

**THE ROLE OF COMMUNITY WATER PROJECTS IN
ALLEVIATING POVERTY: A SURVEY OF BUURI DIVISION, BUURI
DISTRICT.**

BY

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A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN
PROJECT PLANNING AND MANAGEMENT, UNIVERSITY OF NAIROBI.

2009.

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DECLARATION

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

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DEDICATION

The research project is dedicated to my fiancée grace Wangari and my three sisters; Josephine, Caroline and Nancy. Your challenges and encouraging words have been very instrumental in the completion of this work. Struggle is the meaning of life, the pessimists complain about the wind but the optimists expect it to change.

ACKNOWLEDGEMENT

I would like to thank my supervisors, Professor Timothy Maitho and Mr. Wilson Muema for the support and guidance they have given to me.

My sincere gratitude also goes to my family and my fiancée for their support throughout the study period especially my dad who guided and counseled me when going got tough. Thank you dad.

To my classmates, thank you so much for your support. When the going got tough, you encouraged me to keep moving.

Finally, I thank the Almighty for giving me strength to complete writing this research report. Without God's blessings, all this would not have been possible.

ABSTRACT

The study aimed at investigating the role of community water projects in alleviating poverty in Buuri division of Buuri District. The main objective was to determine if community water projects contribute to poverty alleviation in Buuri division.

The study adopted the descriptive survey design and data was collected using a questionnaire through simple random sampling. The total population was 8000 households and a sample of 203 households was selected to be involved in the study. Data was analyzed using the statistical package for social sciences and the results of the analysis presented in form of frequency tables.

The findings of the study indicated that; community water projects have led to a reduction in water collection time in Buuri division, that water from these water projects has been utilized in various ways including, (domestic uses, small-scale irrigation and in the business of selling water), that the time saved on water collection has been utilized in economically productive activities which lead to an increase in the income and a decrease in the daily expenditure due increase in production and therefore leading to poverty alleviation in Buuri division.

The conclusions were: community water projects have led a reduction in water collection time, that water from these projects has been utilized mainly for domestic use and small scale irrigation and hence the community water projects have contributed greatly towards poverty alleviation in Buuri division.

TABLE OF CONTENTS

	PAGE
Title page.....	i
Declaration	ii
Dedication	iii
Acknowledgement	iv
Abstract.....	v
Table of contents.....	vi
List of appendices.....	ix
List of tables.....	x
List of abbreviations	xi
 CHAPTER ONE: INTRODUCTION	 1
1.1 Background to the study.....	1
1.2 Statement of the problem	3
1.3 Purpose of the study	4
1.4 Objectives of the study.....	4
1.5 Research questions.....	5
1.6 Significance of the study	5
1.7 Scope of the study	6
1.8 Limitations of the study	7
1.9 Assumptions of the study.....	7
1. 10 Definition of terms.....	7

CHAPTER TWO: LITERATURE REVIEW..... 9

2.1 Introduction..... 9

2.2 Theoretical review of literature..... 9

2.3 Empirical review of literature 14

2.4 Conceptual frame work 17

2.5 Water projects management..... 18

CHAPTER THREE: RESEARCH METHODOLOGY..... 19

3.1 Introduction 19

3.2 Research design 19

3.3 Target population 20

3.4 Sampling design 20

3.5 Data collection methods and procedures..... 21

3.5.1 Data collection instrument..... 21

3.5.2 Reliability of the instrument..... 21

3.5.3 Validity of the instrument..... 22

3.6 Operational definition of variables..... 22

3.7 Data analysis methods and justification..... 23

**CHAPTER FOUR: DATA ANALYSIS, PRESENTATION, AND
INTERPRETATION..... 24**

4.1 Introduction..... 24

4.3 Data presentation..... 24

4.3.1 General information..... 24

4.3.2 Reduction in water collection time..... 28

	PAGE
4.3.3 Utilization of water from community water projects.....	29
4.3.4 Economic benefits of community water projects.....	30
4.3.5 Contribution of water projects in poverty alleviation.....	32
4.4 Summary of the chapter.....	35
 CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND	
RECOMMENDATIONS.....	36
5.1 Introduction.....	36
5.2 Summary of findings as per research objectives.....	36
5.3 Conclusions.....	38
5.4 Recommendations.....	39
5.4.1 Recommendations for policy makers.....	39
5.4.2 Recommendations for programmes.....	39
5.4.3 Recommendations for further research.....	40
 REFERENCES.....	 41
 APPENDICES.....	 46

LIST OF APPENDICES

	PAGE
Appendix I Questionnaire.....	46

LIST OF TABLES

	PAGE
Table 3.4.1 Sample size per location.....	20
Table 3.6 Operational definition of variables.....	22
Table 4.3.1.1 Gender.....	25
Table 4.3.1.2 Distribution of water projects.....	25
Table 4.3.1.3 Level of education.....	26
Table 4.3.1.4 Sources of income.....	27
Table 4.3.1.5 Main sources of water in the households.....	27
Table 4.3.2.1 Reduction in water collection time.....	28
Table 4.3.2.2 Water collection time before and after joining water project.....	28
Table 4.3.3.1 Main uses of water.....	29
Table 4.3.3.2 Crops grown by irrigation.....	30
Table 4.3.4.1 Average expenditure per day.....	31
Table 4.3.4.2 Utilization of time saved due to a reduction in water collection time.....	31
Table 4.3.4.3 Economic activities made possible on availability of water.....	32
Table 4.3.5.1 Contribution of water projects to the well being community members.....	32
Table 4.3.5.2 Specific contribution by water projects.....	33
Table 4.3.5.3 Development made possible by availability of water.....	34
Table 5.2 Summary of findings.....	36

LIST OF ABBREVIATIONS

ASAL – Arid and semi-arid lands

CEFA - European Committee for Agriculture and Training

C.F- Confirm from

G.D.P – Gross Domestic Product

G.N.I - Gross National Income

G.O.K - Government of Kenya

MDGs - Millennium Development Goals

R.O.K – Republic of Kenya

SSA - Sub-Saharan Africa

UNESCO- United Nations Education Science and Cultural Organization

USD - U. S Dollar

WHO- World Health Organization

W.R.M.A – Water Resources Management Authority

W.S.R.B – Water Services Regulatory Board

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

A close examination and analysis of the Millennium Declaration confirms the central role of water and sanitation in sustainable development and the major contribution that expanded access to safe drinking water and adequate sanitation can lead to poverty alleviation. As the UN-Habitat (2008) noted, improving access to safe water implies less burden on people, mostly women, to collect water from available sources. It also means reducing the global burden of water – related diseases and the improvement in the quality of life. The burden of water inaccessibility includes time spent in the collection process. Over two thirds of households, globally fetch water from outside the home. In terms of resources, different studies have shown that the search for water may take 2-4 hours daily, traveling distances of over 3km and carrying load of between 20-25 kilograms and technically the function of women and children (Alaci 2004 as quoted in Alaci and Alehegn 2009).

