

**INFLUENCE OF WATER SECTOR REFORMS IN
ENHANCING SUSTAINABLE PROVISION OF WATER:
CASE OF KIGANJO DIVISION OF GATUNDU SOUTH
CONSTITUENCY**

UNIVERSITY OF NAIROBI
GROUP LIBRARY
P. O. Box 30197
NAIROBI

NJUGUNA ESTHER WANJIRU

**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN PROJECT
PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI**

2012

DECLARATION

This research project report is my very original work and has not been submitted for the award of a degree to any other university.

Signature..........Date.....02.08.2012.....

ESTHER WANJIRU NJUGUNA
L50/65161/2010

This Research project report has been submitted for examination with my approval as the university supervisor.

Signature..........Date.....02.08.2012.....

DR. GUANTAI MBOROKI
Senior Lecturer
Department of Educational Studies
University of Nairobi

DEDICATION

This Project Report is dedicated to my loved ones David, Peter, Irene and Alex and my lovely grandchildren Enrique and Abigail. Your love and support has been enormous.

ACKNOWLEDGEMENT

My most sincere appreciation and thanks go to the Almighty God for His grace, strength and protection even when the world looked grim as I was pursuing this Master of Arts Degree.

My deepest appreciation and gratitude goes to my supervisor Dr. Guantai Mboroki for his wise guidance and inputs as I was preparing this research project report. I also wish to appreciate the efforts and support from the resident Lecturer Thika Extra Mural Center, Madam Lydia Wambugu for her invaluable dedication and mentorship during the whole program and being there for me whenever I needed her assistance. My appreciations also go to all those Lecturers who taught me at Thika Extra Mural Centre for their support and mentorship.

To all my colleagues at Thika Extra Mural Centre, you were wonderful people because it was through your support, encouragement, shared ideas and contribution that has propelled me this far.

To all my family members, thank you for your prayers, support and patience during my long unavailability as I undertook the MaPPM Degree. Without your love, support and encouragement I could not have made it this far.

Last but not least to all the good people who in one way or another contributed to the success of this study.

TABLE OF CONTENTS

Title Page.....	i
DECLARATION	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS.....	v
LIST OF FIGURES	xiii
ABBREVIATIONS AND ACRONYMS.....	xiv
ABSTRACT.....	xv
CHAPTER ONE:INTRODUCTION	
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	4
1.3 Purpose of the Study	5
1.4 Objectives of the Study.....	5
1.5 Research Questions.....	5
1.6 Significance of the Study	6
1.7 Delimitation of the Study.....	6
1.8 Limitations of the Study	6

1.9 Assumptions of the Study	7
------------------------------------	---

1.10 Definition of Significant Terms.....	7
---	---

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction.....	9
-----------------------	---

2.2 Sustainable Provision of Water.....	9
---	---

2.3 Review of Water Sector Reforms	10
--	----

2.3.1 Community Participation and Sustainable Provision of Water	13
--	----

2.3.2 Reduction of Non- Revenue Water and Sustainable Provision of Water	15
--	----

2.3.3 Willingness to Pay for Water and Sustainable Provision of Water	17
---	----

2.3.4 Gender Equity and Sustainable Provision of Water	19
--	----

2.4 Theoretical framework.....	22
--------------------------------	----

2.5 Conceptual framework.....	24
-------------------------------	----

2.6 Variables in the Study	26
----------------------------------	----

2.7 Summary of Gaps Identified in the Literature Reviewed	26
---	----

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction.....	27
-----------------------	----

3.2 Research Design	27
---------------------------	----

3.3 Target Population.....	27
3.4 Sample Size and Sampling Procedure	27
3.5 Research Instruments.....	28
3.5.1 Pilot Testing.....	28
3.5.2 Validity of the Instrument.....	29
3.5.3 Reliability of the Instrument.....	29
3.6 Data Collection and Data Analysis Techniques	29
3.7 Ethical Requirements.....	30
3.8 Operational Definition of Variable.....	31
 CHAPTER FOUR: DATA ANALYSIS, PRESENTATION ,INTERPRETATION AND DISCUSSION OF THE FINDINGS.....	 33
4.1 Introduction.....	33
4.2 Response Rate.....	33
4.3 Demographic Characteristics of Respondents	33
4.3.1 Gender Distribution of the respondents.....	33
4.3.2: Age Distribution of the Respondents.....	34
4.3.3 Education Level of the respondents.....	35
4.3.4: Household Income Distribution of for the Respondents	36

4.4: Community Participation and Sustainable Provision of Water	36
4.4.1 Awareness of Water Sector Reforms.....	37
4.4.2 Staff Interaction with Interaction with Customers.....	38
4.4.2: Performance Rating of the WSP.....	38
4.4.3: Rating of the water quality	39
4.4.4 Attendance of Public Barazas/Structured Stakeholder Meetings	40
4.4.5 Frequency of public Barazas/Structured Stakeholder Meetings.....	41
4.4.6 Failure to Attend Public Barazas/ Structured stakeholder Meetings	42
4.4.7 Awareness of Existence of Water Board	43
4.5.8 Knowledge of Director representing Area of Supply	44
4.4.9 Responsibility to Guard Water Infrastructure against Vandalism and Theft.....	45
4.5: Reduction in Non-Revenue Water and Sustainable Water Provision	46
4.5.1 Type of Water connection.....	46
4.5.2 Water Usage.....	47
4.5.3 Report on Illegal Connections	47
4.5.4 Reason for not reporting illegal connection.....	48
4.5.5 Report on Leaking/ burst pipes.....	50
4.5.6: Reasons for not Reporting	51

4.6 Willingness to Pay for Water and Sustainable Provision of Water 51

4.6.1 Frequency of water Payment 52

4.6.2 Priority of water payment 53

4.6.3 Customers not paying their Bills on Time 53

4.6.4 Effect of Distance on Regular Payment for Water 54

4.6.5 Erroneous Water Bill 55

4.6.6 Effect of Erroneous Bills on Willingness to Pay 55

4.8. Gender Equity and Sustainable Provision of Water 56

4.8.1 Status of Water Connection 57

4.8.4 Period of Registration 58

4.8.6 Frequency of Water Supply 59

4.8.7: Satisfaction with Frequency 59

4.8.8 Reasons for Dissatisfaction with Water Frequency 60

4.8. 9 Rating of the Cost of Water 61

4.8.10 Alternative Water Supply 62

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS..... 64

5.1 Introduction..... 64

5.2 Summary of the Findings..... 64

5.2.1 Demographic Characteristics of the respondents..... 64

5.2.2 Community Participation and Sustainable Provision of Water 64

5.2.4 Reduction of Non- Revenue Water and Sustainable Provision of Water..... 65

5.2.5 Willingness to Pay for Water and Sustainable Provision of Water 66

5.2.6 Gender Equity and Sustainable Provision of Water 66

5.2 Conclusions of the Study 67

5.4 Recommendations of the Study 68

5.5 Suggestions for further Research..... 69

REFERENCES 70

Appendix I..... 75

Letter Of Introduction..... 75

Appendix Ii: Letter Of Authority To Collect Data 76

Appendix III: Questionnaire for Community Respondents..... 77

Appendix Iv: Questionnaire For Staff Respondents 80

Appendix V: C.K. Morgan Table 82

Appendix Vi: Kenya Water Institutions After Enactment Of Water Act 2002..... 83

LIST OF TABLES

Table 4.1: Gender Distribution of the Respondents	34
Table 4.2: Age Distribution of the Respondents.....	35
Table 4.3: Education Level Distribution of the Respondents.....	35
Table 4.4: Household Income Distribution for the Respondents.....	36
Table 4.5: Community level of Awareness of Water Sector Reforms	37
Table 4.6 Staff Interaction with Customers	38
Table 4.7: Performance of WSP.	39
Table 4.8: Attendance of Public Barazas/Meetings.....	41
Table 4.9: Frequency of Public Barazas/ Stakeholder Meetings.....	42
Table 4.10: Reasons for Not Attending Public Barazas/ Public Meetings	42
Table 4.11: Awareness of Existence of Water Board.....	43
Table 4.13: Community Responsibility in Guarding Water infrastructure	45
Table 4.14: Type of water connection	46
Table 4.15 Usage of Water	47
Table 4.16: Reports on Illegal Connections.....	48
Table 4.17: Reason for not reporting illegal connection.	49
Table 4.18: Report on burst pipes.....	50

Table 4.19: Reasons for not making Reports on Leaking Pipes.....	51
Table 4.20: Frequency of water Payment.....	52
Table 4.21: Priority of water payment.....	53
Table 4.22: Customers who do not Pay Bills on Time.....	54
Table 4.23: Effect of Distance on Regular Payment for Water.....	54
Table 4.24: Erroneous Water Bill.....	55
Table 4.25: Effect of Erroneous Bills on Regular Payment.....	56
Table 4.26: Status of the Water Connection.....	57
Table 4.27: Period of registration.....	58
Table 4.28: Frequency of Water Supply.....	59
Table 4.29: Satisfaction with Water Frequency.....	60
Table 4.30: Dissatisfaction with Water Frequency.....	61
Table 4.31: Cost of water.....	62

LIST OF FIGURES

Fig. 1: Conceptual frame work25

ABBREVIATIONS AND ACRONYMS

GASWASCO	-	Gatundu South Water & Sanitation Company
GWP	-	Global Water Partnership
HRBA	-	Human Rights Based Approach
ICWE	-	International Conference on Water and the Environment
IWRM	-	Integrated Water Resources Management
MDG	-	Millennium Development Goals
NRW	-	Non- Revenue Water
NWSS	-	National Water Services Strategy
UNCED	-	United Nations Conference on Environmental Development
UNDP	-	United Nations Development Fund
UN	-	United Nations
WB	-	World Bank
WSB	-	Water Services Board
WSP	-	Water Service Provider
WSR	-	Water Sector Reforms
WSRS	-	Water Sector Reform Secretariat
WSTF	-	Water Services Trust Fund
WTP	-	Willingness to pay

ABSTRACT

This research study was carried out in Kiganjo Division within Gatundu South Constituency. The objective of the study was to evaluate the influence of water sector reforms in enhancing sustainable provision of water and in particular determine the influence of water sector reforms in enhancing; community participation, reduction of non-revenue water, willingness to pay for water and gender equity in access to water. The study was prompted from issues raised on community participation, non-revenue water, financial sustainability and connectivity to piped water supply.

The literature reviewed was in line with Community Participation, Non-Revenue Water, Willingness to Pay for Water and Gender Equity in access to Water, all of which were geared towards achieving enhanced sustainable provision of water.

Primary data was collected through use of close ended questionnaires. The population size was 200 water customers living within a radius of two kilometers from Kiganjo Township in Kiganjo Division in Gatundu South Constituency. Probability random sampling was used to select the respondents. The C. K. Morgan table was used to arrive at the sample size of 134 respondents which comprised 51 (38.1%) males and 83(61.9%) females.

The data collected was edited, coded and analyzed using statistical package for social sciences (SPSS). The study established that 120(89.6%) of the respondents were not aware of water sector reforms although 100(74.6%) had noted changes in service delivery. The study established that the quality of water supplied as rated from average to high quality was 123(91.8%). The study also established that there was low community participation as evidenced by a low percentage of respondents who had knowledge of the existence of Board of Directors and the Directors representing their interests. The research established that majority of water customers 107(79.9%) had metered connections and 66(49.3%) would make reports of illegal connections while 89(66.4%) would make reports on leaking pipes. All these indicators contribute towards reducing non revenue water (NRW) and thus enhance sustainable provision of water.

The study established that 74(55.2%) of the respondents paid their water bills on monthly basis while only 66(49.3%) had water payment as their first priority when it came to payment of services in their households. 66(49.3%) of the respondents said the distance to payment centers affected their willingness to make regular payment for water while 65(48.5%) said receiving erroneous water bills reduced their willingness to pay as 39(60.0%) of these respondents had to wait until the error was corrected before paying their bill. Low willingness to pay impact negatively on financial sustainability of the WSP and consequently reduces sustainable provision of water.

The study established that 99(73.9%) of the respondents had active water connections and hence were accessing piped water within their households where 75(56.0%) responded that their connections were registered after incorporation of GASWASCO and although water supply was rationed 82(61.2%) received water from two times and above in a week where 66(49.3%) responded that they were satisfied with the frequency of water supply.

The study concluded that there was gender equity in access to water since majority of the households had active connections. This enabled the women who ordinarily would have been going to fetch water from alternative sources to carryout other economic activities.

The study recommended that community mobilization should be carried out to sensitize the community on their role in enhancing sustainable provision of water. It further recommended that the WSP should work with the community and encourage them to make reports on illegal connections and leaking pipes so as to bring down the level of NRW.

CHAPTER ONE:INTRODUCTION

1.1 Background to the Study

According to Gbadegesin & Olorunfeni (2007) quoting the UN-WATER/AFRICA (2004) report describes water as a precious natural resource, vital for life, development and the environment. It can be a matter of life and death, depending on how it occurs and how it is managed. Irrespective of how it occurs, if properly managed, it can be an instrument for economic survival and growth. It can be an instrument for poverty alleviation lifting people out of the degradation of having to live without access to safe water, while at the same time bringing prosperity to all. However, when it is inadequate in either quantity or quality, it can be a limiting factor in poverty alleviation and economic recovery, resulting in poor health. According to the Millennium Development Goal (MDG) Summit Report (2010), progress on the MDG 7 target which aims '*to reduce by half the proportion of people without sustainable access to reliable drinking water and basic sanitation by 2015*' is currently on track. At the current rate of progress it is unlikely that this target will be achieved in many parts of the developing world. According to the most recent *Human Development Report*, 2040 is a more likely date for this goal to be reached in Africa unless there is accelerated investment in the sector (UNDP, 2006).

The 21st century brings with it both persistent and new water challenges, including growing human populations and demands for water, unacceptable water quality in many areas, weak or inadequate water data collection and regulation, and growing threats to the timing and reliability of water supply due to climate change. Rural areas in developing countries across the world remain severely disadvantaged, with eight out of ten people not having access to an improved water supply. Access to safe drinking water has improved over the last decades in almost every part of the world, but approximately one billion people still lack access to safe water (UN, 2006). Globally, almost 1.9 million children die each year from diarrheal diseases caused by unreliable drinking water, inadequate sanitation facilities and poor hygiene. It is the second largest cause of child mortality, after respiratory infections, accounting for 15 percent of child deaths globally, and 18 percent of child deaths in the poorest countries (MDG Report, 2005).

From the researches and papers reviewed for this research project report, bad laws in water sector have led to poor service delivery of water services in most countries throughout the world. The water sector is currently undergoing major transformation at local, regional and global level. Today's situation is challenged by uncertainties, e.g., in water demand, by worsening water quality, by pressure for cost-efficient solutions, and by fast changing socio-economic boundary conditions. One expects additional uncertainties, due to climate change, such as a shift in the pattern of extreme events. Hence, new strategies and institutional arrangements are required to cope with risk and change in general (Pahl-Wostl, 2002).

Philippe Cullet (2006) shows that from analysis of recent developments in developing countries, radical reform of water sector is necessary for India's towns and cities to improve the quality of services needed to contribute maximally to the country's economic growth and to improve the well being of its people. According to UN (2006), International human rights treaties and conventions consider access to water and sanitation as a human right. This means that all individuals are entitled to have access to sufficient amount of safe drinking water and to basic sanitation facilities. Under Human Right Based Approach (HRBA), everyone is entitled to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use. HRBA to water and sanitation demands accountability of governments, the international community and the private sector, requiring information sharing and genuine participation in decision-making by the most vulnerable and marginalized individuals, who have been historically discriminated against or neglected such as residents of informal settlements and the poor rural communities. A water sector crisis in Africa followed the recessionary conditions of the 1970s, when many suppliers found themselves in a financial vicious circle caused by a decline in government funding of capital expenditure, low tariffs, low billing, low revenue collections and increasing demand for water (Shirley, 2002).

According to Robins, (2003) in a UN report where the United Nations designated 2003 the International Year of Fresh Water on acknowledgement that there was still much work to be done to address the unattained goals of the drinking water and sanitation decade of the 1980s. Thus, the 1992 Dublin Conference on Water and Environment statement laid down a new approach to water resources management. With the Dublin Principles, the notion of water as an economic good was embedded

in the international debate in the early 1990s. It was argued that the “supply-oriented approaches” that had been pursued up to then had not proved to be financially sustainable and had therefore not reached the poor in particular. Hoering and Schneider (2004) argue that orientation on water as an economic good and the related cost recovery principals for water supply were to achieve a better sustainability and better supply for the poor. Principle Four was that water has an economic value, and should be recognized as an economic good, while also maintaining that access to clean water at affordable prices are fundamental human rights.

In 1999 it became clear to the Kenyan Government that achieving the dream of water for all by the year 2000 was impossible and it had to change strategy if it had to succeed. In 2002 the Water Sector Reforms momentum in Kenya culminated in the enactment of the Water Act 2002 which was gazetted in October, 2002. The Act created new water institutions to govern water management and provision in Kenya. According to the National Water Services Strategy (NWSS) the Kenya government committed itself to adopting (HRBA) after enactment of the Water Act.

