very good financial management since the committee is able to pay for repairs by a skilled personnel. Even though there seem to be some problems on handling of the finances there is clear indication that the projects have good financial structures. Thus it is healthy to declare that for a project to be self sustainable it needs to have efficient and effective financial structures.

## 4.7 Correlation Results

### **Objective One: Influence of the project preparation and implementation on the sustainability of water projects.**

In order to establish the influence of project preparation and implementation on the sustainability of water projects, a spearman rank correlation coefficient was calculated (using SPSS version 19, since data is ordinal) .The results were as shown in tables below.

**Table 4.11**

### **Sustainability of water projects and Period taken in project Planning and Implementation**

<b>Period</b>		<b>Value</b>	<b>Asymp. Std. Error<sup>a</sup></b>
<b>Sustainability</b>	<b>Spearman Correlation</b>	<b>-.063</b>	<b>.122</b>
N of Valid Cases		66	

From table 2, the value of the Spearman Rank Correlation Coefficient is -.063, meaning that that period taken in project planning and implementation had some influence on the project sustainability. As the period increased the sustainability of the water project decreases.

### **Objective 2: Community management and planning of projects influence on sustainability.**

In order to establish the community management influence on sustainability of water projects Spearman's rank of correlation coefficient was calculated using SPSS 19. The results were as shown in table 4.14.

**Table 4.12**

**People involved in the planning of water supply projects and View on Planning**

	<b>View on Planning</b>	<b>Value</b>	<b>Asymp. Std. Error<sup>a</sup></b>
People's	Spearman	.028	.119
Involvement	Correlation		
<b>N of Valid Cases</b>		<b>66</b>	

From table 4.14 the spearman's rank of correlation coefficient is .028 meaning that there is some evidence that people involved in the planning of the water supply projects influence sustainability of the water supply projects.

**Objective 3: Cooperation of stakeholders and convenience of methods used to convey information.**

In order to establish the influence of the methods used to convey information on meetings on the convenience of the methods used Spearman's rank of correlation was used. The results were as shown in table 4.14 .

**Table 4.13**

**Methods used to convey information and convenience of the methods**

		Value	Asymp. Std. Error <sup>a</sup>
<b>Methods of Conveying information</b>	<b>Spearman Correlation</b>	<b>.234</b>	<b>.128</b>
N of Valid Cases		66	

From the table 4.15 above spearman's rank of correlation is 0.234 meaning that there is a positive between methods of conveying information on meetings and convenience of the methods used. Majority of the respondents agreed on churches as the best methods of conveying information as convenience of the methods.

## **CHAPTER FIVE**

### **SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter deals with the summary of the findings based on the analysis of data, the conclusion drawn from the major findings and finally the recommendation of the researcher on the way forward.

#### **5.2 Summary of findings**

The first objective was to establish the influence of the project preparation and implementation on sustainability of water projects. The study found out that project preparation and implementation cycle is a very important factor for sustainability of water supply projects. It revealed that the sample consisting of 5 self sustainable water projects were mostly planned and implemented in a period of 2 years. The researcher also enquired on the stakeholders who played a big role in the planning of the project and a big number of the respondents gave the community. This is an implication that the plan of the project should consider the community benefiting from the project.

Respondents view on the planning was good as they are able to get the community without difficulties. From the beneficiaries responses in relation to this factor it is clear that planning and implementation is a very influential factor to sustainability of water supply projects. It shows that the project preparation should take the right period, highly consider the community and give satisfactory outcomes. This findings concurs with Valdez and Bamberger (1994) that information has to be collected to define the target population. The condition to be resolved or alleviated by the study relates directly to the target population.

The objective was to ascertain the influence of community management on sustainability of water supply projects. The findings revealed that the committee consisted of community members of the community. On rating of the management good management was resolved to. It implied that the respondents were satisfied with the management of



their projects. On ownership of the project the respondents pointed out strongly that the project was owned by the community and that they were the managers.

The objective was to examine the influence of co-ordination of stakeholders to sustainability of water projects. The findings on co-ordination of stakeholders were as the questions including acceptance showed that the project was reality accepted by the stakeholders which may be due to the involvement of the community in planning who are the majority stakeholders. Again it reveals that regular meetings are covered to discuss issues on the project when need be. Churches and chief Barazas were found out as the major methods of conveying information on the meetings. Responses on the view of the convenience of the methods of communication showed that the methods were convenient as majority rated them as convenient.

There was a need of assessing the influence of procurement and financial management on sustainability of water supply projects. For the assessment the researcher enquired whether there was generation of income. In response all the respondents i.e. 100% confirmed that there was generation of income through water sales. Inquiry on whether the projects owned bank accounts majority of the respondents agreed that their projects had bank accounts. However 12.12% refused that their projects had bank accounts. This then indicates that there may be some mischief in the handling of the money. When members were asked whether they accessed the financial records only 63.63 were in agreement while an alarming 36.36% part of the respondents were in dis- agreement clearly indicating that even though there was income generation in all the projects there was some misunderstanding on the expenditure of the same.