Given this perspective, Water supply service has significant socio economic benefits. Due to reduced water collection time for example, users not only save money but also benefit from saved time for other activities: either productive (economic), domestic (such as looking after children, cooking and cleaning), personal (socializing), or development and management related (e.g. attending meetings, carrying out group work and participating in community activities (James 2003 as quoted in Alaci and Alehegn 2009). Therefore providing people with a reliable and easy accessible water supply has the potential of increasing the income of households (Ahmedabad, 2006).

Mt Kenya is the second highest mountain in Africa and the single most important physical feature that has influenced the natural conditions in the old Meru district of which Buuri division is part of. The attitude of Buuri division ranges from, 3,000 to 5,199m above sea level. Mt. Kenya has influenced the atmospheric conditions leading to a wide variety of

micro climate and agro –ecological zones. The forested upper zones of the old district are the catchments areas of the numerous rivers in the district, (G.O.K, 2002)

Many rivers originate from Mt. Kenya which is the catchments area of the region. However most of these rivers flow towards the central and southern districts and only a few flows towards Imenti North district, that is the famous Kathita river and other small streams. However, none of these rivers or streams passes through or across Buuri division. Therefore the main source of water in this region is piped water which is tapped all the way from the slopes of Mt .Kenya forest several kilometers far away from human settlements.

The division consists of the four locations namely Naari, Kiirua, Ruiri and Rwarera locations. Parts of Ruiri and Rwarera locations are semi-arid. The area is mainly an agricultural zone with no particular cash crop. People in the semi-arid areas mainly rear cattle that are resistance to high temperature and that can go for many days without water.

Community water projects in most areas are generally designed with only domestic uses in mind. Common objectives are improving welfare and health and this places community water projects finally in the social or health sectors and not in the sector of economic development (Francis & Verhagen 2005). So is the case of community water projects in Buuri division.

In Kenya, women and children are generally responsible for domestic water collection and management and so is the case in Buuri division. Women make choices about the water they collect and the source from which it is collected. The amount of time they spend collecting water affects the amount of time they have for education and paid work.

In rural areas, water resources are used for a combination of basic human needs and productive purposes. Water serves in a wide range of productive uses to secure food and non-food income for rural households. It is a productive asset and an economic good which,

can be combined with other assets to generate financial and non-financial livelihood benefit (Mokgope, K. & Butterworth, J.A. 2001).

Poverty in Kenya is the outcome of economic, political and social processes that interact and frequently reinforce each other. A reversal of fortune for the majority in Kenya requires more than loans from international monetary institutions and massive investments. It requires Kenyans to actively participate in the development of the country.

1.2 Statement of the problem

Community water projects are generally developed mainly with domestic uses in mind. Their common objectives include improving welfare of the community members and this places them mainly in the social and health sector and not in the sector of economic development. (Francis & Verhagen 2005).

Many projects have been implemented in Buuri division such as Mutethia water project, Kirimagitune water project, Muguuku water project, Kironya water project, Bahati water project, Ngarinaru water project and CEFA water project. There is an often implicit assumption that providing the rural people with more water will alleviate poverty. In water-stressed catchments with competing water users, it is important to understand and have evidence to support the view that providing more water to rural households will alleviate poverty. Cases of poverty are evident in Buuri division with 50 percent of the population being considered as poor. The main causes of poverty include; inadequate and unreliable rainfall, drought and lack of water in dry areas. (R.O.K, 2005).

Research done in other parts of the country indicates that taking water to community households can help in poverty alleviation. A number of factors contribute in poverty alleviation but the role of water in poverty alleviation in Buuri division is poorly understood.

The following question needs to be addressed, what is the evidence that improving access to water to the rural households in Buuri Division through community water projects leads to poverty alleviation?

1.3 Purpose of the study

The research was used to determine whether community water projects in Buuri Division play any role towards poverty alleviation in the area. In order to achieve this goal, the study analyzed the economic activities which have been made possible in the area due to these community water projects. The study also analyzed and attempted to quantify the value of those other activities that members now engaged in, during the time they used on water collection.

1.4 Objectives of the study

Main objective

The main objective of the study was to assess the role of community water projects in poverty alleviation.

Specific objectives

The specific objectives of the study were to;

- (i) Determine if community water project have led to a reduction in water collection time in Buuri division.
- (ii) Examine how water from community water projects has been utilized in Buuri division.
- (iii) Assess the economic implication of taking water to community households in Buuri division.
- (iv) Determine whether community water projects play any role in poverty alleviation in Buuri division.

1.5 Research questions

- (i) Do community water projects lead to a reduction in water collection time in Buuri division?
- (ii) How is water from community water projects utilized by the community members in Buuri division?
- (iii) What are the economic benefits of taking water to community households in Buuri division?
- (iv) Do community water projects play any role in poverty alleviation in Buuri division?

1.6 Significance of the study.

The research addressed issues which contribute to poverty alleviation. Poverty alleviation is one of the major development challenges facing low-income countries. Since independence, one of the principle goals of Kenya's development effort has been to alleviate poverty. Therefore the study focused on very important issues because it was concerned with issues that are of great concern even to the government of Kenya and the world as a whole. The study looked at how community water projects have been adjusted to maximize benefits from productive uses of water, saved human energy and time thus maximizing the poverty alleviation impact.

The study is also very significant because it is a stepping-stone towards achievement of the Kenya Vision 2030. The aim of the Kenya Vision 2030 “ the globally competitive and prosperous country with high quality of life by 2030” aims at transforming Kenya into a newly industrialized middle-income country providing a high quality of life to all its citizens in a clean and secure environment (G.O.K 2007).

Water is life and one cannot talk of quality life when the citizens of a country do not have access to clean and safe drinking water. The study collected evidence to show that the issue

of water must be addressed if any nation has to fight poverty successfully. The issues of water must be solved by the government in collaboration with other development partners if the country has to meet the MDGs. This research focused on issues of water which is a natural resource and which should be well managed if the MDGs have to be achieved, (Fox and Liebenthal, 2006).

The study also showed that water problems in the rural areas can be solved through development of community water projects which are either sponsored by the people themselves, non-governmental organizations or by the government itself.

The study also stimulated debate on and promoted a better understanding of the importance of community water projects in the lives of people. The goal was to set out a basic framework to help explain the relationship between poverty and community water projects. The research also contributed to the existing body of knowledge by adding to the emerging literature on the multiple values of improved water supplies through community water projects.

1.7 Scope of the study.

The research was limited to Buuri Division in Buuri District. The research considered community water projects sponsored by the community itself, the government and non-governmental organizations. It also looked at how these community water projects have changed the lives of the community members in terms of welfare and economic status.