From this background to the study the need for water reform especially in developing countries becomes a reality. This research sought to determine the influence of water sector reforms in; enhancing community participation, reducing Non- Revenue Water (NRW), enhancing willingness to pay for water and promoting gender equity in access to water in Kiganjo Division of Gatundu South Constituency. According to yearly impact reports on performance of Kenya’s Water Services Sub-sector prepared by Water Services Regulatory Board (WASREB) since the rollout of water sector reforms, there is significance improvement in provision of water and reporting in urban areas. However there is a challenge in reporting on rural areas and hence it becomes difficult to establish the influence of water sector reforms in enhancing sustainable provision of water. Therefore a gap that the research sought to fill through collection and analysis of data in the target area which is basically rural was identified.

In the context of development, community participation refers to an active process whereby beneficiaries influence the direction and execution of development projects rather than merely receive a share of project benefits (Paul, in Bamberger, 1986). However while reviewing cases of community participation in Kenya there seemed to be a problem in involvement of communities in decision making in the area

of water provision. The research identified the gap and sought to collect and analyze data to determine the influence of Water Sector Reforms in promoting community participation to enhance sustainable provision of reliable and adequate water in Kiganjo Division of Gatundu South Constituency.

1.2 Statement of the Problem

Although water is a precious natural resource, vital for life, development and the environment and can be a matter of life and death, there is still a big challenge in achieving sustainable provision of reliable and adequate water in the Third World countries. From the background to the study of this research study, it is clearly indicated that water provision is a big challenge especially in the third world countries. Most countries in the world have tried to reform their Water Laws with a view to enhancing sustainable provision of water, however little research had been carried out to determine the influence of these reforms in enhancing sustainable provision of water and thus creating an information gap.

Annual Impacts reports prepared by Water Services Regulatory Board (one of the institutions created after enactment of Water Act 2002 in Kenya) on influence of Water Sector Reforms in enhancing sustainable provision of water in Kenya, showed that there was an information gap especially in the rural areas. This was mainly created by lack of sufficient information on the influence of water sector reforms in enhancing sustainable provision of water particularly in rural areas. The reports also indicated very high Percentage of Non Revenue Water (NRW) and low financial sustainability within the Water Service Providers (WSPs) operating in rural areas. Therefore the research study aimed at collecting data within Kiganjo Division in Gatundu South Constituency which is basically a rural area with a view to establish the influence of water sector reforms in enhancing sustainable provision of water in the area.

1.3 Purpose of the Study

The purpose of this research was to evaluate the influence of water sector reforms in enhancing sustainable provision of water in Kiganjo Division of Gatundu South Constituency.

1.4 Objectives of the Study

The objective of the research was to evaluate the influence of water sector reforms in enhancing sustainable provision water in Kiganjo Division of Gatundu South Constituency. While the specific objectives sought to:

1. To evaluate the influence of community participation in enhancing sustainable provision of water in Kiganjo Division.
2. To establish the influence of reduction of non- revenue water in enhancing sustainable provision of water in Kiganjo.
3. To determine the influence of willingness to pay for water to enhance sustainable provision of water in Kiganjo Division.
4. To evaluate the influence of gender equity in access to water in enhancing sustainable provision of water in Kiganjo Division.

1.5 Research Questions

The research questions sought to establish the following:

1. To what extent had community participation influenced sustainable provision of water in Kiganjo Division?
2. To what extent had reduction of non revenue water influenced sustainable provision of water in Kiganjo Division?
3. To what extent had willingness to pay for water influenced sustainable provision of water in Kiganjo Division?
4. To what extent had gender equity in access to water influenced sustainable provision of water in Kiganjo Division?

1.6 Significance of the Study

The outcome of the research would contribute towards achieving the MDG 7 target whose aim was to reduce by half the number of people without access to safe water by the year 2015 and achieving the Kenya Vision 2030 whose one of the tenets, aims to enhance environmental sustainability and improve access to safe water. The Water Act 2002 which brought on board water sector reforms was meant to enhance sustainable provision of reliable, adequate and safe water to Kenyan citizens. Therefore the outcome of this research would also shed light on the influence of Water Sector Reforms in enhancing sustainable provision of water in Kiganjo Division of Gatundu South Constituency. The findings would inform different stakeholders depending on their role in provision of water as follows: GASWASC the Company charged with provision of water in Gatundu South Constituency could use the findings to enhance community participation, through awareness creation and sensitization on their role in improving provision of water. Athi Water Services could use the results as a basis of further research in other WSPs within its jurisdiction. To the academicians, this study would also contribute additional literature, adding to the body of knowledge on sustainable provision of water.

1.7 Delimitation of the Study

The research was confined to within a radius of two Kilometers from Kiganjo Township in Kiganjo Division of Gatundu South Constituency. This enabled the researcher to concentrate in a smaller geographical area and hence allowed her to collect richer information that could be generalized to the whole of Gatundu South Constituency. The respondents were registered water customers who had lived in Kiganjo Division for most of their lives.

1.8 Limitations of the Study

Although there was a time constraint for carrying out the study this did not affect the quality of study carried out as the researcher used her many years of experience in the water sector to carry out a thorough research within the time allowed. The researcher was funding the study and had limited funds. However she trained three research assistants which limited the number of field visits through administering many questionnaires per day. The literacy level of the community

within the study area was inadequate and even those who responded to have attained secondary education required assistance to fill the questionnaire. Therefore the questionnaire had to be interpreted into the local language by the researcher and the assistants which to their advantage were well versed.

1.9 Assumptions of the Study

The assumptions of the study were as follows:

1. The researcher expected the respondents within Kiganjo Division to answer the questions correctly and truthfully.
2. The sample picked randomly was expected to represent the population of Kiganjo Division of Gatundu South Constituency.
3. The data collection instruments were reliable and valid which implied that the instruments would respectively give the same results when questionnaires were administered to a section of respondents who either represented even or odd numbers and the scores correlated and the instrument collected the information it was expected to collect.

1.10 Definition of Significant Terms

These are terms which were used in the study which the researcher explained according to the meaning she assigned to them.

Water Sector Reforms

In Gatundu South Constituency Water sector reforms refer to enhanced community participation, reduction of non-revenue water, willingness to pay for water and gender equity in access to water all to enhance sustainable provision of water.

Sustainable Water Provision

Sustainable water provision in reference to water sector reforms referred to increased access to reliable, adequate and safe water which meant water is available consistently, in sufficient amounts and it is of good quality whenever required by consumers.

Non- Revenue Water:

Non-Revenue Water (NRW) refers to water lost in the system through illegal connections, burst pipes, faulty meters and non- metered connections that cannot be sold to increase revenue collection to enhance sustainable provision of water.

Willingness to Pay for Water

Willingness to pay for water refers to desire by water users to pay for improved water services. It is through paying for water services that revenue collection is improved which lead to sustainable provision of water.

Gender Equity in Access to Water

This refers to equal participation of both men and women in actions that will enhance sustainable provision of water.

Water Act 2002:

This refers to the current Water Act in the Laws of Kenya which was enacted in 2002 after repealing of the previous Water Act Cap 372 of the Laws of Kenya. The repealing was meant to bring about sweeping reforms and enhance sustainable provision of water at reasonable distance to all Kenyan Citizens.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter contains a review of relevant literature where literature review is the systematic study of collecting and analyzing the existing information on the research topic area (Skinner, 2003:4.6). According to Kumar (1999) and Skinner (2003), literature review helps the researcher understand the research topic more deeply. The chapter contains reviewed literature in the field of community participation, reduction of NRW, Willingness to Pay for Water and gender equity in access to water. All to enhance sustainable provision of water.

This research reviews previous researches in the field of reforms at global, regional and local levels. It also dwells on issues of sustainability, expounds on reforms in general and outlines the influence of implementation of reforms in various sectors of development including water provision at global, regional and local level. The literature reviewed for the study involved: literature and researches on community participation, reduction of non-revenue water, willingness to pay for water and gender equity in access to water. The chapter also outlined the theoretical and conceptual frameworks which gave the relationships between the independent, dependent, intervening and extraneous variables.

2.2 Sustainable Provision of Water

According to UN (1987) report, the most popular definition of sustainability is drawn from the 1987 report of the UN World Commission also called Brundtland Commission on Environment and Development which defined sustainability as “meeting the needs of the present without compromising the ability of the future generation to meet their own needs”. Sustainable development is about marshalling resources to ensure that some measure of human well-being is sustained over time. Pearce & Atkinson (1993) articulate the objective to take actions which will not impair future generations from living at least as well as the present and hopefully better.

Sustainability is a concept that is ‘complex and contested’ (Pretty, 1995). It is far from having a single accepted definition in development. However, the following is a definition from Richard Carter (2011) that builds on that of Len Abrams (2000):

'Sustainability is about whether or not water and sanitation services and good hygiene practices continue to work over time after external assistance ceases. Thus, Bossert (1990) in a report on sustainability of donor funded projects refers to sustainability in water supply as a dominant concern, affecting decisions and actions that "may shape donor policies for years to come". Sustainability success involves the achievement of lasting beneficial changes in water services. Based on this research sustainability in water provision refers to supply of reliable water that is available whenever required i.e. a supply available when the provider indicates it will be available while sustainable provision of adequate water refers to a supply that is enough to meet water requirement for all the households. Lastly sustainable provision of safe water refers to provision of water that has aesthetic characteristics, free from pathogens and harmful substances.

2.3 Review of Water Sector Reforms

According to UN (2006) well-managed water systems are a fundamental policy goal for all countries and can be an important driver for green growth. Yet significant gaps persist between aspirations to ensure access to sufficient and sustainable quantities of good quality water and the actual conditions on the ground. Identifying appropriate policies and approaches for integrative water policy is only a first step, its implementation is essential. The need for water sector reforms to meet the challenge is now widely accepted. According to P. Sangameswaran (2006) one can broadly distinguish between four formulations of water reforms at the international level. These are: the Dublin-Rio principles, the advocacy of water markets and privatization of water services by the World Bank, the Asian Development Bank, the approach of 'Integrated Water Resources Management' propagated by the Global Water Partnership and the World Water Council and the rights discourse (of which the most important articulation is the idea of right to water).

According to the UN, 1992 report the Dublin-Rio principles highlighted four key principles; that "freshwater is finite and vulnerable resource" Whilst the World's population keeps increasing, freshwater resource remains finite. Dublin principle number four declares freshwater resource as having economic value and therefore has to be seen as economic good. But as stated earlier, freshwater resource was seen in the

past as an endless free natural resource. This led to wastage, over consumption and mismanagement of this important natural resource. As an economic good, freshwater resource can not be wasted since some how its use must be paid for in one way or the other. Moreover as a finite and vulnerable resource, freshwater can not always be available in the quality and quantity as expected if measures are not taken to enhance its protection. These principles significantly contributed to the Agenda 21 recommendations adopted at the UN Conference on Environment and Development at Rio de Janeiro in Brazil in 1992. In line with the Dublin principles, Agenda 21 also emphasized on the importance of protecting the supply and quality of freshwater resources and of delegating water resources management to the lowest appropriate level. However, unlike the Dublin principles, it emphasized that water is an economic and social good (UNCED, 1992).

According to Hoering and Schneider (2004), the World Bank plays a key role in the global water sector reforms and has a crucial influence on the policies of the recipient countries as well as on those of the other multilateral and bilateral donors. It shapes national and international water policy both via its linking the award of loans to strict conditionality and by its leading role in the formation of opinion in the water debate. The central aspect of the World Bank's water policy since the beginning of the 1990s is the notion of water as an economic good. It is focused on a comprehensive reform of the water infrastructure sector, which so far has been largely in public hands. In 1994 the Water Reform Framework obliged the Australian State and Territory governments to among other things: undertake public education and consultation to enhance public understanding of the reform program and the need for change, and provide opportunities for stakeholder involvement in decisions on water use issues.

Water sector reforms are advocated as a way to address water sector in developing countries. An article on Reform of Water Institutions, 'Review of Evidences and International Experience'(2007) provides an overview of the reform of water institutions in developing countries in the last three decades focusing on the what, why and how of institutional reform and outlines their implications for policy and research. The review covers four areas: Water rights and river basin institutions, decentralized irrigation management, private sector participation in urban water supply and regulation of water infrastructure. A report on Water privatisation in

Africa (Bayliss, 2001) shows that Water privatisation is being adopted as the reform method in many African countries but there has been little research into its impact which creates a gap that this research will address through collection and analysis of data.

According to Nyanchaga & Ombongi (2007), the history of piped water supply in Kenya can be traced back to the period of the East African Protectorate. At that time water supply was focused on the needs of colonial settlements. The construction of the Kenya- Uganda Railway in 1896 provided an important opportunity for development of water pipelines in the interior of the country along the railway line. In 1952 the Water Act Cap 372 was enacted which remained the legal basis for the water sector until 2002. A fully fledged Ministry of Water Resources Management and Development was created in 1974. The Ministry took over the Government operated water schemes as well as those operated by county councils. In the same year the National Water Master Plan Initiative was launched. Its primary aim was to develop new water supply schemes and secure access to potable water within reasonable distance to all Kenyans. The initiative bore the slogan, "*Water for all by the year 2000*" (Institute of Economic Affairs Report, 2007). However this dream never came to be and the Kenya Government had to institute reforms in the water sector to enhance water management and provision.

A report commissioned by GIZ in Kenya for the period 2003- 2013, shows that prior to the reforms in the Kenyan water sector, the standard of water and sanitation services was constantly declining. This was mainly because water management was unprofessional and centralized, the infrastructure was poorly maintained, and tariffs were kept too low as a result of political influence. No pro-poor policies were in place, so the poor depended on informal, unregulated services, often provided by cartels using unlawful practices. They often had to pay five to ten times more for water of doubtful quality than consumers connected to the utilities. This led to high incidences of water-borne diseases and unacceptable living conditions due to inadequate sanitation, which in turn hampered development and lowered the chances for people in urban, low-income areas to break out of the poverty cycle.

A top-down management approach also characterized the management of water resources. Nearly all the country's measuring stations collapsed, and users drew water

without control, leading to over-exploitation. Pollution of the environment also went unpunished. Rampant deforestation in Kenya saw forest coverage fall from 17 % in 1990 to just 1.2 % today. Most alarming has been the degradation of Kenya's so-called 'natural water towers' five forested mountains that serve as natural reservoirs supplying up to 90 % of the country's water. The loss of these forest areas has devastated the supply and quality of fresh water. Between 1969 and 1999, the annual per capita storage of surface water declined from 11.4 to 4.3 cubic meters. All these challenges led Kenya to institute Water Sector Reforms.

In 1999, the first National Policy of Water Resources Management and Development was published. The policy stated that the government would *hand over* urban water systems to autonomous departments within local authorities, and rural water supply to communities. Another provision of this document was placing water and sanitation services under single utilities. While developing the National Water Policy, the Government also established a National Task Force to review the Water Act, Cap 372, and draft amendments that would result in a complete overhaul of the sector. The current legal framework for the Kenyan water and sanitation sector is based on the *Water Act Nr. 8 of 2002* which became effective in March 2003 (Water Act, 2002).

The Water Act 2002 created two main branches in water sector to manage and ensure access of the water resource, namely Water Resource Management Authority (WRMA) and Water Service Boards (WSB). Under the Water Services Boards, numerous Water Service Providers (WSPs) were incorporated. These would deal with direct abstraction, treatment and supply of water to the Kenyan public. The WSPs are either urban based or rural based depending on whether their service area is urban or rural respectively. Provision of water in the rural areas in Kenya is the main focus of this research project.

2.3.1 Community Participation and Sustainable Provision of Water.

Oakley & Marsden (1987) define community participation as the process by which individuals, families, or communities assume responsibility for their own welfare and develop a capacity to contribute to their own and the community's development. In the context of development, community participation refers to an active process whereby beneficiaries influence the direction and execution of

development projects rather than merely receive a share of project benefits (Paul, in Bamberger, 1986). Paul's five objectives to which community participation might contribute are: Sharing project costs where participants are asked to contribute money or labor (and occasionally goods) during the project's implementation or operational stages, increasing project efficiency where beneficiary consultation during project planning or beneficiary involvement in the management of project implementation or operation and increasing project influence where greater beneficiary involvement to help ensure that the project achieves its objectives and that benefits go to the intended groups. In this research project report the beneficiaries who are the water users are expected to participate through community representation in the water board. Under the new model of water resources management and provision, the local communities are involved at Policy level through representation in the respective Water Boards while the communities directly participate through paying for services provided to them by WSPs and guarding the infrastructure against vandalism. The Boards are charged with the role of giving policy guidelines to the water institution management in order to enhance good governance and sustainability in provision of water. They are also supposed to have a sense of ownership where they assist the water provider in reducing non revenue water, vandalism and paying their water bills in time to enhance financial sustainability of the water utilities that serve them.

According to Lenzen (2002), based on field investigations of initiatives to increase stakeholder participation in water provision in Brazil and India, a research paper by Rao et al (2009) provides insights into the practice of water sector reforms. Looking at the pace of reforms in India the report finds that the process of creating institutions to facilitate stakeholder participation is proceeding rapidly, but greater attention is required on administrative reforms and capacity building. Through participation people learn (Beetham, 1992) in this case it is only through participation that community will learn their role in enhancing sustainable provision of reliable and adequate water. Through the influence of water sector reforms which promote community participation, it is expected that the community will reap the benefits of sustainable provision of reliable and adequate water in Gatundu South Constituency.