All in all the financial issues seems to still be in control. This is evidenced by the responses on the people who do repairs in cases of breakages. A percentage 72.72% of the respondents indicated that the repairs were done by skilled personnel a clear indication that there is always money available for the repairs as required.

### **5.3 Discussion of the findings**

The first objective established the influence of project preparation and implementation in sustainability. Data analysis and interpretation of interview and questionnaire responses from the community members showed that project preparation and implementation affects sustainability of water projects. Establishment of the influence of project preparation and implementation was intended to assess whether it is a factor influencing sustainability of projects in Machakos County. A questionnaire was employed to enquire from the respondents. This finding indicated that project preparation in time and personality together with its timely implementation is a very important factor in water projects sustainability. It should therefore be highly considered when carrying out a development in the area in form of a project. This finding is in agreement with Valandez and Bamberger (1994) information has to be collected to define the target population. The condition to be resolved or alleviated by the project identified and the project goals and objectives are formulated.

Secondly the researcher objective was to ascertain the influence of community management on sustainability of water supply projects. Data analysis and interpretation of the responses on a questionnaire by the community showed that community management influences a lot sustainability of water projects. Ascertaining of the influence of community management was to establish whether it is a factor influencing sustainability of water projects in the area of study. The researcher used a questionnaire to collect the responses. The findings indicate that community management ensures ownership and hence security of the project hence it is an important factor for sustainability of the projects. It should therefore be well captured in developments of the area involving water projects.

The findings concur with a report of the United Nations Conference on environment and development. UNCED (1992) that there is powerful logic to community management of water supplies. The resource is local its use is local and the effects are local. Nevertheless it has to be recognized that there are genuine fears among agency staff. World Bank (1980) reported that projects need to adapt to local customs and land tenure systems

planning needs to take into account all major stakeholder groups, including local communities and not just settlers.

To examine the influence of cooperation of stakeholders on sustainability of water projects, data analysis and interpretation of the responses on a questionnaire by the member of the community showed that coordination of stakeholders affects sustainability of water projects. The researcher used both a questionnaire and an interview to acquire the responses from the respondents. The findings indicate that the stakeholders needs to be well co-ordinate prior and during the project live for smooth running of the project activities hence its vitality to the projects undertakings. It should therefore be an important factor to consider. This is in agreement with the views of Valdez J. Bamberger M (2000) who states that the social and political organization of rural communities can either facilitate or impede the creation of cooperatives and the organization of rural development programs.

The last objective was assessing the influence of procurement and financial management on sustainability for water supply projects. Data analysis and interpretation of the questionnaire and interview responses from the members for the community revealed that effective financial standards on sustainability of water projects aimed at assessing the influence of the financial structures on sustainability of water projects in the area. The findings indicate in the area. The findings indicate that effective financial structures are project sustainability. They should thus be always put into consideration whenever developments involving projects are being undertaken.

These findings concur with WSP- AF (2000) in that financial discipline together with each group's authority to set its own tariffs and to et and approve annual budget, enables income to cover all the operating and maintenance costs.

#### **5.4 Conclusion**

This study investigated the factors influencing sustainability of water supply projects in Machakos County. This was in relation to means of living with the changing environment proper management and financial systems of water supply projects which needs to have sustainability. The emphasis is on the knowledge of factors influencing sustainability of the projects.

The study specifically sought to establish the influence of the project preparation and implementation, ascertain the influence of community management, examine the influence of co-operation of stakeholders and assess the influence of financial systems on sustainability of water supply projects. The study established that a project should be planned considering beneficiaries and be well and timely implemented. That community management ensures ownership hence security of the project. That coordination of stakeholders ensures smooth running of the activities and that good financial structure facilitates proper operation and maintenance of the project. In view of these findings the study concludes that there is need of proper planning and implementation of the project the implemented needs to be managed well by the community. All stakeholders should be involved for smooth running during and after project life for proper operation and maintenance. There should be effective financial structures for earning revenue and management of the same. The observation of the above will secure sustainability of water supply projects the county.

#### **5.5 Recommendations**

The researcher has reported that a project should be well prepared and implemented considering time and beneficiaries that community management is most suitable for water projects that the stakeholders should be well coordinated for smooth running of the project and that effective financial structures should be put in place to ensure success. The study has also shown that sustainability require timely planning and implementation proper management. Support by the stakeholders and setting of proper financial structures. Due to this background the researcher wishes to make the following

recommendations. Despite its limitations the study should be well understood and be considered when carrying out project developments in Machakos County.

1. The researcher recommends that the government should advocate for proper planning with involvement of the benefiting community and timely implementation with the required results. This can be done through making of a policy by the ministry demanding for the practice of the same by the involved organizations.
2. The project team should consider and implement community management through ensuring that all the projects they undertake are locally managed. This can be done through encouraging meetings on the site only and educating the beneficiaries on the management.
3. The project team should also ensure awareness of all stakeholders on the project intentions all the time. This can be done through addresses made in chief Barazas, church gatherings and other gathering in the area.
4. The project committee should set up financial structures considering both rising of funds and dissemination of the same in relation to operating and maintaining of the project. This can be done through learning and training on the same.