The research attempted to show that investments in water are a good bet; not only for just social, health and environmental reasons, but also to directly generate economic growth that is, in many cases, effective in reaching the poor and that can transform the prospects of many Kenyan's poorest regions.

Conclusions were based only evidence obtained from the analysis of data collected in the four locations of Buuri Division and were not compared with data collected elsewhere.

1.8 Limitations of the study

The following limitations were experienced in the process of the research especially in data collection.

- i). Respondent bias in the process of interviewing or responding to questionnaire.
- ii). Difficulties in filling in the questionnaire as a great percentage of sample were illiterate.

1.9 Assumptions of the study

- i). The sample selected represented the total population.
- ii). The data collection instrument had validity and was measuring the desired constructs.
- iii). The respondents answered the questions truthfully.

1.10 Definitions of terms.

Community

A community is a group of people which has a common belief, culture, interests and living in a particular local area.

Community based development

Community based development occurs when communities are responsible for planning, managing and implementing developmental changes with little if any intervention from governments, non-governmental organization or other external factors.

Community water project

A community water project included any or all projects for the development, storage, treatment, purification and distribution of water. These are generally used to improve water supply or access to water.

Economic value

Economic value refers to the amount (of money or goods or services) that is considered to be a fair equitable for something else.

Household

Refers to one or more persons, whether related or unrelated, who share common living quarters.

Poverty

Poverty was used in the study to refer to shortage of common things such as food, clothing, shelter, education and safe drinking water.

Poverty alleviation

Poverty alleviation is any process which seeks to reduce the level of poverty in a community or amongst a group of people or a household.

Poverty measurements in this research will be based on the level of income and consumption or expenditure.

Consumption will include both goods and services that are purchased, and those that are provided from one's own production.

Project

A project is a finite endeavor (having specific start and completion dates) undertaken to create a unique product or service which brings about beneficial change and added value.

Water collection time

This refers to the time taken by each individual in the community in search of water in cases where piped water is not available in their household.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews literature related to previous research on the topic and related topics and also literature related to the research questions. The review includes directly related studies and studies that provide additional perspectives on the research objectives and research questions. The section is divided into two sections: theoretical literature review and empirical literature review.

2.2 Theoretical review of literature

Combating poverty is the main challenge for achieving equitable and sustainable development and water plays a vital role in relation to human health, livelihoods and economic growth, (Reba, 2003). He continues to argue that poor access to water contributes to hunger and food insecurity.

Women constitute more than half the population in Kenya and make significant contribution to the development of the economy (G.O.K, 1991). The findings of the committee formed by the president of the republic of Kenya states that women play a dominant role in Agriculture, traditionally in food production. They also play an important role in small-scale and informal sector in the rural and urban areas. The quality of the countries labour force is to a large extent dependent on women's performance as mothers, the custodians of family health and welfare, especially that of young children.

The committee recommended appropriate measures in water supply and availability of energy saving jikos both of which contribute directly and indirectly to income generation by counseling woman's time and energy. It therefore implies that projects which would reduce the time that women are involved in certain actives would make them available to be engaged in other economically productive activities because they assist them in saving time and energy.

Fox and Liebenthal (2006) argues that water, sanitation and hygiene are essential for achieving the MDGs - and hence for alleviating global poverty. Around the world poor people place a high priority on drinking water. Considerable studies suggest that improved water generates substantial economic benefits, mainly by saving time and energy. The time and energy saved by improved water supply can be used in economically productive or educational activities.

The Vision for the water and sanitation sector is "to ensure water and improved sanitation availability and access to all by 2030". Kenya is a water-scarce country with renewable fresh water per capita at 647 m³ against the United Nations recommended minimum of 1,000 m³. This compares unfavorably with the neighboring countries of Uganda and Tanzania, which have per capita levels of 2,940 m³ and 2,696 m³ respectively. Kenyans' access to water and sanitation is relatively poor compared to countries such as Malaysia. It is critical to note that Kenya's fresh water per capita has been declining and is projected to reach 235 m³ by 2025 unless effective measures to address the challenges are implemented. Additional supply and more efficient management of Kenya's scarce water resources, for household and commercial enterprises, will therefore be necessary to achieve the economic, social and political priority projects suggested by Vision 2030.

Efficient water management will, therefore, not only contribute to sustainable long-term economic growth, but also to poverty alleviation, health and security. The poor will gain directly from improved access to water and sanitation through improved health, reduced health costs and time saved. An improved water source together with better sanitation (which includes disposal of effluents and excreta) is one of the most important contributors to better human health. It is estimated that 80 per cent of all communicable diseases are water-related and hence constitute a major portion of health care expenditure. Benefits of improved water services and sanitation therefore include averted health related costs, which is a gain to the economy as a whole. (G.O.K, 2005).

The level of development of irrigation in Kenya is low compared to its potential. Kenya's irrigation potential in 2006 was estimated at 539,000 hectares, but only 105,800 hectares (about 20 per cent of irrigatable land) have been exploited for agricultural production. However, with the construction of water storage facilities, the available irrigated land could be increased to 1.3 million hectares. This could be achieved through enhanced water storage capacity, thereby increasing agricultural production. This would also help control floods, which mainly affect poor communities. Under Vision 2030, productivity in the proposed irrigated areas will therefore have benefits on the future of Kenya's economy and society that go beyond increasing agricultural production and value addition, as proposed in the economic pillar. (G.O.K 2007)

Kemper and Sadoff (2009) observe that the world community is making renewed commitments to urgently needed poverty reduction in the developing world. To achieve this goal – as agreed at the 2002 Monterrey Conference and the Earth Summit in Johannesburg and outlined in the Millennium Development Goals – increased growth will be key: low income countries need to grow at per capita rates of 3.6 percent per year if the 29 percent of the world's population living on less than 1 USD a day in 1990 is to be halved by 2015. The payoff will be great: increased growth means decreases in extreme poverty, decline in child malnutrition, and enhanced regional and global security. This growth needs to be one that puts social equity and environmental responsibility at the center. At the same time, consensus is growing worldwide that water and water services are essential because they touch on almost all Millennium Development Goals. Investment in water infrastructure in order to protect against droughts and floods and provide water supply to cities and rural areas, and water to grow food is basic for economic growth and poverty alleviation in poor countries.

Much of sustainable development is focused on getting people out of poverty. People privileged enough to live in more prosperous parts of the world rarely have to confront the

consequences of water scarcity. For many of the world's poorest however, the story is very different. Inadequate access to water forms a central part of people's poverty, affecting their basic needs, health, food, security and basic livelihoods. Improving the access of poor people to water has the potential to make a major contribution towards poverty alleviation. (UNESCO, 2003).

The economic well being of a society has so far excited the greatest demand on the world's water resources. It means according to this statement that water as a resource contributes greatly to the economic well being of a society. According to UNESCO, (2003) the major economic role of water lies in its relationship with agriculture. This is certainly true at a national level, where food security issues and national economic performance are related albeit in a complex way. But it is certain that the control of crop timing can equally affect the macro economics of a country or region. Control of crop timing is only possible if farmers do not rely on rain for watering their crops but have access to water for irrigation.