Midgley (1986) examines community participation, the state and society while Rao et al on Community-Driven Development as drivers of change examining the case of Water Supply and Sanitation Projects in Rural Punjab, Pakistan evaluates the

influence of community driven development (CDD) approach to rural water supply. The findings of this research will guide the researcher to make conclusions and recommendations regarding influence of water sector reforms in promoting community participation to enhance sustainable provision of reliable and adequate water.

According to Nyanchaga and Ombongi (1987), one way of ensuring a health citizenry after Kenya gaining independence was through provision of adequate and reliable water. However the government did not involve the community in construction and management of water systems. Therefore the communities failed to 'identify' with the water systems. The result were failed government and community water schemes leading to low coverage and access to reliable and adequate water at reasonable distances. The enactment of the Water Act 2002 revolutionized provision of water through creation of new institutions to increase access and sustainability. However enactment of the Water Act 2002 was one thing but implementation was another. Therefore this research seeks to evaluate the influence of water sector reforms in promoting community participation and awareness of the reform process which outlines their involvement in order to enhance sustainable provision of reliable and adequate water.

2.3.2 Reduction of Non- Revenue Water and Sustainable Provision of Water

According to WASREB Impact Report No. 4 "Non-Revenue Water" (NRW) is defined as the difference between the amount of water put into the distribution system and the amount of water billed to consumers. It averages 35% in the region's cities and can reach much higher levels in rural areas (ADB, 2010). The International Water Association (IWA) has developed a detailed methodology to evaluate the various components of NRW. Accordingly NRW has the following components.

1. Unbilled authorized consumption.
2. Apparent losses (water theft and metering inaccuracies)
3. Real losses (from transmission mains, storage facilities, distribution mains or service connections)

A study undertaken by the UN and Stockholm in 1997 indicates that pricing mechanisms for water need to be introduced which allocate water in a way that will

optimize its benefits. If the cost of using or misusing water is not paid by the user, it will be borne by the community at large. One of the major challenges facing water utilities is the high level of water loss in distribution networks. If a large proportion of water that is supplied is lost, meeting consumer demands is much more difficult. Since this water yields no revenue, heavy losses also make it harder to keep water tariffs at a reasonable and affordable level. This situation is common in many Asian cities. Conversely, successful utilities actively address NRW by controlling physical losses, ensuring customer meter accuracy and making all efforts to keep the number of illegal connections within limits. Taking these measures can boost revenue by increasing the amount of water that can be billed while reducing wastage of the product. This increases profitability and improves the return on investment. With larger profits, the utility can then reinvest retained earnings and improve its productivity.

According to World Bank (2006) most developed countries have no or very limited apparent losses while it has been estimated that developing countries, on average, apparent losses - in particular theft through illegal connections - account for about 40% of NRW. In some cities, apparent losses can be higher than real losses. Reducing apparent losses from illegal connections is often beyond what a utility can achieve by itself, because it requires a high level of political and social support. Illegal connections are often in slums and rural areas, which mean that their regularization in some cases particularly affects the poor.

While it is the technician's duty (or his/her team of plumbers), to carry out network inspections daily, all members of the community are expected to be responsible for reporting leaks, illegal connections and other inappropriate or illegal behavior (such as vandalism). Reports can be made by any member of the community. It is in the community's best interest to look after the network. Leaks and illegal connections may allow contaminants to enter the piped water supply, which can cause negative health effects. Also, vandalism may result in an interrupted water supply. The management team must act fast after reports have been filed to ensure that action is taken against water thieves and leaks are plugged within a reasonable time. If action is taken slowly or if anonymity is not respected, the community may lose confidence and trust in the Management Team and may cease to report future leaks and theft. This is crucial for this researcher while carrying out this study to

probe the respondents to know whether they are willing to report such inappropriate behavior and whether they would think such reporting would benefit them.

The World Bank has estimated the total cost of NRW to utilities worldwide at US\$14 billion per year. Reducing by half the current levels of losses in developing countries, where relative losses are highest, could generate an estimated US\$ 2.9 billion in cash and serve an additional 90 million people. Most available data on NRW levels are expressed in Percentages, ranging from 7% in Germany to more than 90% in Lagos, Nigeria. In the specific context of the United States, NRW reduction can also mean reduced legal liability and reduced insurance payments. Reduction of NRW should incorporate community involvement. Once the user community knows the benefits of reducing NRW which include lower tariffs, they are likely to cooperate with utilities to guard against illegal connections which occur in their midst, report leakages and generally protect water infrastructure from vandalism. The reduction of commercial losses, while politically and socially challenging, can also improve relations with the public, since some consumers may be reluctant to pay their water bills knowing that many others use services without being billed or being under billed.

Reviewing WASREB Impact Reports volume 1-4 which give performance reports shows that in urban areas the level of NRW has been progressively reducing. However the pace in the rural areas is relatively slow which leaves a gap to be investigated by this researcher to evaluate the influence of water sector reforms in enhancing management of NRW in Kiganjo Division of Gatundu South Constituency which for all intent and purpose is a rural area.

2.3.3 Willingness to Pay for Water and Sustainable Provision of Water

Willingness to pay (WTP) is essentially the maximum amount of money that beneficiaries are willing to pay for a service. According to Bin-Seraj (2007) in the design of a tariff structure, it is essential to match households' willingness to pay with their ability to pay. Ability to pay (ATP) is purely a financial phenomenon that is derived from income or expenditure information of households and helps in determining the optimal tariff structure of a service. Ability to pay is primarily a function of income and cost of living, which in turn is a function of employment (Brikke, 2000). According to a research study carried out in Dodoma, Tanzania, it is anticipated that positive WTP indicates potential community ability to recover

operation and management costs (Altaf, Jamal, and Wittington, 1992). Thus WTP can be used to help ascertain the potential for fulfilling sustainability, at least from a financial viewpoint. WTP is a concept applied to many research studies worldwide revealing very high levels of willingness to pay for water in developing countries. Decade of Drinking Water and Sanitation (1980's) stated that financial constraints were the single most serious obstacle to the progress of the Decade's goals. Clearly WTP has a role in evaluating acceptable water charges to users upon which water policy can be developed with the confidence of achieving cost recovery.

According to USAID (1996) indigenous governments in developing countries have had to become more innovative in the area of finance. Briscoe (1997) suggests that attention to the rural area should be pursued as an additional source of state revenue. Whittington's research in the area of WTP is the most prolific. However, as Whittington (1987) states that little is known about household behavior in securing water for domestic purposes and how much they will be willing to pay for improved services. He describes a study from Onitsha, Nigeria (1987) which illustrates how levels of payment for water equate to the financing of urban water supply infrastructure development. According to a report dabled Water Supply and Sanitation Projects in Selected Developing Member Countries of 2002, households connected to a piped system were paying, on average, 1%-2% of their household income for water, and their willingness to pay was well established. However, the willingness to pay of households in villages still using hand pumps and standpipes differed in each country and was basically very low. While in some projects in the Philippines less then 50% of the households were willing to pay to connect to a piped supply.

Major development agencies such as the World Bank (1997) promote the pricing of water as a means for public water utilities to manage the allocation of existing water supplies more effectively. It therefore supports the economic concept of willingness to pay for water (1992). The Bank's approach to estimating levels of WTP is by application of the 5% rule. This rule commonly assumes that there is an elastic demand for the purchase of water with a cost of less than 5% of a household's income and an inelastic demand where the cost exceeds 5% of the household's income. Whipenny (1994) criticizes such a broad approach to evaluating levels of WTP not least because it does not allow for the varying values of water through space

and time. Rogerson (1996) agrees with Winpenny by stating that development agencies tend to overestimate the amount individuals are WTP whilst government agencies tend to underestimate. Consequently, Rogerson (1996) advocates further research, but at the household level in order to evaluate levels of WTP more accurately. Rogerson (1996) continues to argue that such inaccurate pricing levels for water often result in the failure of many water supply projects. USAID (1996) is aware that the situation is compounded by project failure as it is misinterpreted by water planners and public officials as an indication that the price is set too high rather than an indication of unmet demand and dissatisfaction. This situation confirms Altaf & Hughes (1994) comment that there is a social distance between planners and beneficiaries leading to a high chance of misjudging consumer demand. In contrast to treating water as an economic good, however, Schur (1993) argues that the issue of water supply is between providing water as a basic need whilst also protecting it as a scarce resource. As a basic need, Schur (1994) believes it is the state's responsibility to ensure all citizens have access to sufficient water supplies and sanitation facilities.

2.3.4 Gender Equity and Sustainable Provision of Water

According to a UNDP (2006) report on water governance, women are most often responsible for domestic and community water management in developing societies. They determine the sources of water to collect, quantity of water to be taken and the water's hygienic quality. Yet, women's decisions in regard to water management are often dictated by their social position, geographic location and increasingly by market forces.

Although water supply is increasing following enhanced efforts for the Millennium Development Goals (MDGs), there still are many women who carry water, their whole life, keeping them out of school and out of economic development and further empowerment. According to Ademun (2009), competition for water has resulted in the collapse of water based ecological systems hence declining river flows and large-scale ground water depletion (UNDP, 2006). This is leading to an increased potential for conflict within and between countries with the rural populations being the most affected (UNDP, 2006, Anand, 2007). Even though the water crisis is observed as a general problem for the rural population, women bare the greatest burden because of their socially gendered roles, which involve looking for and

collecting water for their households (Buckingham, 2000, Rodda, 1993). Because of their task of water provision at the households, the participation of women in education, income generating activities as well as in cultural and political engagements is often compromised (Panda, 2007, Karl 1995). Consequently, this leads to material deprivation for women, their lack of voice, vulnerability to shocks and lack of capacity to cope with any form of crisis and hence widening the poverty gap and gender inequalities in developing countries (UNDP, 2004, Rodda, 1993). Therefore ensuring easy access to adequate amounts of good quality water by extending provision of water services to rural households in a coordinated and inclusive approach for all people is central to promoting gender equality (Lenton, et al., 2008). Such a step will also contribute to the protection of natural resources which is also essential for environmental sustainability as one of the pillars of the MDGs (Lenton, et al., 2007).

Access to clean water can change gender relations in the household and offer women the opportunity for productive use where their mobility is socially constrained (Sutton, 2007, Karl, 1995). But this is only possible if those responsible for making choices for the technologies for water supply, paying water bills at household level and those who attend water management meetings at community level are identified (Rydhagen, 2002). Lack of access to safe water is at the heart of the poverty trap, especially for women and children, who suffer in terms of illness, drudgery in collection of water, and lost opportunities because of the time that water collection consumes.

In rural Africa, according to the World Bank, 40 million hours are spent each year in collecting water for domestic use and half of Africa's population is without access to safe water (Black, 1998). Recent renewed focus on poverty alleviation has resulted in increased attention to the benefits of improved water accessibility. Poverty assessment research has consistently shown that improvement in water services is a critical element in designing and implementing effective strategies for poverty alleviation. A gender perspective which seeks to include an understanding of gender roles and relations and how these affect and are affected by water and sanitation interventions, can ensure greater sustainability and resource efficiency and can therefore increase the number of beneficiaries. Experience has shown that

interventions which include the views and input of both men and women generally work better.

Water is not 'gender neutral'. Water resource management is incomplete without a gender perspective because: Women are often the primary users of water in domestic consumption, subsistence agriculture, health and sanitation. According to a research program 'Gender and Broadening Access to Land and Water in Southern Africa'(2002), policy documents now almost automatically include discussion about the need to address gender differences in resource management and to increase efforts to identify women as key players in the reform process. According to Njuki (2002) other positive examples are available from Kenya, where watershed committees with both men and women were more effective than all-male or all-female organizations, because they were able to draw upon the complementary strengths of men and women. Men had stronger external connections (bridging social capital), which was helpful, for example, in obtaining external assistance, while women tended to be more highly trusted, especially in managing money.

Among the Maasai community of Kenya, during the drought, women and girls who are the traditional water-collectors and frequently the food producers travel five km or more on foot to look for water. Many are forced to quit or curtail side businesses or even stop going to school to meet the family's needs as water grows increasingly scarce, and men bring home the dying cattle for women to hand-feed (World Bank, 2010). Yet women do not play a central role in decision making about water. According to Theresa Wasike a Gender Desk Officer at the Ministry of Water and Irrigation Kenya there are more men than women at the management and decision making level. The women will come but they will take the backstage, they don't feel they have any role to play. Therefore there is still a lot to be done to empower women to achieve gender equality in water. The goal is "gender mainstreaming" of the water sector, a concept supported by the World Bank Group's Gender Action Plan and at various stages in several African countries (economic empowerment of women is more the central concept of the GAP). The idea is to accelerate the integration of gender concerns in economic sectors such as infrastructure, and as a result address the root causes of poverty and gender inequality.

According to a UNDP (2010) report, project in Turkana district of Kenya in 2010 saw more than 2000 girls return to school after 30 boreholes were drilled by a U.

interventions which include the views and input of both men and women generally work better.

Water is not 'gender neutral'. Water resource management is incomplete without a gender perspective because: Women are often the primary users of water in domestic consumption, subsistence agriculture, health and sanitation. According to a research program 'Gender and Broadening Access to Land and Water in Southern Africa'(2002), policy documents now almost automatically include discussion about the need to address gender differences in resource management and to increase efforts to identify women as key players in the reform process. According to Njuki (2002) other positive examples are available from Kenya, where watershed committees with both men and women were more effective than all-male or all-female organizations, because they were able to draw upon the complementary strengths of men and women. Men had stronger external connections (bridging social capital), which was helpful, for example, in obtaining external assistance, while women tended to be more highly trusted, especially in managing money.

Among the Maasai community of Kenya, during the drought, women and girls who are the traditional water-collectors and frequently the food producers travel five km or more on foot to look for water. Many are forced to quit or curtail side businesses or even stop going to school to meet the family's needs as water grow increasingly scarce, and men bring home the dying cattle for women to hand-feed (World Bank, 2010). Yet women do not play a central role in decision making about water. According to Theresa Wasike a Gender Desk Officer at the Ministry of Water and Irrigation Kenya there are more men than women at the management and decision making level. The women will come but they will take the backstage, they don't feel they have any role to play. Therefore there is still a lot to be done to empower women to achieve gender equality in water. The goal is "gender mainstreaming" of the water sector, a concept supported by the World Bank Group's Gender Action Plan and at various stages in several African countries (economic empowerment of women is more the central concept of the GAP). The idea is to accelerate the integration of gender concerns in economic sectors such as infrastructure, and as a result address the root causes of poverty and gender inequality.

According to a UNDP (2010) report, project in Turkana district of Kenya in 2010 saw more than 2000 girls return to school after 30 boreholes were drilled by a U.

S funded program. This is because the time for moving for many miles in search of water is drastically reduced. This in away leads to gender equity as girls can attend school just like the boys which will make them more empowered and more useful to their community. Within the context of this research, the researcher will probe the community for emerging issues on gender when it comes to access to water.

2.4 Theoretical framework

This research project report is grounded in a community-based natural resources management (CBNRM) theoretical framework. This framework provides an analytical approach that views users as the focal point for sustainable Natural Resources Management. Without user cooperation and participation, the chances of successful natural resources management diminish. According to C. Chikozho, this approach is manifest in literature from scholars like Morpheme (1991) and Murombedzi, (1991), who argue that in managing natural resources, the unit of proprietorship should be the unit of production, management and benefit sharing. It must also be as small as practicable and the users must perceive management of the resource in question as beneficial to them if they are to be motivated to manage the resource sustainably. Since the reforms seek to encourage devolution of management responsibility to communities, the paper assumes that communities, with the help of newly created institutions, are going to be the unit of proprietorship, production, management and benefit sharing. The researcher for this project report views the study in the light of influence of water sector reforms in promoting community participating in order to enjoy the benefits of sustainable water provision within Gatundu South Constituency which is in line with natural resource management theoretical framework.

Environmental sustainability is conceived as having to do with control, power, participation, and self- determination. Development of institutions that empower local communities is seen as a prerequisite for sustainable resource management (Murombedzi, 1991; Abel and Blackie 1986; Seiderman, 1992). Theories of participatory management suggest that the lack of participation of a large number of the users of a resource would lead to performance weaknesses in the organization, because of weaknesses in communication, representation, democracy and accountability, which may lead to free riding, rent seeking and corruption (Ostrom,

1992). This theory fits in this research project report where the users are expected to participate to enhance sustainable provision of water in Kiganjo Division of Gatundu South Constituency.

Skinner (1995) looked at what individuals and communities were actually involved in within participative partnerships as a tool to categorize participation. Within an effective participative structure, roles and responsibilities will be clear and transparent. Skinner suggests that a community will adopt five roles if fully participating within a regeneration programme. Within these five roles community members will act; as beneficiaries of the programme and users of services, as consultees and representatives of local opinion, as the source of general community activity, as the source for the delivery of regeneration programmes and as potential long term partners in regeneration. Through analysis of the exchange of power, and observation of Skinner's five roles, it is possible to make an assessment of the level of community participation within any given programme.

Within the context of the current research project report, the researcher will evaluate community participation as beneficiaries and users of water provision service and as potential partners in enhancing sustainable provision of water through guarding against illegal activities such as vandalism, irrigation, illegal connections etc. This will help to reduce unaccounted for water and reduce cost of water while at the same time increasing revenue collection to enhance sustainable provision of water in Kiganjo Division. The community members should willingly and dutifully pay their water bills to enhance financial sustainability of the water utilities.