## **5.6 Suggestion for further research**

In view of the recommendation of the study, the following suggestions for further research were made:-

1. A similar study should be done in other parts of the county to find out if the same results will be realized.
2. A study should be carried out on the effects of poor sustainability of the water projects in the area.

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## **APPENDICES**

### **APPENDIX I**

**UNIVERSITY OF NAIROBI  
DEPARTMENT OF EXTRA-MURAL STUDIES  
PROJECT PLANNING AND MANAGEMENT  
P.O. BOX 30197-00100,  
NAIROBI.  
2<sup>ND</sup> June 2012.**

### **TO WHOM IT MAY CONCERN**

I am a student at the University of Nairobi pursuing a Masters course in Project Planning and Management.

I am expected to undertake a research project to be submitted to the examiner, University of Nairobi as requirement for partial fulfillment for the award of Masters Degree. I am researching on An Investigation to the Factors Influencing sustainability of water supply project in Central Division of Machakos County. I have selected your community water supply project as one of the water supply communities to carry out my study.

Please assist me by completing the questionnaire. The information will be treated with a lot of confidentiality.

Your cooperation will be highly appreciated.

Yours faithfully,

**MARY M. MULWA.**

## APPENDIX II

### QUESTIONNAIRE

This questionnaire will help the researcher to obtain information for research purposes. The information given will be used for exam purposes and therefore will be treated confidentially.

Give your response by ticking in the box or writing in the space provided.

Water supply project.....

Gender of interviewee.....

Location / Sub-location / Village.....

1. Are you a member of this water project?

Yes  No

2. What is your position in this community water project?

a) Committee member

b) Project member

c) Local leader

d) Non of the above

3. What period did the planning and implementation of your water supply project take?

a) About 20 years

b) About 2 months

c) About 4 months

d) About 2 years

4. Who were involved in the planning of this water supply project?

a) Administrative officers

b) The community

c) The committee

d) The donor

e) Village elders

f) Opinion leaders

5. Who came up with the idea of the project above?
- a) member of the community
- b) somebody from outside
- c) none of the above
6. How can you rate the planning of the project.
- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor
7. Did the project continue well even after the funding was withdrawn?
- Yes  No  Not sure
8. During the initial stage of this water and sanitation project, was every member of the community within the supply area involved?
- Yes  No
- If yes how? .....
9. Was the project readily accepted in the community?
- Yes  No
- If number (9) above is No, what kind of problems were raised during the start of the project and how were solved?
- .....
- .....
10. Did the community contribute either in cash or in kind during implementation of this project?
- Yes  No
11. Is the distance convenient to the members of the community?
- Yes  No

12. Does your water supply project generate some income through water sales?  
 Yes  No
13. If the answer for No. 12 above is yes, who collects the revenues?  
 a) Treasurer   
 b) Secretary   
 c) Chairperson   
 d) Others specify.....
14. Does the water project own a bank account?  
 Yes  No
15. Does this project own by-laws?  
 Yes  No
16. How would you rate the leadership of this water and sanitation project by the management committee?  
 a) Excellent   
 b) Very good   
 c) Good   
 d) Fair   
 e) Poor
17. Do members of the community have access to financial records?  
 Yes  No
18. Do men and women perform the same roles in the community project?  
 Yes  No
19. Whenever there is a problem in the project like leaking pipes or worn out parts, who repairs it?  
 a) Member of the community   
 b) Somebody from outside   
 c) Skilled personnel
20. How do you rate the usefulness of the project in your community?  
 a) Helping us fully

- b) Fairly helping us
- c) Not useful at all
21. How is the management of your project?
- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor
22. Who convenes meetings for the project beneficiaries?
- a) Manager
- b) Chairman
- c) Secretary
- d) None of the above
23. What of method of communication do they use in conveying the information about the meetings?
- a) Chiefs Barazas
- b) Churches
- c) Letters
- d) Verbally
24. How convenient are the methods?
- a) Very convenient
- b) Convenient
- c) Not convenient
25. Do you attend all meetings?
- Yes  No

26. Are the questions of the community fully addressed in meetings?

Yes  No

If number, 26 above is no, what methods do you use?

a) Violence

b) Diplomacy

c) Ignore

## APPENDIX III

### INTERVIEW SCHEDULE

1. How would rate the distance covered to water points  
Very convenient   
Convenient   
Fairly convenient   
Far away
2. How would you rate the water quality  
Excellent   
Very good   
Good   
Fair   
Poor
3. How would you rate the income generated from water sales  
Very high   
High   
Moderate   
Low
4. How do you rate the leadership of this water and sanitation project by the management committee  
Excellent   
Very good   
Good   
Fair   
Poor



5. How often do the members of the community have access to financial record?

Often

Very often

None of the above

6. How do you rate the management of your project

Excellent

Very good

Good

Fair

Poor

7. Who convenes meetings for the project beneficiaries

Manager

Chairman

Secretary

None of the above