At a local level, agriculture is the main stay of many rural communities and the availability of food for household consumption and for sale at local markets. In addition the availability of irrigation water enables more crops to be grown per year and the economics involved in selling of produce in irrigation and in year-round farming increase employment opportunities which has direct economic benefits on a local community.

Water with all its multiple uses plays a pivotal role in the sustenance of rural livelihoods. As such, the provision of water which goes beyond domestic uses to include water for small-scale productive uses should be encouraged to enhance people's livelihood options by making significant contribution to household income, food security, improved nutrition and health. All these multiple benefits, if combined can assist in the fight against hunger and poverty, (Katsi, *et. al*, 2007).

According to WHO (2009), the basic contention, supported through a wide range of case studies, is that water management is a good investment; not only can it contribute to poverty alleviation, but can do so in ways that are affordable and, in many cases, generate wealth. Furthermore, it has a great potential to promote the health of local communities, which in turn will contribute importantly to poverty alleviation.

Safe water is widely recognized as both a fundamental human need and a key input into economic activity. Across the developing world, the typical approach to addressing these needs is to segregate supplies of water for domestic use from water for large-scale agricultural production. In that arrangement, the goal of domestic water supply is to provide small amounts of clean safe water for direct consumption, cleaning, bathing and sanitation, while the goal of agricultural water supply is to provide large amounts of lower quality water for irrigated agriculture. A new third use of water is now being given more attention by researchers: small amounts of water employed in selected household enterprises. This third use may be particularly important for women. There is a potential, therefore, that provision of modest amounts of water to smallholder farmers can enhance household economic production, save labor time for women and girls, and improve family health. (Were, 2006)

One of the benefits of water use certainly not to be neglected is the positive impact on the livelihoods of the poor. Especially in the extensive semi-arid and arid areas of the developing world, rural livelihoods are strongly influenced by water use. The impact goes further than the traditional public health benefits attributed to it. Water can also be a resource used in or necessary for productive activities and its collection is important in terms of time consumption. Following categories of water use by rural communities can be identified. Water for basic human needs – these uses are focused on survival, providing water for drinking, cooking, sanitation and hygiene, with mainly health impacts and benefits; Water for productive activities – these uses impact on food security or income. Output may serve own consumption (subsistence production of vegetables, brick-making) or

the market (sale of vegetables, fruits or ice blocks). Activities may also be associated with providing services (e.g. hair salons); Water for other activities – these uses are not focused on production and mainly have religious or environmental significance. As a productive asset for the poor, water is thus generating both financial and non-financial livelihood benefits. Better understanding and analysis on how exactly these productive water uses affect the livelihood of the poor has a huge potential to add to the goal of reducing rural poverty. Hence, benefits from productive water uses should not only be taken into account within water resources management but also within poverty reduction strategy (Speelman *et. al.* 2006)

2.3 Empirical review of literature

Improved accessibility of water through mechanisms such as water projects as been found to contribute towards poverty alleviation here in Kenya and in other parts of the world.

According to a research by Were *et. al.* (2006) done in western Kenya highlands, safe water is widely recognized as both a fundamental human need and a key input into economic activity. There is a potential that provision of modest amount of water to smallholder farmers can enhance household economic production, save labour time for women and girls, and improve family health.

According to the research by Were *et. al.* (2006) there are multiple values of improved water supplies- improved health, time savings and small-scale production for individual farmers and collectives for the case of a rural community in the western highlands of Kenya. With minimum support two groups in this community have managed to install and operate system of spring protection and piped water to their members' homesteads. Members of these homesteads particularly women have benefited substantially in terms of time saving, health and small scale production. Time saved can be invested in economic activities hence helping in poverty alleviation.

Water was also shown to have productive uses at the household level as indicated by a research carried out by Speelman *et. al*, (2006). Speelman acknowledged that water is critical to all production chains of the economy and its availability in terms of quality and quantity affects output and economic growth. Speelman continues to argue in his findings that one of the benefits of water use certainly not to be neglected is the positive impact on the livelihoods of the poor. Especially in the extensive semi-arid and arid areas of the developing world, rural livelihoods are strongly influenced by water use. The impact goes further than the traditional public health benefits attributed to it. Water can also be a resource used in or necessary for productive activities and its collection is important in terms of time consumption.

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Speelman *et. al*, (2006) found the following categories of water use in rural households of Ukambani district; water for basic human needs- these uses focused on survival, water for productive activities and water for other activities which are not focused on production. As a productive asset of the poor, water is thus generating both financial and non-financial livelihood benefits. Better understanding and analysis on how exactly these productive water uses affect the livelihood of the poor has a huge potential to add to the goal of alleviating rural poverty. Hence, benefits from productive water uses should not only be taken into account within water resources management but also within poverty alleviation strategies.