The theoretical framework on collective action as an institution is commonly overlooked or, when recognized, frequently misunderstood. Most basically, this collective action can be defined as voluntary action taken by a group to achieve common interests (Marshall, 1998). The action can take place through an organization such as a producer cooperative or members can participate in such action directly. As a governance structure, collective action occurs not only when group members pool labor and resources to build a dam or well, for example, but also when a group establishes rules for resource use or non-use. In this regard the community can choose to establish rules that safeguard water infrastructure, illegal activities and gender equality to enhance sustainable provision of water in Gatundu South Constituency.

This will go along way in improving access to water for both men and women within the community.

2.5 Conceptual framework

A conceptual framework is a hypothesized model identifying the concepts under study and their relationships (Mugenda & Mugenda, 2003). It presents in a diagrammatic form the way the researcher has conceptualized the relationship between the independent and the dependent variables. This section provides a structural description of the relationship between the variables forming the concepts of the study on the implementation of water sector reforms. The framework below is an illustration of water reforms implementation matrix showing various variables that are indicative influence of water sector reforms implementation in any given area. The independent variables are grouped together on the left but not in any order of importance. The dependent variable is placed on the right connected with an arrow as a sign of direct relationship.

Independent Variable

Dependent Variable

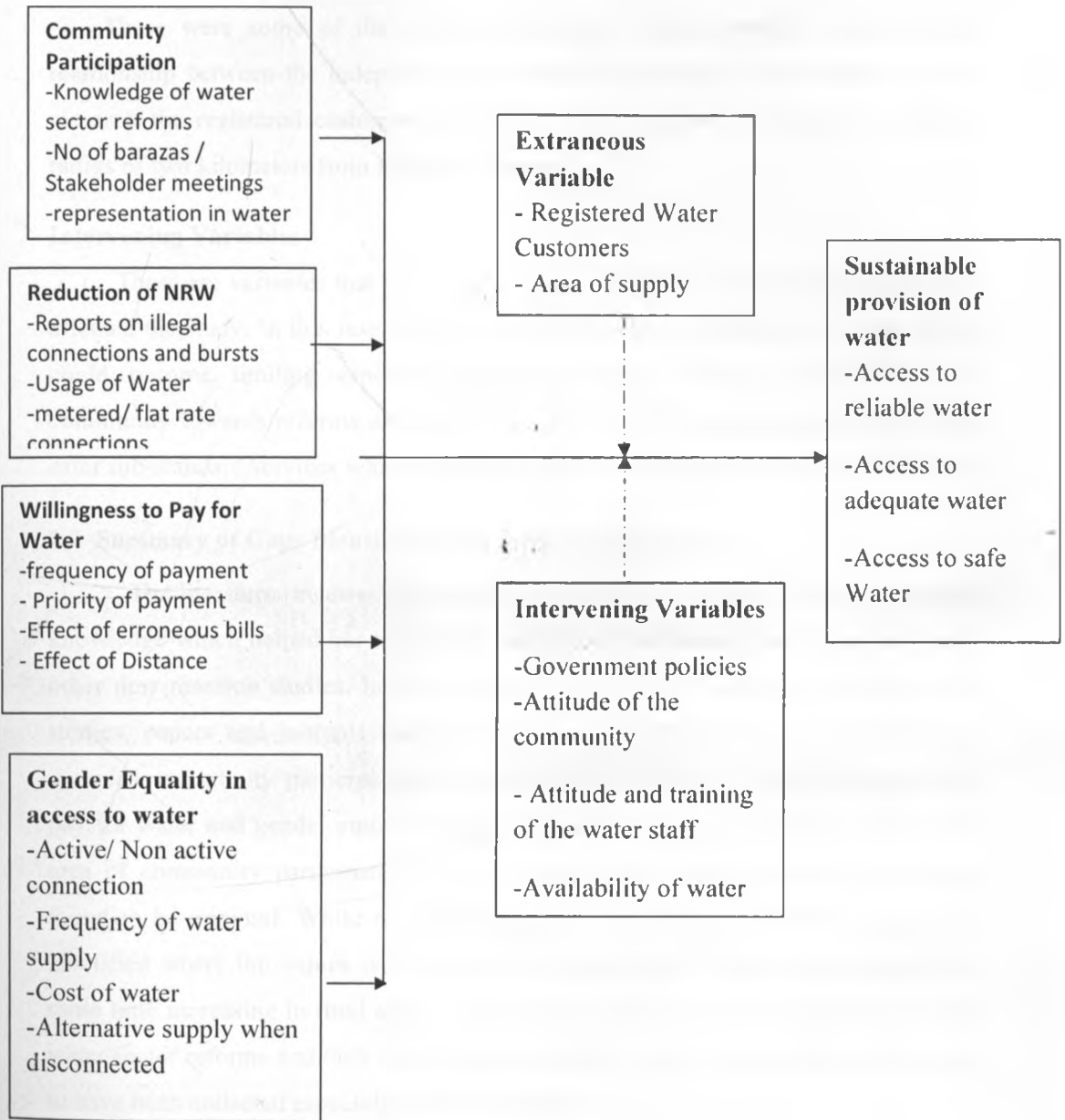


Fig. 1: Conceptual frame work

2.6 Variables in the Study

Extraneous Variables

These were some of the factors outside this research which influenced the relationship between the independent and dependent variables in the study. For this research the registered customers with WSP. The study was confined to within a radius of two kilometers from Kiganjo Township.

Intervening Variables

These are variables that the researcher had no control of and which could have affected the study. In this research, Government policies, availability of water which could become limiting especially during prolonged droughts, attitude of the community towards reforms and training of WSP staff where untrained staff would offer sub-standard services which would interfere with sustainable provision of water.

2.7 Summary of Gaps Identified in the Literature Reviewed

The literature reviewed in this study enabled the researcher to identify gaps in knowledge which helped her to create a framework and a direction for the study and other new research studies. In the literature reviewed the researcher looked at case studies, papers and journals that related to sustainable provision of water which included community participation, reduction of non- revenue water, willingness to pay for water and gender equity in access to water. The gaps identified were in the area of community participation in rural areas where their involvement had been found to be minimal. While reviewing literature on reduction of NRW, a gap was identified where the values were found to be lowering in urban areas while at the same time increasing in rural areas. Another gap was viewed in the relation between water sector reforms and their actual implementation where very little data was found to have been collected especially in the rural areas.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research methodology, the research design, the target population, sampling procedure, research instruments, Pilot testing, validity and reliability of research instruments, data collection procedures and methods of data analysis for this research.

3.2 Research Design

The research design which was used to conduct the study was descriptive survey method. According to (Kombo et al, 2006) the descriptive survey method is used to collect information by interviewing or administering questionnaires to a sample of respondents with an intention of describing the nature of existing situations. It is considered most appropriate design in behavioral sciences as it seeks to find out factors associated with certain occurrences, outcomes and condition of behavior (Bell, 1987). The research design was found to be appropriate for gathering information, summarizing, presenting and interpreting it for the purpose of clarification based on (Orodho and Njeru, 2004). The research design was found to be most appropriate for the study because it enabled the researcher to produce statistical data that was used to determine the influence of water sector reforms in enhancing sustainable provision of reliable and adequate water in Kiganjo Division within Gatundu South Constituency. The researcher administered the questionnaires with assistant from two research assistants.

3.3 Target Population

The target population was taken as the Two Hundred (200) registered water customers within a radius of two Kilometers from Kiganjo Township in Kiganjo Division of Gatundu South Constituency.

3.4 Sample Size and Sampling Procedure

A sample size is a sub-set of the total population that is used to give the general views of the target population (Kothari, 2003). The sample size must be a representative of the population in which the researcher would wish to generalize the research findings. Using Crejcie Morgan table (Appendices IV), the sample size of

this study was obtained as one hundred and thirty four (134) respondents based on the target population of Two Hundred (200) registered water customers within two Kilometer radius of Kiganjo Township in Kiganjo Division in Gatundu South Constituency.

The researcher used systematic random sampling. This was achieved through obtaining a list of all the registered water customers within the two kilometer radius from Kiganjo Township from the Thiririka Scheme Manager. A systematic random sampling method was used to identify the respondents. A sampling frame obtained from the 200 registered water customers within a radius of two Kilometers from Kiganjo Township was used. The connections had their registration numbers which were subjected to excel random sampling. A list of all the two hundred connections were exported to an excel sheet and subjected to random sampling. Each number got either a TRUE or FALSE value. All those connections which got the value ' TRUE ' were selected and their households identified by the Company Staff.

3.5 Research Instruments

According to Best (1981) research instruments are the tools used in the collection of data on the phenomenon of the study. Closed ended questionnaires were used in this research. According to Mugenda & Mugenda (1999) a questionnaire is a list of standard questions prepared to fit a certain inquiry. The questionnaire consisted of five sections. The first section was on the general data of the respondents while the other four sections addressed the four research variables. Structured questions provided predetermined alternatives. The researcher also administered another set of questionnaires to the staff from the Water Provider for triangulation purposes.

3.5.1 Pilot Testing

Orodho (2003) describes pilot testing as a smaller version of a larger study that is conducted to prepare for the study or to field test the survey to provide a rationale for the design. It involves pre-testing of the instruments to determine their validity and reliability. The researcher pilot-tested the instruments by administering the prepared questionnaire to thirteen respondents of registered water customers in the neighboring Ngenda Division within Gatundu South Constituency. The sample was obtained using the C. K. Morgan table. After the administering the questionnaire the

researcher was able to make adjustments where necessary in order to make the instrument valid and reliable.

3.5.2 Validity of the Instrument

Validity of research instrument in this case a questionnaire refers to the extent to which the right questions are phrased in the least ambiguous way. It is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. The meaning of all terms must be clearly defined so that they have the same meaning to all respondents (Best, 1981). When a measure provides adequate coverage of the concept, it is considered to have content validity. The development of a content valid instrument is typically achieved by a rational analysis of the instrument by raters (ideally 3 to 5) familiar with the construct of interest. The researcher involved professional colleagues, supervisors and lecturers to validate data collection instrument for the study. Advice by these people assisted the researcher in improving instrument with a small sample with similar characteristics and necessary adjustments were made.

3.5.3 Reliability of the Instrument

According to (Orodho, 2004) reliability of measurements refers to the degree to which a particular measuring procedure gives consistence results over a number of trials. It can be considered as the degree to which instruments used for data collection are free from errors and therefore can produce consistent results. To test the reliability of the instruments in this research, the researcher used split- half technique which involved administering only one session of questionnaire during pilot testing. The questionnaires were based on 10% (Mugenda and Mugenda, 1999) of the total number of questionnaires used for the study. Using the Statistical measure known as SPSS, the researcher obtained the reliability. The coefficient obtained was 0.689 and indicated the degree to which the two halves provide the same results and thus describing the internal consistency of the test. This figure was close to 0.7 which was considered to be reliable according to Mbwesa (2006).

3.6 Data Collection and Data Analysis Techniques

The data was collected using questionnaires which were administered to the respondents by the researcher and her assistants. Each questionnaire took about five

minutes to administer. The researcher first sought for consent from the respondent and explained questions that were not clear. Then gave the questionnaires to the respondents those who had inadequate literacy levels requested to be assisted to interpret the tool in the local language. When the researcher and her assistants finalized administering the questionnaires after several days of field work, all the questionnaires were itemized ready for coding and keying in the information in the computer for analysis..

According to Singleton & Straits (1999) data analysis follows three steps once the data is gathered: The Processing of data which refers to consolidation, recasting or regrouping of data to make analysis easier. There are three stages in data processing; editing, coding and tabulation. Editing refers to checking of the questionnaires for completeness and accuracy while coding is a method of conceptualizing data and classifying it into meaningful and relevant categories for the purpose of analysis. The data is then tabulated for ease of analysis.

The data collected was analyzed using descriptive statistics. This enabled the researcher to meaningfully describe distribution of scores or measurements using a few indices or statistics (Mugenda, 2003). This method is preferred because it helps to show frequencies, mode among other variables as well as correlation. The data collected was analyzed using computer software Statistical Package for Social Scientist (SPSS) for analysis. The raw data obtained from the study was coded, grouped and subjected to nominal and ordinal measurements and presented using Percentages and distribution tables.

3.7 Ethical Requirements

Ethical issues arise in social research when conflict occurs between societal values such as freedom and privacy and scientific methods aimed at obtaining the highest quality of data (Singleton and Straits, 1999). For this study the data collection forms did not bear the name or ethnicity of the respondent but the respondent was identified by a study code instead. An informal consent was obtained from the respondents as the researcher gave a full detailed explanation of the study. The respondents were made aware of their voluntary participation and information collected from them treated with confidentiality and used only for the purpose of the study.

3.8 Operational Definition of Variable

Objectives	Variables	Indicators	Measurement Level	Tools of Data Collection	Tools of Analysis
Demographic Characteristics	-Gender -Age -Education -Income level	-Gender -Age -Education -Income	-Nominal -Ordinal -Ordinal -Ordinal	Questionnaire	Frequencies & percentages
Review of Water Sector Reforms	-Water Sector reforms	-Knowledge of reforms - WSP performance -Quality of Water	-Nominal -Ordinal -Ordinal	Questionnaire	Frequencies & percentages
To determine influence of Water Sector Reforms in promoting community participation	community Participation	-Meetings attended -Knowledge of Board existence - Knowledge of director - Responsibility to guard infrastructure	Nominal -Nominal -Nominal -Nominal	Questionnaire	Frequencies & percentages
To evaluate the influence of Water Sector	Non Revenue Water	-Type of water	-Nominal		

Reforms in promoting reduction of Non- Revenue Water	(NRW)	connection -Usage of water -Reports on illegal connections- Reports on leaking or burst pipes	-Nominal -Nominal -Nominal	Questionnaire	Frequencies & percentages
To establish the influence of Water Sector Reforms in promoting willingness to pay for water services in Kiganjo Division	Willingness to pay for water	-Frequency of water payment -Priority of water payment- Effect of Distance to payment center - Effect of erroneous water bill	-Ordinal -Nominal -Nominal -Nominal	Questionnaire	Frequencies & percentages
To establish the influence of Water Sector Reforms in promoting gender equity in access to water	Gender Equity	-Status of water connection (Active/inactive) --Frequency of water per week	-Nominal -Ordinal	Questionnaire	Frequencies & percentages %

CHAPTER FOUR : DATA ANALYSIS, PRESENTATION INTERPRETATION AND DISCUSSION OF THE FINDINGS

4.1 Introduction

Chapter Four covers analysis of data, presentation and interpretation of the findings on the influence of water sector reforms in enhancing sustainable provision of water; a case of Kiganjo Division in Gatundu South Constituency. The focus was on community participation, reduction of non revenue water, willingness to pay for water and gender equity in access to water. All these variables were geared towards enhance sustainable provision of water. Quantitative data analysis results are presented as descriptive statistics, frequencies and Percentages.

4.2 Response Rate

In order to answer the research questions, the researcher and her assistants administered 134 questionnaires to the study respondents who were registered water customers with Gatundu South Water and Sanitation Company Limited. All the questionnaires were returned since the researcher and her assistants administered the questionnaires due to the inadequate literacy levels which required them to interpret the tool in the local language.

4.3 Demographic Characteristics of Respondents

The demographic characteristics of respondents included their gender, age, education level and annual household incomes. These characteristics have a bearing in sustainable water provision.

4.3.1 Gender Distribution of the respondents

Gender is an important factor in determining success of a community project towards achieving its objectives. A gender perspective seeks to include an understanding of gender roles and relations and how these affect and are affected by water and sanitation interventions. The study findings with regard to gender are shown in Table 4.1

Table 4.1: Gender Distribution of the Respondents

Gender of Respondents	Frequency	Percentage
Male	51	38.1
Female	83	61.9
Total	134	100.0

The results from Table 4.1 represent 51(38.1%) male and 83(61.9%) female. Therefore female respondents were more than the male respondents. The fact that females were more than males could be a result of availability of women within their households carrying out domestic chores while the men were away working to supplement the family income. On the other hand women bear the burden of water provision in the household and therefore take keen interest when it comes to access to water within reasonable distance to their households. Therefore ensuring easy access to adequate amounts of good quality water by extending provision of water services to rural households in a coordinated and inclusive approach for all people is central to promoting gender equality (Lenton, et al., 2008).

4.3.2: Age Distribution of the Respondents

Age is a demographic characteristic which shows the distribution of respondents by their age. The following results represent age distribution of the respondents as tabulated in Table 4.2.

Table 4.2: Age Distribution of the Respondents

Age in Years	Frequency	Percentage
20-29	16	12.2
30-39	21	15.6
40-49	30	22.2
>50	67	50.0
Total	134	100.0

From Table 4.2 the age distribution of the respondents indicates that 97(72.2%) of those interviewed were from forty years and above which could imply that they had lived in the area most of their lives giving them a long experience of the water provision in their area and were able to articulate phases in provision between different providers.

4.3.3 Education Level of the respondents

Education level is one of the demographic characteristic of the respondents and its distribution is as indicated in Table 4.3.

Table 4.3: Education Level Distribution of the Respondents

Education Level	Frequency	Percentage
No Education	42	31.3
Primary	58	43.3
Secondary	32	23.9
Tertiary	2	1.5
Total	134	100.0

As shown in Table 4.3, 100 (74.6%) had education level of primary school and below while only 34 (25.4%) had attained secondary school level and above. Therefore it was necessary to interpret the tool in the local language. Even those who

indicated they had secondary level education requested for assistance when it came to interpreting the questionnaire. Adequate literacy level is an important indicator in water provision because only those who are educated and have certain skills could represent the community at board level.

4.3.4: Household Income Distribution of for the Respondents

Table 4.4 shows the distribution of annual household income among the respondents. Income levels are indicative social economic status of the community which could translate to their ability to pay for water.

Table 4.4: Household Income Distribution for the Respondents

Annual Income Level (Ksh.)	Frequency	Percentage
0-100,000	108	80.6
100,001-300,000	25	18.7
300,001-500,000	1	0.7
Total	134	100.0

Table 4.4 indicates that (108)80.6% of the respondents reported an annual household income levels ranging from Ksh 0- 100,000. With such low household income levels, high poverty levels are evident which could be an impediment to regular payment for water services or even connectivity and hence hinder sustainable provision of water.

4.4: Community Participation and Sustainable Provision of Water

This section reviews community participation which is one of the variables that was used to measure influence of water sector reforms in enhancing sustainable provision of water. The indicators for community participation included: awareness of water sector reforms, community responsibility in guarding water infrastructure, attendance of public Barazas/ stakeholder meetings organized to address water provision issues, rating the WSP performance and giving feedback on water quality, knowledge of existence of water board and directors representing the community. The

water sector reforms brought changes in the management of water to enhance sustainable provision of water.

4.4.1 Awareness of Water Sector Reforms

The researcher sought to know community level of awareness of water sector reforms. Table 4.5 shows the responses from the respondents when they were asked whether they were aware of existence of water sector reforms.

Table 4.5: Community level of Awareness of Water Sector Reforms

Knowledge of Reforms	Frequency	Percentage
Yes	14	10.4
No	120	89.6
Total	134	100.0

The results from the responses are shown in Table 4.5 as follows; (120) 89.6% of the respondents were not aware of Water Sector reforms and only (14)10.4% had an idea about the reforms. This could mean that little sensitization and mobilization had been done in the area by those concerned to educate people on the tenets of the Water Sector Reforms. The reforms were meant to involve communities in management of water in order to improve water provision in Kenya and hence reduce the percentage of people without access to safe water. According to a World Bank report (2006), Water sector reforms are advocated as a way to address water provision in developing countries.

Awareness of water sector reforms refers to the community level of knowledge of water sector reforms which were brought on board after repealing the previous Water Act Cap 372 of the Laws of Kenya in 2002. The new law, Water Act 2002 brought about sweeping changes in the management of water in Kenya. These changes included involving the community in management of water in order to enhance sustainable provision of water. This could only happen if the community was fully mobilized and sensitized on the role they would they were expected to play to improve sustainable provision of water.

4.4.2 Staff Interaction with Interaction with Customers

In order to triangulate the information given by the respondents from the community, a questionnaire was administered to twelve (12) members of staff of the water service provider to gauge the staff level interaction with water customers. The responses from the respondents are shown in Table 4.6.

Table 4.6 Staff Interaction with Customers

Staff/Customer		
Interaction	Frequency	Percentage
Yes	3	25.0
No	9	75.0
Total	12	100.0

The results as tabulated in Table 4.6 indicated that 9(75.0%) the staff did not engage their customers on the issues of water sector reforms while only (3)25.0% said they took time to explain to their customers issues of water sector reforms. These results conformed with what the customers had responded on their level of awareness of water sector reforms. This is probably because the customers visited the offices only when they had problems they wanted the WSP to solve for them and hence did not concentrate on other explanations.

4.4.2: Performance Rating of the WSP

The water sector reforms were meant to improve on service delivery by those charged with the responsibility to provide water. The performance would be rated by the water customers who received the service. Table 4.7 shows the rating given to the WSP by their water customers.

Table 4.7: Performance of WSP.

Quality of Service	Frequency	Percentage
High performance	50	37.3
Average Performance	61	45.5
Poor Performance	23	17.2
Total	134	100.0

The results of the rating are tabulated in Table 4.7 and indicates that 50 (37.3%) had displayed high performance in terms of service provision, 61(45.5%) said the performance was average while 23(17.2%) indicated the performance was poor. The interpretation was that even though the community had not been aware of their role in participation to improve service delivery, they rated the performance from average to high as 111(82.8%). This could be as a result of creation of new institutions that had signed performance contracts to improve on service delivery.

According to a report commissioned by GIZ in Kenya for the period 2003-2013, the standard of water and sanitation services was constantly declining prior to the reforms in the Kenyan water sector. This was mainly because water management was unprofessional and centralized, the infrastructure was poorly maintained, and tariffs were kept too low as a result of political influence. Therefore the results from this study showing a rating of 111(82.8%) from average to high performance are in line with what the GIZ report had indicated.

4.4.3: Rating of the water quality

Water quality refers to water that is free from contaminants and hence will not have any adverse effect on human beings and animals when it is consumed. The water sector reforms were meant to ensure the citizens received adequate and safe water. Table 4.8 shows responses from the respondents when they were asked to rate the quality of water they were receiving.

Table 4.8: Rating of the water quality

Rating of Water		
Quality	Frequency	Percentage
High quality	56	41.8
Average quality	67	50.0
Poor quality	11	8.2
Total	134	100.0

The results as tabulated in Table 4.8 showed that 56(41.8%) water was of high quality, 67(50.0%) of average quality while (11)8.2% rated the water as of poor quality. One of the objectives of the water sector reforms was to supply safe water to the community i.e. water that is free from disease causing organisms and free from turbidity. Therefore with 123(91.8%) of the respondents saying that water was of average to high quality shows the improvement in quality was significant after water sector reforms were implemented. According to a UN-Africa report of 2004, good quality water can be an instrument for poverty alleviation lifting people out of the degradation of having to live without access to safe water, while at the same time bringing prosperity to all.

4.4.4 Attendance of Public Barazas/Structured Stakeholder Meetings

One method of communicating with water customers is through using platforms like public Barazas and structured stakeholder meetings. The WSP and associated institutions are expected to organize these meetings regularly and in different areas of supply. Table 4.8 shows responses from the respondents when they were asked whether they attended such functions.

Table 4.8: Attendance of Public Barazas/Meetings

Barazas Attendance	Frequency	Percentage
Yes	28	20.9
No	106	79.1
Total	134	100.0

The results as displayed in Table 4.9 shows that only 28(20.9%) attended such Barazas while 106(79.1%) said they did not attend. The percentage of those attending the meetings is very low compared to those who said they attended, this was probably because little mobilization and sensitization had been carried out in the area. It is during public Barazas and stakeholder meetings, that the WSP and associated institutions sensitize the public on the water sector reforms and the citizen engagement in enhancing sustainable provision of water.

Attendance of public Barazas and structured stakeholder meetings is comparable to Skinner's (1995) analogy which looked at how individuals and communities were actually involved in participative partnerships as a tool to categorize participation. Within an effective participative structure, roles and responsibilities will be clear and transparent. Therefore through attending meetings to address water provision, the community would clearly understand their role in enhancing sustainable provision of water. This research project report is grounded in a community-based natural resources management (CBNRM) theoretical framework. This framework provides an analytical approach that views users as the focal point for sustainable Natural Resources Management. Without user cooperation and participation, the chances of successful natural resources management diminish.

4.4.5 Frequency of public Barazas/Structured Stakeholder Meetings

To triangulate the information given by the respondents from the community, the staff respondents were asked to give the frequency of meetings organized by the WSP in a year. Table 4.9 shows the responses from the sampled staff.

Table 4.9: Frequency of Public Barazas/ Stakeholder Meetings

Frequency of Public Meetings	Frequency	Percentage
Quarterly	4	33.3
Yearly	8	66.7
Total	12	100.0

The results as tabulated in Table 4.9 indicated that 8(66.7%) such meetings were organized once a year while 4(33.3%) said the meetings were organized on quarterly basis. The findings of the research indicated majority of staff said that such meetings were organized on yearly basis probably referring to the annual stakeholder meeting called by WSP to report to the stakeholders on how the (WSP) had performed. It is unlikely the WSP would involve all the stakeholders in their area of service because of their numbers. In that case only a small number of the water customers were given an invitation to attend the meetings where those attending were randomly selected from all the areas.

4.4.6 Failure to Attend Public Barazas/ Structured stakeholder Meetings

Table 4.10 shows responses from the respondents when they were asked why they did not attend public Barazas / structured stakeholder meetings.

Table 4.10: Reasons for Not Attending Public Barazas/ Public Meetings

Reasons for not Attending Barazas	Frequency	Valid Percentage
No Meeting organized	49	46.2
Not Interested	51	48.1
Heard of Meeting but Too busy	6	5.7
Total	106	100.0

The results as shown in Table 4.10 indicate that 49(46.2%) of the respondents said that they had never heard of any meetings organized to discuss water provision,

51(48.1 %) said they had no interest even when they heard of the meetings while 6(5.7%) indicated that although they had heard of such meetings they were too busy to attend. The reasons advanced by the respondents for not attending public Barazas and stakeholder meetings showed that the WSP and other stakeholders involved in sustainable provision of water had done little to mobilize and sensitize the community on the importance of water sector reforms in enhancing sustainable provision of water. The WSP should use other means of community mobilizations like local churches, print and mass media and conduct road shows to educate water customers on their role in enhancing sustainable provision of water.

4.4.7 Awareness of Existence of Water Board

Board of Directors is a policy formulating body of WSP as constituted in the Water Act 2002. The directors represent areas of supply and interest groups within the community. It is through the board that the community participates directly in the management of water provision in their service area. Table 4.11 shows the responses from the respondents when they were asked whether they were aware of the existence of the Board of Directors.

Table 4.11: Awareness of Existence of Water Board

Community Representation in the		
Board	Frequency	Percentage
Yes	24	17.9
No	110	82.1
Total	134	100.0

The results as tabulated in Table 4.10 shows that 24(17.9%) of the respondents were not aware of the existence such a Board while 110(82.1%) said they were not aware that such a board existed. This could mean that that there was very little mobilization and sensitization carried out within the community by the WSP and other related institutions after the roll out of the water sector reforms. The reforms were meant to involve communities in management of water through the Board of Directors.

According to Paul, in Bamberger, (1986) community participation refers to an active process whereby beneficiaries influence the direction and execution of development projects rather than merely receive a share of project benefits. As a governance structure, collective action occurs not only when group members establishes rules for resource use or non-use. This is done through the board which formulates policies. Therefore the community should acknowledge the existence of the board and its role in enhancing sustainable provision of water.

4.5.8 Knowledge of Director representing Area of Supply

Directors are members of the board who represent various interest groups within a WSP service area. They are members of the community and their role is to formulate and implement policies geared towards enhancing sustainable provision of water. Table 4.12 displays the results of the respondents when they were asked whether they knew the director who represented their interest in the Board.

Table 4.12: Knowledge of Director representing your area

Director Representing Area	Frequency	Percentage
Yes	19	14.2
No	115	85.8
Total	134	100.0

The results shown in Table 4.12 indicates that 115(85.8%) were not aware of the director who represented their interests in the board while 19(14.2%) responded that they were aware of the director representing their interests. This could only be as a result of the inadequate literacy levels because on triangulation through gathering of information from the WSP, it was noted that every year adverts were placed in the newspapers requiring community members to apply for positions in the board.

Low awareness of the directors that sit in the WSP Board could mean that the community would not be able to interact with their director and raise any issues that affect water provision in their area. The Directors discuss problems within their area that could hinder sustainable provision of water and give policy guidelines to the

WSP’s management team. Therefore the community should interact with directors so as to bring on board problems affecting their areas.

4.4.9 Responsibility to Guard Water Infrastructure against Vandalism and Theft

The water sector reforms were intended to instill a sense of ownership of water infrastructure by the communities. Therefore they would guard the infrastructure against vandalism and theft which had previously led to collapse of water systems. Table 4.13 shows the tabulation of results showing responses from the respondents.

Table 4.13: Community Responsibility in Guarding Water infrastructure

Responsibility to Guarding		
Water Infrastructure	Frequency	Percentage
Yes	75	56.0
No	59	44.0
Total	134	100.0

The results as indicated in Table 4.13 shows that 75(56.0%) of the respondents said that they were aware of their responsibility to guard water infrastructure against vandalism while 59(44.0%) said they were not aware of such a responsibility. The water sector reforms were meant to involve the community and instill a sense of ownership of the water infrastructure. This would mean that the community would guard the infrastructure and bring to an end the destruction and vandalism that had occurred previously. The responses could mean that even with low awareness of the water sector reforms slightly more than half of the community felt that guarding water infrastructure against vandalism and theft would ensure they received water within their households.

This could be related to Marshall (1998), collective action which is defined as voluntary action taken by a group to achieve common interests in this case sustainable water provision. The action can take place through an organization such as a producer cooperative or members can participate in such action directly. In the case of Kiganjo

Community the collective action would have been inform of taking responsibility to guard water infrastructure from vandalism and theft.

4.5: Reduction in Non-Revenue Water and Sustainable Water Provision

This section evaluates indicators of reduction in non-revenue water and sustainable provision of water. A high Percentage of non- revenue water can cripple water provision as a lot of water produced cannot be accounted for and hence it is never sold to customers to enhance financial sustainability of the water system. The variables evaluated under reduction of non revenue water included; type of water connection, water usage, reports on illegal connection and bursts or leaking pipes all of which have a bearing in reduction of non revenue water and consequently sustainable provision of water.

4.5.1 Type of Water connection

The water sector reforms were intended to increase metering levels, reduce and eventually do away with flat rates connections. Flat rate connections are those connections that are not metered and their monthly charge is based on equal amount irrespective of water consumed while metered connections meant that their water passed through a water meter to determine the volume of water they consumed Table 4.14 show responses from the respondents when they were asked to indicate the type of connection in their households.

Table 4.14: Type of water connection

Type of connection	Frequency	Percentage
Flat rate	27	20.1
Metered Connection	107	79.9
Total	134	100.0

The result of the responses are tabulated in Table 4.14 and showed that 107(79.9%) responded that they had metered connections while 27(20.1%) of the respondents said they used water on flat rate basis. The high percentage of metered connections indicated that a high percentage of water could be accounted for and

would be sold to increase revenue collection and subsequently financial sustainably that would lead to sustainable provision of water. The water sector reforms were brought on board to increase efficiency in management of water so as to reduce water loss and increase water coverage.

4.5.2 Water Usage

The water sector reforms created two divisions in the Ministry of Water and Irrigation which are Water Services and Irrigation. This research was basically on water provision division which deals with domestic water provision. Table 4.15 shows responses from respondents when they were asked how they used the water supplied to them.

Table 4.15 Usage of Water

Water Usage	Frequency	Percentage
Domestic Only	125	93.3
Irrigation	0	0
Both Domestic and Irrigation	9	6.7
Total	134	100.0

The results as displayed in Table 4.15 shows that 125(93.3%) said they used the water for domestic use only while 9(6.7%) said they used the water for both irrigation and domestic. This could have resulted from WSP efforts to reduce non revenue water through having policies that only allowed the consumers to use water for domestic usage only and instituting heavy penalties to those who were found to be using water for other purposes other than domestic. If this water was to be used for irrigation it would mean many consumers would not get adequate water in their households. Therefore having many respondents saying that they used water for domestic meant more safe water would be available for consumption to other users.

4.5.3 Report on Illegal Connections

Illegal connections refer to those connections that have not been registered by the WSP and hence their water cannot be accounted for or sold to customers to raise

revenue collections. Table 4.16 shows responses from the respondents when they were asked whether they would report their neighbours who had connected themselves illegally without first registering with the WSP.

Table 4.16: Reports on Illegal Connections

Illegal Connection	Frequency	Percentage
Yes	66	49.3
No	68	50.7
Total	134	100.0

The results of the responses as tabulated in Table 4.16 shows that 66(49.3%) of the respondents said they would report their neighbours to the water service provider while 68(50.7%) said they would not make such reports.

While it is the technician’s duty (or his/her team of plumbers), to carry out network inspections daily, all members of the community are expected to be responsible for reporting leaks, illegal connections and other inappropriate or illegal behavior (such as vandalism). Reports can be made by any member of the community. It is in the community’s best interest to look after the network. According to World Bank (2006) it has been estimated that developing countries, on average, have apparent losses - in particular theft through illegal connections – accounting for about 40% of NRW. Therefore to enhance sustainable provision of water through reduction of NRW, the community must be sensitized to report all illegal connections, leaks and vandalism of water infrastructure to those charged with the responsibility of water provision.

4.5.4 Reason for not reporting illegal connection

Although community members are expected to be reporting illegal connections, they sometimes have reservations and may fail to make such reports. Table 4.17 shows the responses from the respondents when they were asked why they could not make reports on illegal connections.

Table 4.17: Reason for not reporting illegal connection.