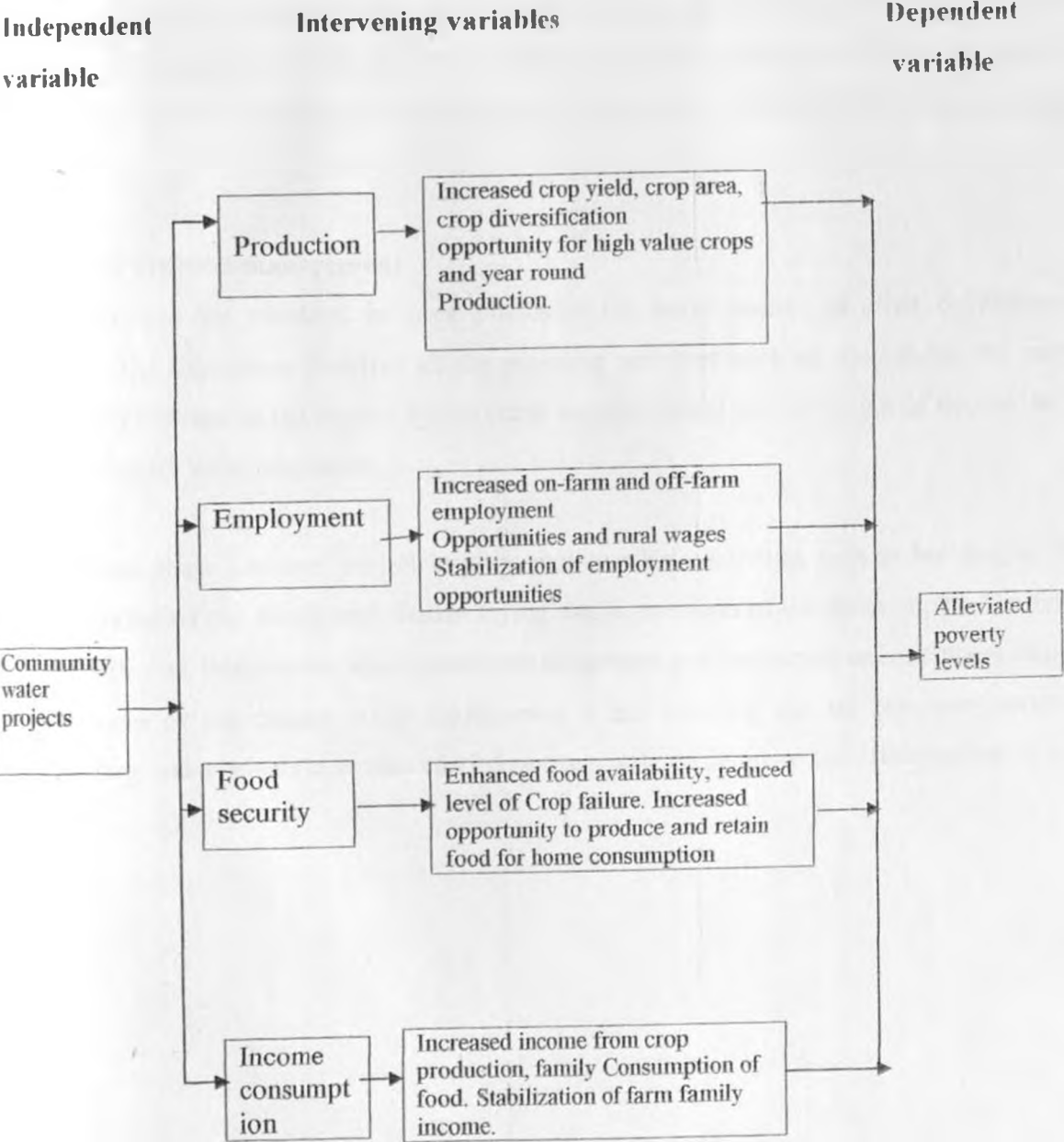
Francis and Verhagen (2005) carried out a study in Banaskantha District Western India on economic and Gender benefits from domestic water supply. The study was carried out in two villages, the enterprise and control village. In the enterprise village there was domestic water supply while in the control village there was no domestic water supply. The study made the following findings;

That water collection was time consuming and on average a household spent nearly five hours a day on collecting water. This is because their piped water was of poor supply and usually broke down for long periods of time. The findings also show that women from enterprise village spent more time in income- generating activities than women in the

control village. Such activities included; expenditure saving activities – including working on their own land and income generating activities- either by hiring themselves out as daily wage laborers or through doing micro-enterprise work.

They also found that if water supply was improved, such that women spent only one hour per day collecting water, women could use the time saved either for income – generating activities or for domestic, social and developmental activities. To further substantiate these findings, data were collected on how women would allocate time savings from an improved water supply. It was found that the women would allocate 72% of those time savings to income generating activities, provided that sufficient economic opportunities were available. This engagement in income generating activities would have a positive impact on poverty alleviation.

2.4 Conceptual frame work.



The independent variable is community water projects and the dependent variable is poverty alleviation. Poverty alleviation is influenced by increased agricultural production, increased

employment opportunities, improved food security and reduced daily expenditures. Poverty alleviation will be measured relatively in terms of changes in the income of a household. An increase in the income will be said to contribute to poverty alleviation while a decrease in the income levels will cause an increase in poverty levels assuming the inflation rate is constant.

2.5 Water projects management

Water projects are managed in three phases in the same manner as other development projects. The first phase involves all the planning activities such as, identifying the water source, registration of the project by the water services board and surveying of the course to be followed by water engineers.

The second phase involves project implementation where activities such as building of the dam, digging of the trench and finally laying and connection of the water pipes. The final phase is project termination where works on the project are completed and members enjoys the services of the project while maintaining it and carrying out the necessary repairs. Monitoring and evaluation is also carried out regularly to improve the effectiveness of the project.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This part of the research report describes the procedures that were followed in the process of the research. The steps involved in conducting the research are described fully. This chapter explains the research design, target population, sampling design and data collection methods and procedures.

The research aimed at determining whether community water projects play any role in poverty alleviation. That is to determine whether community water projects play any role in reducing the poverty level of members of a certain community who invest heavily in these projects.

Poverty was based on the levels of income and consumption. Information on income and consumption was obtained through a sample survey, with which household heads were asked to answer detailed questions on their spending habits and sources of income before they were members of a community water project and after they became members of a community water project. The same questionnaire was administered even to those who did not belong to any community water projects.

3.2 Research Design

The research design that was adopted for this research is the descriptive survey design. This design was adopted because of the large population involved in the research therefore necessitating the need to take a sample from the total population for the purpose of data collection, data analysis and conclusions.

3.3 Target Population

The research targeted Naari, Kiirua, Ruiri and Rwarera locations of Buuri division because of their comparable socio-economic conditions. The research also targeted households in rural areas. Age groups and gender were not used as determinants of the population. Buuri division has four administrative locations with a population of 8000 households.

3.4 Sampling Design.

Simple random sampling was the sampling design used for the study. A sample of 203 households was selected randomly from the four locations.

Table 3.4.1: Sample size per location

Location	Number of households sampled.	Total number of households
Naari	52	2200
Kirua	51	2000
Ruiri	50	2000
Rwarera	50	1800

These households were identified through simple random sampling design with the assistance of the area chief. The area chief was requested by the researcher to provide the lists of households in his location. These lists acted as the sampling frames. Every member in each list was given a number, the numbers were then written in small pieces of papers, folded and placed into a container and mixed thoroughly. The papers were then picked by the researcher and the research assistance according to the number required for each particular location and these were the households involved in the research. The procedure was repeated in all the four locations involved in the study.

3.5 Data Collection Methods and procedures.

The survey method was used for data collection. The sampled household's heads were requested to respond to a questionnaire and the responses recorded for analysis. This method was adopted for the study as it is efficient and more economical than observation. Information was gathered by a few well – chosen questions that the respondents responded to. The survey method was most appropriate in this case because the respondents were uniquely qualified to provide the desired information for the research to a success.

3.5.1 Data collection instrument.

Data was collected using a questionnaire. The questionnaires were administered by the researcher and the research assistance. The items in the questionnaire were such that they yielded in-depth data, which was very useful in the research. The questionnaires were mainly administered by using two methods:

- (i) Self administered questionnaire. This is where respondents completed the questionnaires themselves. This was mainly adopted by the literate respondents.
- (ii) Researcher administered questionnaire. The researcher used the questionnaire to interview the respondents in some cases. This was done when the subjects did not have the ability to easily interpret the questions because of their education levels. In such cases the researcher read and interpreted the items of the questionnaire and recorded the responses from the respondents. The same questionnaire was also administered to those who belonged to a community water project and those who did not.

3.5.2 Reliability of the instrument.

A pilot study was carried out prior to the main study in order to check the reliability of the research instrument and to ensure that it yielded the same results on repeated trials thus improving the data collection technique.

3.5.3 Validity of the instrument.

The pilot study was also used to determine the validity of the instrument to ensure that it was measured what it was supposed to measure.

Table 3.6 Operational definition of variables

Research objectives	Variables	Measurement scale	Indicators	Analysis
To determine if community water projects have led to a reduction in water collection time in Buuri division.	Water collection time	Ordinal scale	Number of people spending many hours on water collection Time available for jobs	Descriptive
To examine how water from community projects has been utilized in Buuri division.	Increased production, Food security	Nominal scale	Small-scale irrigated plots. Watering animals. increased production. improved food security	Descriptive

To assess the economic implication of taking water to community households in Buuri division.	Income, Savings	Ordinal scale	Employment opportunities. Business opportunities. Reduced expenditure	Descriptive
To determine whether Community water projects play any role in poverty alleviation in Buuri division.	Employment, Income	Ordinal scale	Increased employment opportunities, Increased production, Increased income	Descriptive

3.7 Data analysis method and justification:

After all the data was collected, the questionnaires were coded and the data feed into the statistical package for social sciences, (SPSS). Data was analyzed mainly through descriptive statistics. This involved the use of frequency tables, and percentages.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter details the results of study as proposed in the research methodology. Data was analyzed regarding general information (including gender, distribution of projects, sources of income and education level), role of water projects in poverty alleviation (food production and employment opportunities), reduction in water collection time, utilization of water from community water projects, and the economic implication of taking water to community households in Buuri division.

Data is presented in tables.

4.3 Data presentation

Data is presented in terms of the general information such as gender of the respondents, level of education, sources of water and the sources of income and the research objectives.

4.3.1 General information

Out of the 203 questionnaires administered, 202 were accepted for analysis representing 99.51% response rate which is acceptable statistically. The percentages were worked out of a total of 202 respondents. The general information obtained was gender of the respondents, distribution of water projects, level of education of respondents, sources of income and sources of water.

4.3.1.1 Gender

In terms of gender, 59.4% were males and 40.6% were females as shown in table 4.3.1.1 below;

Table 4.3.1.1: Gender

Gender	Frequency	Percent
Male	120	59.4
Female	82	40.6
Total	202	100.0

4.3.1.2 Distribution of water projects.

Table 4.3.1.2 below shows the distribution of water projects across the four locations of Buuri division. All the respondents in the four locations belonged to at least a water project as indicated by the table.

Table 4.3.1.2 Distribution of water projects

Water project	Frequency	Percent
CEFA	82	40.6
Kathita water project	23	11.4
Mutethia	63	31.2
N/A	2	1.0
Nkauna bao water project	26	12.9
Ruiri-Thau water project	2	1.0
Rwarera community water	4	2.0
Total	202	100.0

4.3.1.3 Level of education

Majority of the respondents, (40.6%) had only secondary level of education and a small percentage (15.5%) post secondary education. Lack of academic and professional qualification would have lead to a reduction in the maximum utilization of water from the water projects hence reducing the expected economic benefits of this commodity.

Table 4.3.1.3: Level of education

Level of education	Frequency	Percentage
None	28	13.9
Primary	59	29.2
Secondary	82	40.6
College	28	13.0
University	5	2.5
Total	202	100

4.3.1.4 Sources of income

The respondents had various sources of income. The main source of income identified was farming with the majority of those interviewed (75.7%) falling in this category, followed by business (33.2%). This meant that the residents of Buuri division were significantly going to benefit from the water projects especially for irrigation purposes hence boosting their agricultural productivity leading to a reduction in poverty levels. Other sources of income were formal employment (11.4%) (E.g. teaching, veterinary officers) and informal employment (e.g. casual laborers) as shown in figure 4.3.1.4 below.

Table 4.3.1.4: Sources of income

Sources of income	Frequency	Percentage
Farming	153	75.74
Business	71	33.17
Formal employment	23	11.39
Non-formal employment	9	6.93

N=202

4.3.1.5 Sources of water in the households

Table 4.3.1.5 shows that the main source of water in the division was piped/project water with a frequency of 171 of those interviewed translating to 84.7%. 7.4 % claimed to get from swamps and springs and a further 7.9 % depended on rainfall as a source of water. Further evidence shows that water from these community projects as being utilized by members of households in various ways.

Table 4.3.1.5: Main sources of water households

Water source	Frequency	Percent
Rain	16	7.9
Swamp/springs	15	7.4
Piped/water project	171	84.7
Total	202	100.0

4.3.2 Reduction in water collection time in Buuri division.

There was a considerable reduction in water collection time as shown in table 4.3.2.1 below. The extra time saved here was invested into value addition in agricultural production. Majority, that is 99.5% of the respondents agreed to this with only a small percentage 0.5% denying this fact. This observation was also supported by the fact that before joining the water projects, 62.4 % of the respondents spend over 4 hours looking for water but this group was reduced to 5.0% after joining the water project. Again, before the water project 1.0% spent less than 2 hours in looking for water but this percentage was increased to 50% after joining the water project as shown in table 4.3.2.2 below.

Table 4.3.2.1: Reduction in water collection time in Buuri division.

Reduction in water collection time	Frequency	Percentage
Yes	201	99.5
No	1	0.5
Total	202	100

Table 4.3.2.2: Water collection time before and after joining the water project

Time taken to collect water	Percentage (before water project)	Percentage (after water project)
Less than 2 hours	1.0	49.5
Between 2-3 hours	1.0	28.7
Between 3-4 hours	35.6	16.8
Above 4 hours	62.4	5.0
Total	100	100

4.3.3: Utilization of water from community water projects in Buuri division.

Water from community water projects in Buuri division has been utilized in various ways all to improve the quality of life and alleviate poverty as presented below. This was mainly through small scale irrigation projects to increase agricultural production and eventually creating employment opportunities in the agricultural sector as farming formed the main source of employment.

Table 4.3.3.1 below shows that almost all households (97.0%) utilized water for domestic purposes. It was also encouraging to note that at least 52% of households utilized water for small scale irrigation leading to increased agricultural production in terms of crop diversification and crop yield and also creating opportunity for high value crops. Only a small percentage (19.3%) used this water for business purposes. The different types of crops grown by irrigation included but were not limited to potatoes, maize, carrots, onions, cabbages, kales and tomatoes as shown in table 4.3.3.2 below.