Reasons for not Reporting	Frequency	Valid Percentage
Fear of Victimization	39	55.7
Not Concerned	19	27.1
Do not know I could report	12	17.2
Total	70	100.0

The results as tabulated in Table 4.1 indicate that 39(55.7%) of the respondents said they feared to be victimized if their neighbours who had illegal connections found out that they had reported them to the water service provider, 19(27.1%) said that they were not concerned and hence they would not make any report to the WSP while 12(17.2%) of the respondents said they were not aware that they could make such reports. The results indicate that over half of the respondents did not trust to make reports on illegal connections because they could not trust the staff from the WSP to keep their identity secret which would probably lead to them being attacked by those whom they had reported.

According to the World Bank (2006) report, the management team must act fast after reports have been filed to ensure that action is taken against water thieves and leaks are plugged within a reasonable time. If action is taken slowly or if anonymity is not respected, the community may lose confidence and trust in the Management Team and may cease to report future leaks and theft. Members of the community have to gain confidence in WSP so that when they make reports the staff members will not disclose their identity for fear of victimization. Reducing apparent losses from illegal connections is often beyond what a utility can achieve by itself, because it requires a high level of political and social support. Illegal connections are often in slums and rural areas, which mean that their regularization in some cases particularly affects the poor.

Once the user community knows the benefits of reducing NRW which include lower tariffs, they are likely to cooperate with utilities to guard against illegal connections which occur in their midst, report leakages and generally protect water

infrastructure from vandalism. The reduction of commercial losses, while politically and socially challenging, can also improve relations with the public, since some consumers may be reluctant to pay their water bills knowing that many others use services without being billed or being under billed.

4.5.5 Report on Leaking/ burst pipes

Leaking or burst pipes cause heavy loss of water if is not addressed in good time. Table 4.18 shows responses from the respondents when they were asked whether they would report leaks and burst pipes.

Table 4.18: Report on burst pipes

Report of burst pipes		
	Frequency	Percentage
Yes	89	66.4
No	45	33.6
Total	134	100.0

The results from Table 4.18 indicate that 89(66.4%) would make reports to the WSP if they came across any leaking pipes while 45(33.6%) said they would not make such reports. By 89(66.4%) of the respondents saying they would report to the WSP if they found such leaking pipes implies that a lot of water can be saved when such reports are made and appropriate action taken by the provider such as shutting of supply or repairing the pipe immediately. According to World Bank (2006), the management team must act fast after reports have been filed to ensure that action is taken by plugging off leaking pipes within a reasonable time. If action is taken slowly, the community may lose confidence and trust in the Management Team and may cease to report future leaks. This will help to reduce water loss and enhance sustainable provision of water.

4.5.6: Reasons for not Reporting

Table 4.19 indicates responses from the respondents when they were asked to give reasons as to why they would not report to the WSP if they found pipe leaks or bursts.

Table 4.19: Reasons for not making Reports on Leaking Pipes

Reasons for not Reporting	Frequency	Valid Percentage
I do not know where to report	9	17.7
Not Aware You could report	25	49.0
I do not have providers contact	17	33.3
Total	51	100.0

Table 4.19 shows the results from fifty one (51) respondents who would not make reports on leaking pipes to the WSP where 9(17.7%) of the respondents said they did not know where to report, 25(49.0%) said they were not aware they could report while 17(33.3%) of the respondents said they did not have the providers contact.

These findings indicate that the WSP has not carried out adequate sensitization to the community to enable it take responsibility of the water loss since this could deny them water if leakages are not reported on time. The reasons given by those respondents who said they would not report indicate that the WSP should sensitize the community on the importance of making such reports since this would improve on water provision in their area. When a report on leaking pipes is filed and the management and staff are slow to act, the community may lose confidence and trust and may cease to report future leaks.

4.6 Willingness to Pay for Water and Sustainable Provision of Water

Willingness to pay (WTP) is essentially the maximum amount of money that beneficiaries are willing to pay for a service. According to Bin-Seraj (2007) in the design of a tariff structure, it is essential to match households' willingness to pay with their ability to pay.

This section evaluates the willingness to pay for water by those customers connected to the piped water supply. Paying for water provision enhances the water

provider's financial sustainability which enables the provider to sustain provision of water supply to the registered customers. The variables that relate to willingness to pay for water include; frequency of water payments, priority of water payment, and distance to payment centre and effect of erroneous bill on willingness to pay for water.

4.6.1 Frequency of water Payment

The water sector reforms were meant to improve on revenue collection from water customers. Revenue collection enhances financial sustainability of the WSP. The water provider is therefore capable of improving water provision as it would be able to procure pipes and fittings for repairs and pay salaries to the staffs who maintain the water infrastructure. Table 4.20 shows responses from the respondents when they were asked how frequently they paid for their water.

Table 4.20: Frequency of water Payment

Water Payment Frequency	Frequency	Percentage
Monthly	74	55.2
Bi-monthly	30	22.4
Quarterly	13	9.7
Beyond Three Months	17	12.7
Total	134	100.0

The results in Table 4.20 shows that 74(55.2%) of the respondents indicated that they paid their water bills on monthly basis, 30(22.4%) responded that they paid their bills every two months, 13(9.7%) responded that they paid their water bills every three months while 17 (12.7%) responded that they took more than three months to pay their water bills.

Paying for water bills on monthly basis enables the WSP to meet its monthly obligations like paying for salaries, operation and maintenance and other statutory obligations all of which are meant to enhance sustainable provision of water. Since the responses from this research showed that slightly more than half paid their bills on

monthly basis, it implies that the community should be sensitized to increase their willingness to pay for their water to enhance sustainable provision of water.

4.6.2 Priority of water payment

The following are the results obtained after the respondents were asked whether payment for water provision was a priority to them. Table 4.21 shows responses from respondents when they were asked whether paying for water was a priority as compared to payment for other services in the household.

Table 4.21: Priority of water payment

Water Payment Priority	Frequency	Valid Percentage
Yes	66	49.3
No	68	50.7
Total	134	100.0

The results from Table 4.21 indicate that 66(49.3%) said that water payment was a priority while 68 (50.7%) said it was not their first priority. Water is important for sustaining life and unless community has an alternative supply, provision of water should be given first priority. When less than half of the respondents said that they did not prioritize water payment, it means they displayed low willingness to pay for water. The WSP should carryout a rigorous campaign to convince community members to make monthly payments for water if water provision has to be sustained. This is in line with international organizations such as World Bank (1997) which promote the pricing of water as a means for public water utilities to manage the allocation of existing water supplies more effectively. It therefore supports the economic concept of willingness to pay for water.

4.6.3 Customers not paying their Bills on Time

Table 4.22 shows responses the staff respondents were asked the action taken to customers who did not pay their water bills at the required time. The WSP has procedures which they use to deal with customers who do not pay their water bills on time. Through disconnection of customers who do not pay their bills on time,

encourages them to pay their bills on time. When reconnecting after disconnection there is a penalty and hence most customers are made willing to pay their water bills to avoid paying the penalty.

Table 4.22: Customers who do not Pay Bills on Time

Non Paying Customers	Frequency	Percentage
Disconnect supply	8	66.7
Wait for payment the Following Month	4	33.3
Total	12	100.0

Table 4.22 shows responses from staff respondents when they were asked how they dealt with customers who did not pay their bills on time. 8(66.7%) said they disconnected the supply to make the customer pay for water while 4(33.3%) said they waited and hoped the customer would pay their bills the following month. Although the results show that majority of the staff would disconnect water to make the Customers pay, this may not be the best solution. However the customers are sensitized to identify with the water system and its success they would be more willing to pay for their water. This could in turn enhance sustainable provision of water.

4.6.4 Effect of Distance on Regular Payment for Water

Distance to payment centers can negatively affect willingness to pay for water services especially if the customers would have to pay higher amounts for transport to payment centers than the amount in the water bill. Table 4.23 shows responses from the respondents indicating whether payment of water is given priority or not.

Table 4.23: Effect of Distance on Regular Payment for Water

Water Payment Priority	Frequency	Percentage
Yes	66	49.3
No	68	50.7
Total	134	100.00

The results as tabulated in Table 4.23 indicate that 68(50.7%) said that the distance to the payment centers did not affect their regular payment for water while 66(49.3%) said they felt the distance was a hindrance to their regular payment for water. Therefore by 66(49.3%) saying that distance to payment centers affected their willingness to pay for water means if the issue of distance was addressed then they would pay their bills more regularly and hence enhance sustainable provision of water.

4.6.5 Erroneous Water Bill

Erroneous water bills refer to faulty bills that do not match consumption of water and the amount of money in the bill. Table 4.24 shows the responses from the respondents when they were asked whether they had ever received an erroneous water bill.

Table 4.24: Erroneous Water Bill

Erroneous Water Bill	Frequency	Percentage
Yes	65	48.5
No	69	51.5
Total	134	100.0

The results were as shown in Table 4.24 where 65(48.5%) of the respondents said they had ever received an erroneous bill while 69(51.5%) said they had never received an erroneous water bill. The high percentage of erroneous bills could reflect the WSP inefficiency in reading the meters or a high percentage of faulty meters which did not produce correct readings of the amount of water produced. In such a case it is difficult to assess the volume of water sold and subsequently the revenue collected. If the billing is lower than the actual volume of water consumed, the WSP stands to lose and it is unlikely to enhance sustainable provision of water.

4.6.6 Effect of Erroneous Bills on Willingness to Pay

Erroneous water bills emanate from wrong meter readings, failure to deduct previous payments, readings from faulty meters. They result in high bills which cause dissatisfaction to the customers.

Table 4.25 shows responses from respondents when they were asked whether receiving an erroneous water bill had an effect on their regular payment for water services.

Table 4.25: Effect of Erroneous Bills on Regular Payment

Effect of on Willingness to Pay	Frequency	Valid Percentage
Waiting until error is corrected then pay	39	60.0
Paying and report error to WSP	26	40.0
Total	65	100.0

The results as tabulated in Table 4.25 shows that 38(59.4%) said that they had to wait until the error was corrected before making payments while 26(40.6%) said they paid the bill and informed the WSP of the error to make corrections. Therefore issuing erroneous water bills could lower willingness to pay for water since about three fifths of the respondents had to wait for the error to be corrected in order to pay their water bills. This implies that if the error took long to correct then it means that no payment would be made to the water provider and hence this would impact on revenue collection and consequently on sustainable water provision.

4.8. Gender Equity and Sustainable Provision of Water

This section analysis the issues that relate to gender equity in access to water to enhance sustainable provision of water to all. According to a World Bank Report (2006) Water is not 'gender neutral'. Water resource management is incomplete without a gender perspective because: Women are often the primary users of water in domestic consumption, subsistence agriculture, health and sanitation. According to a research program 'Gender and Broadening Access to Land and Water in Southern Africa'(2002), policy documents now almost automatically include discussion about the need to address gender differences in resource management and to increase efforts to identify women as key players in the reform process. Women are affected more than men when it comes to provision of water for household use because they are charged with the responsibility of providing water. The variables that relate to gender

equity in access to water include; status of water connection, period of registration, frequency of water supply, cost of water and alternative source of supply.

4.8.1 Status of Water Connection

A water connection could be active in which case the customers are accessing water within their households or inactive in which case the customer is not accessing water because the connection has been disconnected. Table 4.26 indicates responses from the respondents when they were asked the status of their water connections.

Table 4.26: Status of the Water Connection

Is your connection Active		
	Frequency	Percentage
Yes	99	73.9
No	35	26.1
Total	134	100.0

The results from responses by the respondents as indicated in Table 4.26 shows that 99(73.9%) said their connections were active while 35(26.1%) said their connections were not active because they had been disconnected by the WSP. The higher percentage of active connections is indicative that most households had piped water connection which relieves women of the responsibility to fetch water from alternative sources which may be far and of poor quality.

Access to clean water can change gender relations in the household and offer women the opportunity for productive use where their mobility is socially constrained (Sutton, 2007, Karl, 1995). But this is only possible if those responsible for making choices for the technologies for water supply, paying water bills at household level and those who attend water management meetings at community level are identified (Rydhagen, 2002). Lack of access to safe water is at the heart of the poverty trap, especially for women and children, who suffer in terms of illness, drudgery in collection of water, and lost opportunities because of the time that water collection consumes.

4.8.4 Period of Registration

To enhance sustainable provision of water, those in need of piped water connection from WSP are required by law to apply for registration by paying required levies. Table 4.27 shows responses from the respondents when they were asked the time when their water connections were registered by the WSP.

Table 4.27: Period of registration

Period of Registration	Frequency	Percentage
Before incorporation of GASWASCO	59	44.0
After Incorporation of GASWASCO	75	56.0
Total	134	100.0

The results as tabulated in Table 4.27 shows that 59(44.0%) said they were registered before incorporation of the WSP (GASWASCO), while 75(56.0%) were registered after incorporation of the WSP. This could imply that the WSP which was one of the institutions incorporated after implementation of water sector reforms had improved access to water. This was mostly beneficial for women and children who bear responsibility of fetching water from alternative sources. The Water Sector Reforms created new institutions to improve access to water which previously was low.

The WSP were registered under private companies' Act Cap 486 in order to commercialize them. This allowed WSPs to collect revenue from registered customers and plough it back to improve access to water. Therefore the period when a customer had registered had a bearing on the number of customers who were registered after enactment of Water Act 2002. This shows that 75(56.0%) of the households were able to access water after the water sector reforms were rolled out. Therefore it implies that the reforms have enhanced sustainable provision of water.

4.8.6 Frequency of Water Supply

Table 4.28 shows responses from the respondents when they were asked the frequency of water in their households. When water supply is not adequate it has to be rationed so that different areas receive water based on a predetermined schedule of supply. Based on the rationing schedule the respondents were able to give the number of times they received water from the WSP per week.

Table 4.28: Frequency of Water Supply

Satisfaction with Water Frequency	Frequency	Percentage
Once a week	52	38.8
Twice a week	57	42.5
Three times a week	17	12.7
More than three times a week	8	6.0
Total	134	100.0

The results as tabulated in Table 4.28 shows that 52(38.8%) said they received water once a week, 57(42.5%) said they received water twice a week, 17(12.7%) said they received water three times a week while 8(6.0%) said they received water more than three times a week. From this analysis it can be deduced that 82(61.2%) of the respondents received water from two times and above within a week. This conforms to a UNDP (2006) report which shows that water supply is increasing following enhanced efforts for the Millennium Development Goals (MDGs). Therefore women do not have to result to alternative sources of supply because with proper planning they could have piped water all the time.

4.8.7: Satisfaction with Frequency

Rationing of water supply to customers has its own challenges and can result to some of the customers being either satisfied or dissatisfied. Table 4.29 indicates responses from the respondents when they were asked if they were satisfied with the frequency of water supply.

Table 4.29: Satisfaction with Water Frequency

Satisfaction with Frequency	Frequency	Percentage
Yes	66	49.3
No	68	50.7
Total	134	100.0

The results of the responses are tabulated in Table 4.29 and indicate that 66(49.3%) said they were satisfied while 68(50.7%) said they were not satisfied with the frequency of water supply that they received in their households. Although less than 50.0% were dissatisfied with the frequency of supply, the WSP and associated institutions must do everything possible to enhance sustainable provision of water. This will increase customer satisfaction.

— According to the Water Act 2002, one of the strategic themes of the water sector reforms was to increase customer satisfaction in order to enhance sustainable provision of water. Therefore when 49.3% of the customers are not satisfied it should be a source of concern for the WSP. This calls for innovative procedures to increase water provision.

4.8.8 Reasons for Dissatisfaction with Water Frequency

Water customers could be dissatisfied with services provided to them by the WSP. Inadequate supply of water is one source of customer dissatisfaction. Table 4.30 shows some causes of water customers dissatisfaction as indicated by the respondents when they were asked why they were dissatisfied with frequency of supply.

Table 4.30: Dissatisfaction with Water Frequency

Reasons for Dissatisfaction	Frequency	Valid Percentage
I do not have adequate storage	42	61.8
Inconveniencing	21	30.9
Water should be availed daily	5	7.3
Total	68	100.0

The results for the responses are tabulated in Table 4.30 and indicate that that 42 (61.8%) said they did not have adequate storage and had to go to alternative supply when they exhausted their supply, 21(30.9%) said they were inconvenienced since depending on their usage of water the water got finished from their storage and they had to result to alternative supply while 5(7.3%) of the respondents felt that water should be available always. One of the strategic objectives of the water sector reforms was to attain customer and other key stakeholders' satisfaction.

The WSP and associated institutions should sensitize the customers on the need to have adequate storage because even for those systems that supply water regularly, lack of storage would still inconvenience them and leave them dissatisfied when a system failure occurs. Therefore having adequate storage within a household would ensure there is water throughout. In this case the women would not have to look for alternative supply and this ensures they have ample time for other economic activity. When water supply is not available on daily basis, customers should be sensitized to have adequate storage to store sufficient amount of water until the next cycle of supply. Customers without adequate storage will always be dissatisfied as long as water is not flowing in their taps.

4.8. 9 Rating of the Cost of Water

The water sector reforms changed the notion for water as a social good to a commercial good to improve access and efficiency. Table 4.31 shows response from the respondents when they were asked to rate the cost of water that they received from the WSP.

Table 4.31: Cost of water

Cost of Water	Frequency	Percentage
Very High	51	38.1
Moderately High	83	61.9
Total	134	100.0

The results of the responses as tabulated in Table 4.31 indicate that 51(38.1%) said the cost of water was very high while 83(61.9%) said the water was moderately high. These results could indicate that the community still views water as a social good rather than an economic good as enshrined in water sector reforms. One of the strategic themes of the water sector reforms was to achieve financial sustainability. This was to be achieved through efficient collection of revenue and its usage.