Table 4.3.3.1: Main uses of water

Water use	Frequency	Percentage
Domestic use	196	97.0
Small scale irrigation	104	51.5
Business	39	19.3

N=202

Table 4.3.3.2 Crops grown by irrigation

Crops grown by irrigation	Percentage of respondents
Potatoes	39.11
Cabbages	32.18
Onions	16.83
Carrots	6.44
Tomatoes	5.94
Maize	5.45
Kales	3.96

N=202

4.3.4 Economic benefits of community water projects in Buuri division.

There were immense economic benefits as a result of availability of water in Buuri division. It was noted that at least 100% of the respondents were actively involved in agri-business although some in very small scales. This is evident by from the number of economic activities initiated in the division after the induction of these water projects. Among those activities cited were vegetable cultivation (these vegetables included kales, cabbages, carrots and onions) with about 64.4% of the respondents, and Irish potato production (39.1%). With an increase in agricultural production, there was also creation of employment opportunities uplifting the economic standards of residents of Buuri division.

In terms of expenditure, there was a considerable decrease in amount of money spent per day before joining the project and after joining the project as shown in table 4.3.4.1 below. This can be attributed to the fact that with increased food production, there is a reduction in expenditure on family food. In addition, enough food ensures good health for the population and hence a reduction in money spent on healthcare. Overall, there is a reduction in expenditure and a healthy and energetic society that can work.

Table 4.3.4.1 Average expenditure per day

Average daily expenditure	Percentage (Before water project)	Percentage (After water project)
Less than Kshs 50	0	0
Between Kshs 51-100	0.5	49.5
Between Kshs 101-150	20.8	16.3
Between Kshs 151-200	45.5	34.2
Above Kshs 200	33.2	0
Total	100	100

4.3.4.2 Utilization of time saved due a reduction in water collection time

Due to a reduction in water collection time, the residents of Buuri division were able to have some extra time which was being consumed in water collection, and many of them involved themselves in the following activities which in turn contributed to income.

Table 4.3.4.2 Utilization of time saved due to a reduction in water collection time
(Time measured in hours)

Activity	Frequency	Percentage
Working on my farm	43	21.3
Attending to my business	121	59.9
At work (formal employment)	32	15.8
Looking for jobs	6	3.0
Total	202	100

4.3.4.3 Economic activities made possible due to availability of water

Many people were also able to involve themselves in several agri-economic activities, and others witnessed increase in production due to availability of water in Buuri division.

Table 4.3.4.3 Economic activities made possible by availability of water

Activity	Frequency	Percentage
Able to begin a business (vegetable selling)	20	10
Started farming through irrigation	45	22.3
Increased agricultural production	53	26.2
None	88	43.6

N=202

4.3.5 Contribution of water projects in poverty alleviation in Buuri division.

Overall, the water projects had contributed to the well being of the people of Buuri division.

Table 4.3.5.1 shows 100% of the respondents agreed that the water project had contributed to their well being.

Table 4.3.5.1: Contribution of water projects to the well being of community members

Contribution	Frequency	Percent
Yes	202	100.0
No	0	0
Total	202	100

Some of the specific contribution of the water projects included the following:

Table 4.3.5.2 Specific contributions by water projects

Contribution	Frequency	Percentage
Allowed enough time to attend to other economic activities (farm, business)	41	20.30
Economic empowerment	129	63.86
Increased job opportunities	5	2.48
Availability of clean and safe drinking water	6	2.97
Improved health	7	3.47
No contribution	14	6.93

N=202

4.3.5.3 Development made possible due to availability of water.

The residents of Buuri division were able to make the following development which then contributed to poverty alleviation or indicated low poverty levels.

Table 4.3.5.3 Developments made possible due to availability of water

Development	Frequency	Percent
Access to clean and safe water	29	14.5
Availability of subsistence funds	3	1.5
Built structure of potatoes storage	5	2.5
Cleanliness has improved	31	15.3
Expanded my farm area	12	5.9
Expanded my vegetable garden	26	12.9
Extension of my house	1	0.5
Improved health	6	3.0
Income from sales help us educate children	56	27.7
Increased my income	5	2.5
None	22	10.9
Production of cabbage	1	0.5
We don't buy vegetables like we used to	5	2.5
Total	202	100.0

4.4 Summary of the chapter

A very high percentage (99.5%) of the respondents agreed that community water projects have led to reduction in water collection

The main uses of water from these community water projects were as follows;

- i) Domestic uses including watering animals
- ii) Small scale irrigation
- iii) A small percentage of the respondents were involved in the business of selling water

There were immense economic benefits as a result of taking water to community households in Buuri division. All the respondents were involved in agri- business activities but some were involved in very small scales.

Overall, the community water projects had contributed to the well being of the people of Buuri Division .All the respondents agreed that the water projects had contributed to their well-being.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the summary of the findings of the study, discussion, conclusion and recommendations.

5.2 Summary of findings of the study.

Table 5.2 Summary of findings.

Objectives	Type of analysis	Findings
To determine if community water projects have led to a reduction in water collection time in Buuri division.	Descriptive analysis	Water projects have led to a reduction in water collection time in Buuri division.
To examine how water from community water projects has been utilized in Buuri division.	Descriptive analysis	Water from community water projects has been used for domestic use, small-scale irrigation and business use in Buuri division.
To assess the economic implication of taking water to community households in Buuri division	Descriptive analysis	There were immense economic benefits as a result of availability of water in Buuri division.
To determine whether community water projects play any role in poverty alleviation in Buuri division.	Descriptive analysis	100 % of the respondents agreed that community water projects have contributed to the well being of the people of Buuri division.

5.2.1 Reduction of water collection time in Buuri division.

It was found out that community water projects have led to a reduction in water collection time in Buuri division. 99.5% of the respondents confirmed this confirming that they now take less time to collect water as compared to when they were not members of any water project.

However, many still spend some considerable time (with 28.7% spending between 2-3 hours a day) because, sometimes there is no water due to breakdowns and others despite being members of water projects (15 % of the respondents) did not have piped water in their homes and therefore have to travel a short distance. This implied that the water projects were not adequate to the population.

5.2.2 Utilization of water from community water projects in Buuri division.

It was found out that water from community water projects in Buuri division has been utilized in various ways including;

- i) Domestic uses including water for animals
- ii) Small scale irrigation where crops such as Irish potatoes ,Cabbages, Onions, Carrots and tomatoes were grown using this water .However in Ruiri and Rwarera location the water was not enough to be used for any substantial irrigation.
- iii) A small percentage of the respondents were also involved in the business of selling water.

5.2.3 Economic benefits of taking water to community households in Buuri division.

There were immense economic benefits as a result of water availability in Buuri division .It was noted that 100% of the respondents were involved in agri-business activities on availability of water .These activities included vegetable and Irish potatoes cultivation through small-scale irrigation. Due to a reduction in water collection time, people were able to spend more time on their businesses while others to got involved in paid work.

A lot of saving of money was noted in expenditure because

- i) People were no longer spending much money on buying water
- ii) People spent less money for buying food because they were able to produce a variety locally due to availability of water especially in Naari location where there was sufficient water.