The issue of reasonable tariff can be linked to a report commissioned by GIZ in Kenya for the period 2003- 2013, which shows that prior to the reforms in the Kenyan water sector, the standard of water and sanitation services was constantly declining. This was mainly because water management was unprofessional and centralized, the infrastructure was poorly maintained, and tariffs were kept too low as a result of political influence. No pro-poor policies were in place, so the poor depended on informal, unregulated services, often provided by cartels using unlawful practices. They often had to pay five to ten times more for water of doubtful quality than consumers connected to the utilities. Although the community would be comfortable with a low tariff, the right tariff should be put in place if sustainable provision of water would be achieved to enhance gender equity in access to water.

4.8.10 Alternative Water Supply

Alternative water supply refers to other sources of water supply to the community in the absence of piped water supply within an area of supply. Table 4.32 shows responses from the respondents when they were asked what other alternative water supply they resulted to in the absence of piped water supply.

Table 4.32: Alternative Water Supply

Alternative Supply	Frequency	Percentage
River	60	44.8
Shallow well	53	39.6
Neighbours	7	5.2
Rain Water	14	10.4
Total	134	100.0

The results from the responses are tabulated in Table 4.32 indicating that 60(44.8%) of the respondents said that they fetched water from the river, (53)39.6% from shallow wells, 14(10.4%) from rain water while only 7(5.2%) obtained water from their neighbours. The results indicate that 60(44.8%) fetched water from the river which are normally highly polluted due to the farming activities of the local community. Those who result to shallow wells are not aware that the source could be highly polluted depending on the distance from the pit latrines which are characteristic of rural households. Therefore resulting to alternative water supply could endanger the lives of the community through consumption of water that is not safe and could cause water borne diseases such as typhoid, diarrhea and many others.

According to Black (1998), Lack of access to safe water is at the heart of the poverty trap, especially for women and children, who suffer in terms of illness, drudgery in collection of water, and lost opportunities because of the time that water collection consumes. In rural Africa, according to the World Bank, 40 million hours are spent each year in collecting water for domestic use and half of Africa's population is without access to safe water (Black, 1998).

Therefore lack of access to safe and adequate water at reasonable distances to the households compromises gender equity in access to water. According Lenton, et al. (2008) ensuring easy access to adequate amounts of good quality water by extending provision of water services to rural households in a coordinated and inclusive approach for all people is central to promoting gender equity. Therefore by having 99(73.9%) of the water connections active shows that majority of households are accessing piped water at their households and hence ensuring gender equity in access to safe water.

CHAPTER FIVE :SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of findings, conclusions and recommendations of the study which sought to evaluate the influence of water sector reforms in enhancing sustainable provision of water in Kiganjo Division within Gatundu South Constituency. The findings were specifically on influence of community participation, reduction of non-revenue water, willingness to pay for water and gender equity to enhance sustainable provision of water.

5.2 Summary

Below are summary of findings on water sector reforms, community participation, reduction of non revenue water, willingness to pay for water and gender equity in access to water.

5.2.1 Demographic Characteristics of the respondents.

Questionnaires were administered to one hundred and thirty four (134) respondents, of which 83 (61.9%) were females and 51 (38.1%) were male. The study established that 97(72.2%) of the respondents were from forty (40) years and above which could mean that they had long experience of water provision in the area and were able to comment on the difference in service provision by different WSPs over the years. 100(74.6%) of the respondents had primary level education and below which meant that literacy levels were inadequate and the researcher and her assistants had to interpret the questionnaire to the respondents. Majority of the respondents 108 (80.6%) had low annual incomes ranging from Ksh. (0-100,000). This is a negative trend because even if they would be willing to pay for water services, they may not have adequate resources.

5.2.2 Community Participation and Sustainable Provision of Water

According to a UN (2006) report water sector reforms are advocated as a way to address sustainable water provision in developing countries. The study carried out in Kiganjo Division within Gatundu South Constituency found that 120(89.6%) of the respondents were not aware of the water sector reforms. This is probably because the institutions involved in implementation of water sector reforms and specifically Water Act 2002 had not carried out thorough sensitization and mobilization within their service area.

The strategic themes of water sector reforms in Kenya were to among other things improve on service delivery and specifically provision of adequate and safe water. In this study performance of water service providers was rated by the respondents as follows: 50(37.3%) was rated as high performance, 61(45.5%) as average performance and 23(17.2%) rated as poor performance. The quality of water was rated as follows: 56(41.8%) as of high quality, 67(50.0%) as of average quality and (11) 8.2% as of poor quality. The respondents said there was improvement both in service provision and water quality in comparison with the previous water provider.

This study found that 106(79.1%) of the respondents had never attended public Barazas called by the water service provider to sensitize them on issues of sustainable water provision. During this public Barazas the community is sensitized on their role in enhancing sustainable water provision which includes representation in the Water Board which is at the policy level of the water service provider. However the study found that 110(82.1%) of the respondents did not know that such a board existed while 115(85.8%) did not know the directors who represented their interests at the board level.

5.2.4 Reduction of Non- Revenue Water and Sustainable Provision of Water

Non –Revenue Water (NRW) is defined as the difference between the amount of water put into the distribution system and the amount of water billed to consumers. The water lost if quantified in terms of revenue amounts to huge amounts of money. The water loss result from mode of water connection; metered or flat rate, illegal connections, leakages from burst pipes, inefficient metering devices and meters that are not read consistently which result in erroneous bills.

This research study found out that 107(79.9%) of the registered customers had metered connections and only 27(20.1%) of the respondents said they were on flat rate. This is positive and would greatly reduce the Percentage of non- revenue water. The study also found out that (125) 93.3% of the respondents used their water for domestic use only while only (9) 6.7% used the water for both domestic and irrigation.

The research further found out that 66(49.3%) of the respondents said they would report their neighbors who had connected themselves illegally to the piped water system without registering with the water service provider while (68) 50.7% of the respondents said they would not report the illegal connections because they feared to be victimized if they

were found out by their neighbors or they did not know they could report. 89(66.4 %) of the respondents said they would report to the water service provider if they came across any leaking pipe. A lot of water is lost when a pipe bursts and when members of the public call to report such leaks is positive as this would prevent a lot of water being lost and hence enhance sustainable provision of water.

5.2.5 Willingness to Pay for Water and Sustainable Provision of Water

Willingness to pay (WTP) is essentially the maximum amount of money that beneficiaries are willing to pay for a service. It can be measured under different aspects of service provision. The research established that 74(55.2%) paid their water on monthly basis after receiving their water bills while 60(44.8%) took from two months and above to pay their water bills. Responses from the respondents indicated that 66(49.3%) placed water payment as a priority when it came to payment for services. Of the sampled respondents 66(49.3%) said their regular payment was affected by the distance to the payment centre.

Erroneous water bills comprise of monthly bills with exaggerated readings and thus are very high compared to the actual consumption of the customer. They could also comprise of bills where previous payment by the customer has not been deducted thus showing more money than the customer has actually consumed. The study showed that 65(48.5%) of the respondents had ever received erroneous bills out of this number 39(60.0%) said they paid their bills and reported the error to the water service provider and 26(40.0%) said they waited for the error to be corrected before making payments.

5.2.6 Gender Equity and Sustainable Provision of Water

Gender equity in access to water refers to fairness and justice for both men and women when it comes to access to water. This research study looked at households with active water connections, 99(73.9%) had active water connections while 35(26.1%) had inactive connections. The responses from the respondents on the period of registration showed that 59(44.0%) were registered before registration of the WSP while 75(56.0%) were registered after the incorporation of the WSP. This could indicate that water sector reforms had an influence on gender equity in access to water as more than half of the registered customers did so when the WSP took over management of water provision in Kiganjo Division.

The study established that water supply was not available on daily basis with 52(38.8%) saying they received water once a week, 57(42.5%) twice a week while 25(18.7%) received water more than twice a week. When responding to the question on whether they were satisfied with this frequency, 42(61.8%) responded that they were dissatisfied because they did not have adequate water storage while 21(30.9%) said the frequency was inconvenient. Over the cost of water 51(38.1%) responded that it was very high while 83(61.9%) said that water was moderately high.

The study established that when the piped water supply was not available the community would turn to alternative water sources which include river, shallow wells, neighbours or rain water. 60(44.8%) had the river as alternative supply, 53(39.6%) had shallow wells, 14(10.4%) used rain water while 7(5.2%) turned to neighbours for their water supply.

5.2 Conclusion of the Study

One of the research objectives was to evaluate the extent to which water sector reforms has influenced community participation in enhancing sustainable provision of water. Therefore it can be concluded that ten years after the rollout of the water sector reforms little community mobilization and sensitization has been carried out by relevant water institutions and community members are yet to know their role in enhancing sustainable provision of water.

The study was to evaluate the influence of water sector reforms in reducing non revenue water. From the findings it can be concluded that by having a high majority of customers having metered connection, community members willing to report to WSP on illegal connections and leaking and burst pipes and having majority of customers using water for domestic could significantly reduce the percentage of non revenue and hence enhance sustainable provision of water.

On the determination of willingness to pay for water it can be concluded that although the researcher found that it was difficult to evaluate the objective, by having enablers such as monthly payment of water bills, prioritizing of water payments, partnering with financial institutions to address the distance to payment centers would boost willingness to pay for water and enhance sustainable provision of water.

It can be concluded that the study established that there was gender equity in access to water because majority of households had active water connections and hence women who are charged with the responsibility of drawing water did not have to go to alternative sources of water. Another conclusion from the study is that those who did not have adequate storage of water were not satisfied with water rationing program in place and therefore the WSP and related institutions should sensitize the community members on importance to have adequate storage of water. This would enhance gender equity in access to water.

5.4 Recommendations of the Study

The following are the recommendations arrived at from the research findings:

1. It emerged from the study that majority of community members lack knowledge of the water sector reforms and their influence in enhancing sustainable provision of water. Therefore the Water Provider and institutions charged with implementation of the water reforms and specifically the Water Act 2002 should carryout rigorous community mobilization and sensitization if they are to succeed in enhancing sustainable provision of water.
2. The Board and Management of the WSP should carryout Corporate Social Responsibility (CRS) that would allow communities know more about the WSP and how it is governed. This should include partnering with local community in clean-up exercises of the local townships, branding of local institutions like nursery schools, installing braded dustbins, planting trees, branding all the Company infrastructure like tanks, treatment works, offices and marking water pipelines.
3. The water provider should come up with innovative ways of addressing the distance to payment centers which reduce willingness to pay for water. This would include opening accounts with banks that have opened agencies in rural townships and through mobile money transfers. This would make it more convenient for community members to pay their bills within their areas and at their convenience. This would boost revenue collection and increase financial sustainability and hence enhance sustainable provision of water.

4. The WSP should capacity build their staffs on effective ways of conducting meter readings in order to reduce incidences of erroneous bills which reduce willingness to pay for water.
5. The water supply system should be augmented to increase water production and hence increase the water frequency. This would ensure the community gets water more frequently and reduce their dependency on alternative water sources which are of poor quality and could result in spread of water borne diseases.

5.5 Suggestions for further Researches

1. The researcher recommends the following areas for future studies. Since the research focused on a small area within Kiganjo Division in Gatundu South Constituency, the researcher recommends that a similar research be carried out in the whole of Gatundu South Constituency.
2. The researcher suggests that future studies should use interview schedules and involve respondents in discussion other than the closed ended questionnaires that this researcher used. This would elicit more information from the respondents that would bring out more information and suggestion for further improvement to enhance sustainable provision of water.
3. The researcher further suggests that future researches should evaluate more methods of reducing non revenue water which has implication on sustainable provision of water.

REFERENCES

- African Development Bank. (2010). *The Issues and Challenges of Reducing Non-Revenue Water in Developing Countries*. ADB publication
- Abbott, J. (1996). *Sharing the City. Community participation in urban management*, London. Routledge London & New York
- Altaf, M. A., Jamal H. & Whittington, D. (1992). *Willingness to Pay for Water in Rural Punjab, Pakistan. UNDP–World Bank, Water and Sanitation Programme*. Washington, DC, World Bank. (Water and Sanitation Report No. 4.)
- Altaf, A., Whittington, D., Haroon, J. & Smith, V. K. (1993). *Rethinking rural water supply policy in the Punjab, Pakistan. Water Resources Research*, 29, 1943-1954.
- Anand, P.B. (2007). *Right to water and access to water: An Assessment*, J. Int. Dev (19) 511- 526 Punjab, Pakistan. Water and Sanitation Report 4. Washington DC:
- Bayliss, K. (2003). 'Utility Privatisation in Sub-Saharan Africa: A Case Study of Water', *Journal of Modern African Studies* 41(4): 507–31.
- Beetham, D. (1992). 'Liberal democracy and the limits of democratization' in D. Held (ed.) *Prospects for Democracy. North, South, East, West*, Cambridge.
- Best J. W (1981). *Research in Education* (4th Edn). Prentice Hall . U.S.A
- Bin-Seraj, F.K. (2007). *Willingness to Pay for Improved Sanitation Services*. BRAC Research and Evaluation Division (RED). Bangladesh, BRAC Publication.
- Black, M. (1998). *Learning What Works: A 20-Year Retrospective View on International Water and Sanitation Cooperation (1978 -98)*. Washington DC: UNDP/World Bank Water and Sanitation for Health Program. Paper prepared for the workshop entitled 'Legal Aspects of Water Sector Reforms' organized in Geneva from 20 to 21 April 2007 by the International Development Agency.
- Bossert, T.J. (1989). *Sustainability in Africa: A.I.D. Health Projects in Zolre, Senegal and Tanzania*. Washington, D.C. U.S. Agency for International Development
- Briscoe, J., & Garn, H. A. (1995). *Financing water supply and sanitation under Agenda 21*. Forum, 19(1), 59–70.
- Brikke, F. (2000). *Operation and Maintenance of Rural Water Supply and Sanitation Systems*. Netherlands, RC International Water and Sanitation Centre.
- Buckingham, S. (2000). *Gender and Environment*. Routledge London & New York

- Carter, R.C., & Danert, K. (2003). The Private Sector and Water and Sanitation Services – Policy and Poverty Issues. *Journal of International Development*, 15, 1067-1072.
- Craig, G. & Mayo, M. (eds.)(1995). Community Empowerment. A reader in participation and development, of Water and Environmental Management, 13, 292-296. London
- Coopers & Lybrand Co. (1988). 'Re-organization Study of the Water and Sanitation Sector in Zambia'. Final Report. Sponsored by the Government of the Republic of Zambia, the United Nations Development Programme and the World Bank. Lusaka: Government of the Republic of Zambia.
- Cullet, P. (2006). 'Context of Water Sector Reforms' Prepared for the 5th IWMI-TATA Annual Partners' Meeting, 8-10 March 2006, IRMA, Anand', School of Oriental and African Studies (SOAS) – University of London.
- Dudley, E. (1993). *The Critical Villager. Beyond community participation*. London
- Dagdeviren, H. (2006) 'Re-visiting Privatization in the Context of Poverty Alleviation: The Case of Sudan', *Journal of International Development* 18(3): 469–89.
- Gbadegesin N. & Olorunfeni F. (2007). *Assessment of Rural Supply Management in selected Rural Cities of Oyo State Nigeria*. African Technology Policy Study Networks (ATPS) Working Paper Series No. 49.
- Hall, D. & Lobina, E. (2004). 'Private and Public Interests in Water and Energy', *Natural Resources Forum* 28
- Harris, C. (2003). 'Private Participation in Infrastructure in Developing Countries'. Working Paper No 5. Washington, DC: The World Bank.
- Hoering, U. & Schneider, A.K. (2004). King Customer. *The World Bank's "New" Water Policy and its Implementation in India and Sri Lanka*. Broffur die Welt: Stuttgart.
- Karl, M. (1995). *Women and Empowerment, participation and decision making*, Zed books Ltd. London & New Jersey.
- Kaufmann, R. (2005). Water, Sanitation and Hygiene Interventions for Health – What Works? *Environment Matters. The World Bank Group. Annual Review*. July 2004- June 2005: 24-25. 31
- Kessides, I.N. (2004). *Reforming Infrastructure: Privatization, Regulation, and Competition*. Oxford and New York: Oxford University Press for the World Bank.
- Kim, L. (1998). *Willingness to Pay for Water at the Household Level: individual financial responsibility for water consumption*. A research study carried out in village of Kelara