5.2.4 The role of community water projects in poverty alleviation.

Overall, the water projects had contributed to the well being of the people of Buuri division. At least 100% of the respondents agreed that the community water projects had contributed the improvement of their well-being.

5.3 CONCLUSIONS

Water projects were found to have positive effects to the community members of Buuri division.

They have led to a reduction in water collection time and hence people had more time to involve themselves in income generating activities such as farming, business and paid work. Water from community water projects has been utilized in various ways in Buuri division including domestic uses, watering animals, small-scale irrigation and all these are income-generating activities either directly or indirectly.

Water projects in Buuri division have contributed greatly towards the fight against poverty. This is because they have led to a decrease in daily expenditure, contributed greatly to the income of the residents of Buuri division and the time and energy saved by improved water supply has been used in economically productive activities. Water projects have also contributed to the improvement of food security in the division.

Improved water supply through community water projects has significant socio-economic benefits. Due to reduced water collection time, users not only save money but also benefit from saved time for other activities either productive (economic), domestic such as looking after children, cooking and cleaning), Personal (Socializing), or development and management related e.g. attending meetings, carrying out group work and participating in community activities. Thus providing people with a reliable and easily accessible water supply has the potential of increasing the income of households and hence alleviating poverty.

5.4 RECOMMENDATIONS

According to the findings of the study, the followings recommendations will be of great use to the residents of Buuri division if implemented by the concerned parties.

5.4.1 Recommendations for policy makers.

The Government in collaboration with development partners such as the non-governmental organizations should assist residents of Buuri division to develop more water projects as those that are there are not sufficient to generate substantial impacts, especially in Ruiri and Rwarera locations. The Government can also help the residents of Buuri division identify donors willing to support water projects in the region. There is enough evidence that these water projects contribute to poverty alleviation.

5.4.2 Recommendations for programmes.

The government should also initiate training programmes (through the agricultural extension services) in the region to impart skills to the residents in order to maximize the benefits from these community water projects. These may include training on animal and crop production as well as training on business skills.

5.4.3 Recommendations for further research

- i) During the re search it was found out that there was a very high level of illiteracy in Buuri division. Further research can be carried out to determine the cause of the high level of illiteracy and how it can be minimized.
- ii) Research can also be carried out to determine the most suitable crops for the drier areas of the division in order to increase the productivity of agricultural products.

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APPENDICES

APPENDIX I QUESTIONNAIRE.

Introduction

Am a postgraduate student of the school of continuing and distance learning University of Nairobi. Am currently undertaking a research study in order to fulfill part of master's studies. Due to random selection of my participants you have chosen as one of the respondents. The information given will be treated with confidentiality and will only be used for the academic objectives of the study.

Please respond to each item by either putting a tick next to it or by drawing a circle around the desired option.

SECTION A

RESPONDENTS BACKGROUND

1. Name (optional)_____

2. Location _____

3. Respondents gender (i) Male
(ii) Female

4. Age of respondent

(a) Between 18 -25 years

(b)Between 26-45 years

(c) Between 46 -55 years

(d) Above 55 years

5. Marital status

- (a) Married**
- (b) Separated/ Divorced**
- (c) Widowed**
- (d) Never married**

6. Level of education and Training

- (a) None**
- (b) Primary**
- (c) Secondary**
- (d) College**
- (e) University**
- (f) Others**

7. What are your sources of income? List all.

- (a)**
- (b)**
- (c)**
- (d)**

8. What type of a house do you live in?

- (a) Permanent (stone house)**
- (b) Semi- permanent (Timber house)**
- (c) Thatch roofed houses**

SECTION B.

WATER RELATED ISSUES.

9. What are the sources of water in your house?

- (a) Rain**
- (b) Borehole**
- (c) Seasonal Rivers**
- (d) Swamp/Springs**
- (e) Piped/ water project**
- (f) Others**

10. What are the main uses of water?

- (a) Domestic watering**
- (b) Small scale irrigation**
- (c) Business**
- (d) Others**

11. If irrigation applies in 10 above, what type of crops do you plant?

- (a)**
- (b)**
- (c)**
- (d)**
- (e)**

12. Do you depend on water for irrigation entirely, or you also depend on rainfall for farming needs?

13. Are you aware of any water Projects in your Sub- location?

- (i) Yes**
- (ii) No**

14. Are you a member of any community water project, if yes what is the name of the project.

15. What is the distance from home to the nearest water collection point, if there is no piped water in your home?

- (a) 0-0.5 Kms
- (b) 1-2 Kms
- (c) 2-5 Kms
- (d) 5-10 Kms
- (e) More than 10 Kms

16. What is the amount of time spent looking for water.

- (a) less than 2hours
- (b) Between 2-3 hours
- (c) Between 4-4 hours
- (d) Above 4hours

17. Prior to joining a water Project, how much time did you spend on water collection.

- (a) Less than 2 hours
- (b) Between 2-3 hours
- (c) Between 3-4 hours
- (d) Above 4 hours

18. Do you think water projects have lead to a reduction in water collection time?

- (a) Yes
- (b) No

19. If you don't spend any time on water collection, how do you spend/utilize that extra-time?

- (a)
- (b)
- (c) -

20. What is the frequency of water fetching errands?

- (a) More than once a day
- (b) Once a day
- (c) Two days per week
- (d) Three days per week
- (e) All days of the week.

UNIVERSITY OF NAIROBI
EAST AFRICANA COLLECTION

21. Do people pay for water in your village?

- (i) Yes
- (ii) No

22. If yes, to question 20 above, how much per a 20 liter can?

- (a) Kshs. 10
- (b) Kshs. 5
- (c) Kshs 3
- (d) Kshs. 2
- (e) Others

23. What economic activities have been made possible in your household on availability of water?

- (a)
- (b)
- (c)
- (d)

SECTION C

Expenditure related information

24. How much money (on average) do you spend in your household per day? (daily expenditure)

- (a) less than sh.50
- (b) Between sh. 50-100
- (c) Between sh.100-150
- (d) Between sh.150-200
- (e) Over sh. 200

25. How much money did you spend in your household prior to joining water project? (daily expenditure)

- (a) Less than sh.50
- (b) Between sh. 50-100
- (c) Between sh.100-150
- (d) Between sh.150-200
- (e) Over sh 200

26. Do you have any Children past the age of secondary school?

- (i) Yes
- (ii)No

27. If yes in 26 above, are those children enrolled in secondary schools?

28. If No. 27 above give a reason.....

29. If Yes in 27 above, do you seek any assistance when paying their school fees?

30. What developments have been made possible in your household, due to improved availability / accessibility of water? List

- (a)
- (b)
- (c)
- (d)
- (e)

31. In your own opinion, as the water project contributed in any way to your well being?

- (i) Yes
- (ii) No

32. If yes, specify how?

33. How often in the last year did you have problems satisfying the food needs of the household?

- (a) Never
- (b) Sometimes
- (c) Often
- (d) Always