- Kirkpatrick, C. & Parker, D. (2006). 'Domestic Regulation and the WTO: The Case of Water Services in Developing Countries', *World Economy* 28(10): 1491–1508.
- Kombo D. K. & Tromp L. (2006). *Proposed Thesis Writing*. Pauline Publications
- Kothari, C.R. (2007). *Questionnaire Techniques*. (3rd Edn.) Vikas Publishing House PUT Ltd. New Delhi and Nairobi Kenya.
- Kumar R. (1999). *Research Methodology. A step-By-step Guide for Beginners*. Sage Publications London, UK.
- John Wiley & Sons. (1996). Supply programmes in less-developed countries. *Journal of the Chartered Institution of Water and Environmental Management* Ltd. 10, (2), 130-136.
- Lenton, R., Lewis, K., & Wright, A.M. (2008). Water, Sanitation and the Millennium Development goals, *Journal of International affairs; Spring 2008 Global* pg 247
- Lenzen, M. (2002). *The influence of lifestyles on environmental pressures*. Environmental Law Research Centre (IELRC).
- Martimort, D. (2006). 'An Agency Perspective on the Costs and Benefits of Privatization', *Journal of Regulatory Economics* 30: 5–44.
- Mayo, M. (1994). *Communities and Caring. The mixed economy of welfare*, London: Macmillan. Investment for the Long Term: An Introduction', *Utilities Policy* 12:203-
- Mbwesa J. K. (2006). *Introduction to Management Research*. Basic Management Consultants
- Midgley, J., Hardiman A., M. & Narine, D. (1986). *Community Participation, Social Development and the State*, London
- Mugenda M.O. & Mugenda A. G. (1999). *Research methods qualitative and Quantitative approach*. Acts Press. Nairobi
- Murphree M.W. (1991). *Communities as Institutions for Resource Management* Harare, CASS University: Loughborough, UK.
- Murombedzi J. (1991). *Wetlands Conservation Under Common Property Management Regimes*, Harare, CASS, University: Loughborough, UK.
- Njuguna, J. & Valdivia C. (2005). Motivation for collective action: A case study of Western Kenya. Paper presented at the *CAPRI International Research Workshop on Gender and Collective Action*, Chiang Mai, Thailand, October, 2005.
- Nyanchaga, E. N. & Ombongi, K. S. (1987). *History of Water Supply and Sanitation in Kenya, 1895-2002* in Juuti, Katko and Vuorinen (Eds.) *Environmental History of*

- Water (IWA Publishing 2007), Section on Independent Kenya (1963–1980): pp.280-286. Retrieved 24 March, 2010
- Orodho, A. J. (2004). *Techniques of writing research project report and reports in education and science*. (1st Edn) Reata Printers Nairobi
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. New York, NY, U.S.A.: Cambridge University Press.
- Pahl-Wostl, C. (2002). 'Towards sustainability in the water sector – The importance of human actors and processes of social learning', *Aquat. Sci.*, vol. 64, pp. 394–411.
- Panda, S.M. (2005). Women's collective action and sustainable water management: Case of SEWA's water campaign in Gujarat, India. Paper presented at the CAPRI Research Workshop on Gender and Collective Action, Chiang Mai, October, 2005
- Pearce, D. & G. Atkinson. 1993. "Measuring Sustainable Development." *Ecodecision* . No. 9. June. New York, NY, U.S.A.: Cambridge University Press.
- Pretty R. (1990). Evaluation Guidelines for Community-Based Water and Sanitation Profile &. WASH Technical Report No. 64. Arlington, Va.: Water and Sanitation for Health Project.
- Priya, S.(2006). 'Water, Law and the Commons' in India, World Bank, 1999a, *Initiating and Sustaining Water Sector Reforms*: Paper prepared for A Synthesis, World Bank, Washington DC and Allied Publishers Limited, Mumbai.
- Robbins, P.T. (2003). Transnational Corporations and the Discourse of Water Privatization. *Journal of International Development*, 15, 1073-1082.
- Rogerson, C. (1996). *Willingness to pay for water: The international debates*, *Water SA*, 22(4), p373-80
- Schur, M (1994). The need to pay for services in the rural water sector, *South African Journal of Economics*, 62(4), p419-431
- Seiderman A. et al (eds) (1992). *Transforming Southern African Agriculture*, African World
- Sharma et al (1996). *African Water Resources: Challenges and Opportunities for Sustainable Development*, Washington D.C, World Bank.
- Shirley, M.M., Xu, L.C. & Zuluaga, A.M. (2002). 'Reforming Urban Water Supply: The Case of Chile', in M.M. Shirley (ed.) *Thirsting for Efficiency*, pp. 189–231. Washington, DC: The World Bank.
- Singleton R. A. Jr. & Straights, B.C. (1999). *Approaches to Social Research* (3rd Edn). Oxford University Press.

- Sittoni, T. (2005). *Managing Perceptions of the Reform Process. Kisima: a forum for analysis and debate on water and sanitation issues in Kenya*, February 2005, 5.
- Skinner B. (2003). *Individual project*. A WEDC Postgraduate Module. Loughborough University: Loughborough, UK.
- Smith, L. (2006) 'Neither Public Nor Private: Unpacking the Johannesburg Water Corporatization Model'. Social Policy and Development Programme Paper No 27. Geneva: United Nations Research Institute for Social Development.
- Spencer & Smith, L. (2006). *Neither Public Nor Private: Unpacking the Johannesburg Water*
- Sutton, S. (2007). *Introduction to self supply, putting the user first, incremental improvements and private investment in rural water supply*, SKAT foundation.
- United Nations Conference on Environment & Development (UNCED). (1992). *Earth Summit*.
- UNDP.(2006). *Human Development Report 2006. Beyond Scarcity: Power, Poverty and the Global Water Crisis*. London: Palgrave Macmillan for United Nations Development Programme.
- US Agency for International Development(USAID) (1996). *Environmental Health Project, Coping with Intermittent Water Supply: Problems and Prospects*, Dehra Dun, Uttar Pradesh.
- UNHRC (2006). Report of the independent expert on the issue of human rights obligations related to access to safe drinking water and sanitation, Catarina de Albuquerque A/HRC/12/24), 1 July 2009, <http://www2.ohchr.org>
- Whittington, D. & Swarna, V. (1994). *The economic benefits of potable water supply projects to households in developing countries*. Economic Staff Paper no. 53, Asian Development Bank.
- Winpenny, J. T. (1994). *Managing Water as an Economic Resource*, Routledge, London

APPENDIX I

LETTER OF INTRODUCTION

Esther W. Njuguna

P.O. Box 4198-01002,

THIKA.

Dear Sir/Madam,

**RE: COLLECTION OF DATA ON INFLUENCE OF WATER SECTOR REFORMS
IN ENHANCING SUSTAINABLE PROVISION OF WATER**

I am a student of Master of Arts in Project Planning & Management at the University of Nairobi – Thika Extra- Mural Centre. My registration Number is L50/65161/2010. I am conducting a study titled ‘Influence of Water Sector Reforms in Enhancing Sustainable Provision of Water’ in Kiganjo Division within Gatundu South Constituency.

To facilitate this study, you have been randomly selected as a participant in answering the questionnaire. You are requested to respond to all the questions as your response will be very useful to this study.

Please be assured that any personal information will be treated with utmost confidentiality.

Thank you for your participation.

Yours faithfully,

ESTHER W. NJUGUNA

RESEARCHER

APPENDIX II: LETTER OF AUTHORITY TO COLLECT DATA

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2213489
254-020-300571, 2213123, 2219420
Fax: 254-020-318245, 318249
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: NCST/RCD/14/012/585

Date: 28th May 2012

Esther Wanjiru Njuguna
University of Nairobi
P.O.Box 30197-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Influence of water sector reforms in enhancing sustainable provision of water: Case of Kiganjo Division of Gatundu South Constituency."* I am pleased to inform you that you have been authorized to undertake research in Gatundu District for a period ending 31st July, 2012.

You are advised to report to the District Commissioner and the District Education Officer, Gatundu District before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report thesis to our office.

**DR. M. K. RUGUTT, PhD HSC,
DEPUTY COUNCIL SECRETARY**

Copy to:

The District Commissioner
The District Education Officer
Gatundu District.

"The National Council for Science and Technology is Committed to the Promotion of Science and Technology for National Development"

PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Esther Wanjiru Njuguna
 of (Address) **University of Nairobi**
P.O.Box 30197-00100, Nairobi
 has been permitted to conduct research in

Gatundu South
Central
 District

Local District
Province

on the topic: **Influence of water sector reforms in enhancing sustainable provision of water: A case of Kiganjo Division, Gatundu South Constituency.**

for a period ending: **31st July, 2012.**

PAGE 3

Research Permit No. NCST/RCD/14/012/585
Date of Issue: 28th May 2012
Fee received: KSH. 1,000

Applicant's Signature

Secretary
National Council for Science & Technology

Appendix III: Questionnaire for Community Respondents

This research is being carried out on influence of water sector reforms in enhancing sustainable provision of water. The aim is to determine the influence of water sector reforms in promoting community participation, to evaluate the influence of water sector reforms in enhancing reduction of Non Revenue Water, to determine the influence of water sector reforms in enhancing community willingness to pay for water and to establish the influence of water sector reforms in promoting gender equity in access to water. The purpose is to increase the understanding of how the community can be empowered through involvement in implementation of water sector reforms in order to enhance sustainable provision of water. Please tick where appropriate. Your cooperation, response and time are highly appreciated.

SECTION ONE: Respondents background

1) Sex of the respondent.

i. Male

ii) Female

2) How old are you i) (20-29) ii) (30-39) iii) (40- 49) iv) Over 50

3) What is the highest level of education you have attained?

i) No Education

ii) Primary

iii) Secondary

iv) Tertiary

4) What is your annual household income?

i. Ksh. 0-100,000.

ii) Ksh. 100,001- 300,000

iii. Ksh. 300,001- 500,000.

iv) Ksh. 500, 001 and above

SECTION TWO: Water Sector reforms

5) Have you heard of Water Sector Reforms?

i) Yes

ii) No

6) If yes from whom did you hear?

i. Media

ii) Gatundu South Water Staff

iii) Neighbors

7) . Have you noted any difference in performance before and after GASWASCO took over the management of water in your area?

i) Yes

ii) No

8). If Yes how can you rate the quality of service you receive since GASWASCO took over operation of water in Gatundu South Constituency?

i) High

ii) Average

iii) Low

9) How can you rate the quality of water you receive from WSP?

i. High Quality

ii) Average quality

iii) Poor quality

i) Yes

ii) No

22) Does the distance to the payment centre hinder you from making regular payment?

i) Yes

ii) No

SECTION SIX: Gender Equity and Sustainable Provision of Water

23.) Is your Water connection active?

i) Yes

ii) No

24) If No why is your connection not active?

i) Disconnected for non payment ii) Requested for disconnection

25) How can you rate the cost of water?

i) Very high ii) moderately high iii) low

26) How often do you receive your water?

i. Once a week ii) Twice a week iii) Three times a week v) through out the week

27) Are you happy with this frequency of supply?

i) Yes

ii) No

28) If No why not?

i) I do not have adequate storage ii) Inconveniencing

iii) Water should be available always

29) When your connection is inactive or you are not receiving piped water supply, what is your alternative supply?

i) River

ii) Shallow Well

iii) Neighbors iv) Rain water

APPENDIX IV: Questionnaire for Staff Respondents

This research is being carried out on influence of water sector reforms in enhancing sustainable provision of water. The aim is to determine the influence of water sector reforms in promoting; community participation, reduction of Non Revenue Water, willingness to pay for water and to gender equity in access to water. The purpose is to increase the understanding of how the community can be empowered through involvement in implementation of water sector reforms in order to enhance sustainable provision of water. Please tick where appropriate. Your cooperation, response and time are highly appreciated.

SECTION ONE: Respondents background

1) Sex of the respondent.

i. Male

ii) Female

2) How old are you i) (20-29) ii) (30-39) iii) (40- 49) iv) Over 50

3) What is the highest level of education you have attained?

i) Primary ii) Secondary iii) College iv) University

4) Are you seconded or employed by the Company?

i) Seconded ii) Company employee

4) What is your position in the Company?

i) Management ii) Scheme Manager iii) Other Staff

SECTION TWO: Review of Water Sector Reforms

5) When you interact with your water customers do you take a few minutes to sensitize them on the water sector reforms?

i) Yes

ii) No

6. Are there instances when you supply water that is of poor quality to your customers?

i) Yes

ii) No

7) If yes when are those instances?

i) After pipe has been repaired after burst ii) When the treatment works break down

iii) When the filters are being cleaned and the treatment system is by- passed to maintain continuous flow to customers.

SECTION THREE: Community Participation and Sustainable Provision of Water

8) Does your Company organize public meetings/ Stakeholder meetings to communicate to your water customers?

i) Yes

ii) No

9) If Yes, how often are such meetings?

- i) Monthly ii) Bi- Monthly iii) Quarterly iv) Yearly

SECTION FOUR: Non- Revenue Water and Sustainable Provision of Water

10) Do your Customers report leaking pipes or bursts in their area?

- i) Yes ii) No

SECTION FIVE: Willingness to Pay for Water and Sustainable Provision of Water

11) Do your customers pay their water Bills on time?

- i) Yes ii) No

12) If No how do you deal with such customers?

- i) Disconnect their Supply until payments are made
ii) Wait and hope the customer will pay the following month.

SECTION SIX: Gender Equity and Sustainable Provision of Water

13.) Are there customers whose connections are not active?

- i) Yes ii) No

14) Do your customers complain of the high cost of water?

- Yes ii) No

15) Do you ration your water Supply?

- Yes ii) No

16) If Yes, how often do you supply water to your customers?

- ii. Once a week ii) Twice a week iii) Three times a week v) through out the week

Appendix V: C.K. Morgan Table

N	S	N	S	N	S
10	10	200	134	1200	291
15	14	220	140	1300	297
20	19	225	142	1400	302
25	24	230	144	1500	306
30	28	240	148	1600	310
35	32	250	152	1700	313
40	36	260	155	1800	317
45	40	270	159	1900	320
50	44	280	162	2000	322
55	48	290	165	2200	327
60	52	300	169	2400	331
65	56	320	175	2600	335
70	59	360	181	2800	338
75	63	380	186	3000	341
80	66	400	191	3500	346
85	70	420	196	4000	351
90	73	440	201	4500	354
95	76	460	205	5000	357
100	80	480	210	6000	361
110	92	500	214	7000	364
120	97	550	217	8000	367
130	103	600	226	9000	368
150	110	650	234	10000	369
175	122	700	242	11000	370

Table 1: for Determining Sample Size from a Given Population

Source: Robert V. Krejcie (1970) *Determining Sample Size for Research Activities*.

University of Minnesota, Duluth. N- Population Size; S- Sample Size

APPENDIX VI: KENYA WATER INSTITUTIONS AFTER ENACTMENT OF WATER ACT 2002

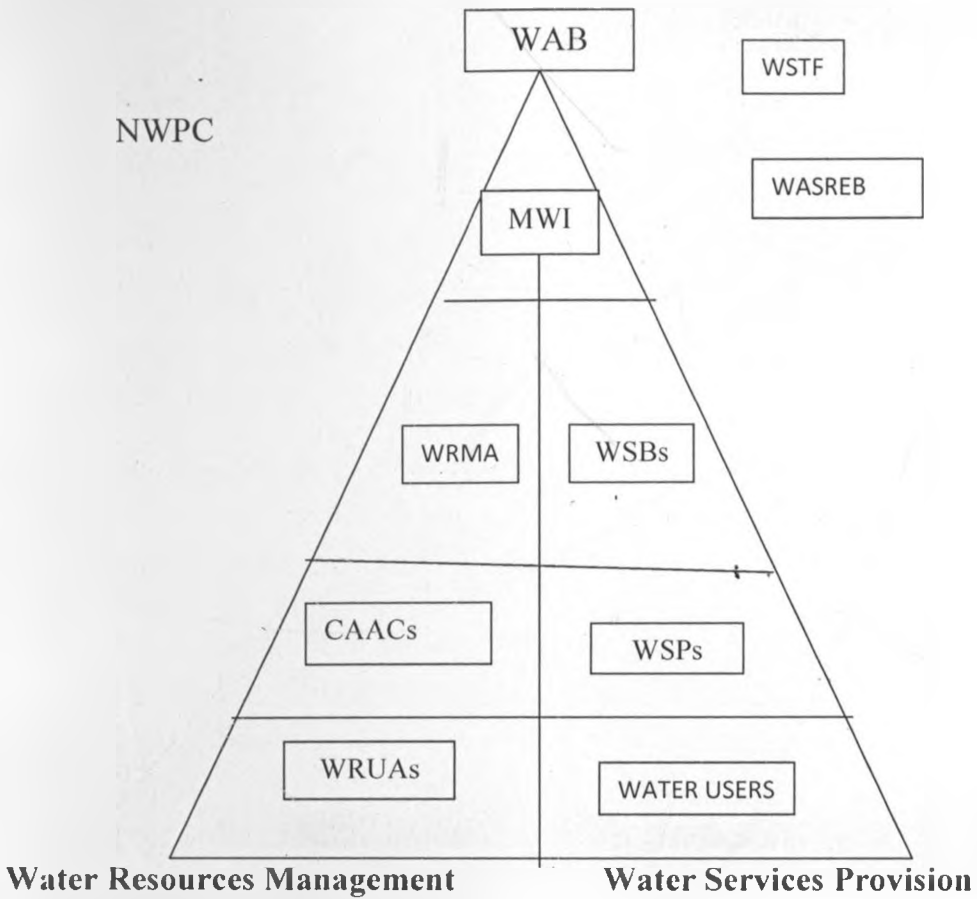


Fig. 2: Water Sector Institutions

- WAB - Water Appeals Board
- MWI - Ministry of Water & Irrigation
- WSB - Water Services Boards
- WSPs - Water Services Providers
- WRMA - Water Resources Management
- CAACs - Catchment Area
- WRUAs - Water Resources Users Association
- WSTF - Water Services Trust Fund
- NWPC - National Water & Pipeline Corporation