FACTORS AFFECTING THE UTILIZATION OF COMMUNITY WATER PROJECTS FOR SMALL-SCALE IRRIGATION IN KYUSO DIVISION, KYUSO DISTRICT, KENYA.

AUGUSTINE MUEMA MUSYIMI

C50/8819/99

A THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTERS OF ARTS OF KENYATTA UNIVERSITY

MAY 2009

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other degree.

Augustine Muema Musyimi.
C50/8819/99
Department of Sociology.
Kenyatta University

21/05/09
Date

"We confirm that the work reported in this thesis was carried out by the candidate under our supervision".

Regina G. Mwatha Karega (PhD
Department of Sociology.
Kenyatta University

22/05/09
Date

Elishiba N. Kimani (PhD)
Department of Gender & Development Studies.
Kenyatta University

08/06/2009
Date

DEDICATION

Dedicated to the poor in Rural Arid and Semi Arid Lands, often famine stricken.

ACKNOWLEDGEMENTS

To God be all the glory for bringing to completion gracefully what He continually begets in me, may His purposes prevail.

I also wish to express my sincere gratitude to the following people and institutions for their guidance, support and patience through the entire period of the study. To Dr. Regina Karega and Dr. Elishiba Kimani, my supervisors in the department of sociology and Gender & Development studies respectively, your support, guidance and long forebearing has been unmatched in my lifetime. God bless you abundantly.

I could not forget various members of staff in the department of sociology for their encouragement and support in a number of ways. Dr. Maina, Professor P.P.W. Achola, Dr. Gachuhi and my lecturers for their concern, follow-up and encouragement. To Lucy and Ruth at the front office, your concerns were a motivation to keep on going.

To those in our place of ministry, Life in Abundance, and in particular, Dr. Florence Muindi for your prayer and financial support. Your friendship and love has kept me.

Special thanks also to the Catholic Diocess of Kitui, Action Aid Kyuso, and Wishing For a Well Appeal Kyuso, for letting me learn from their projects. I acknowledge your concern for the needy which is a noble cause indeed.

Justice would not have been done if I did not mention my research assistant and the people of Kyuso Disrict who shared their lives, views and concern throughout the study. 'Blessed are they that find strength in the Lord who walk through the valley of baca making wells, the rain shall also fill the pools' Psalms 84:6.

Finally, my acknowledgements would be incomplete without the mention of my parents Josephat and Stella Mulyungi, to who I owe a great deal and without whose support and encouragement I would not have come thus far. I love you too.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

AAK	Action-Aid Kenya, Kyuso Programme
CDK	Catholic Dioceses of Kitui
GTZ	German Technical Cooperation- Mwingi programme
NGOs	Non- Governmental Organizations
CWPs	Community Water Projects
LSMS	Living Standards Measurement Survey
WFWA	Wishing For a Well Appeal

ABSTRACT

This study was conducted in parts of the Kyuso Division of Kyuso District among community water projects and their user households. The objectives of the study were to examine the management strategies of community water projects, to determine how household production resources affect access to and utilization of community water projects for small-scale irrigation and to examine how gender relations affect access to and utilization of community water projects for small-scale irrigation. Ten (10) Focus Group Discussions (FGDs) were conducted among the selected Water Project Management Committees, while 74 structured interviews were conducted among user households. Four other structured interviews were conducted to selected key informants and local leaders. One questionnaire was utilized for the Area Head of Department, Catholic Diocese of Kitui. The analysis of quantitative data was done with the use of measures of centrality after coding with the help of the Statistical Package for Social Sciences (SPSS) computer program. Qualitative data analysis was done by the coding and content analysis of data in case summary forms. Key findings included the fact that 78% of the users were not acquainted with irrigation as a farming technique. All 10 management committees made requests for training in various areas to enable them achieve effective CWP management as recommended below. The poor were found to practice SSI more than the better off in the communities. NGO facilitators that achieved SSI in their CWPs were those that had it as a main objective, networked the communities to government agencies and the local administration. Women formed 81% of the water users but only 33% of the management committees. The study conclusions were that, in as much as the failure to achieve irrigation through community water projects can be linked to water development facilitators like communities, non-governmental organizations and government departments, economic as well as non-economic factors like culture, none of these factors can independently or substantially explain the failure by itself. The study's assumption that management strategies, gender relations and household economic status affect the utilization of Community Water Projects for small scale irrigation is therefore true. It is recommended that the government and concerned Non-Governmental Organizations should ensure the delivery of service to their targets which fosters their participation and enablement rather than lack of agenda and inability to maintain projects especially after end of external support. Projects should be designed not only to meet the immediate need of the target community but also to allow for the exit of the donor and for redesigning to meet future needs. More importantly harmonization of the functions of the services board and the resource management board should be popularized and actualized as per the water act 2002. The significant presence of women as active members should be supported by specific efforts to train them to take up leadership and decision making positions. The study findings revealed that there is a need for training in accounting, networking and skills to help build capacity of the communities to manage, utilize and develop water projects as production resources.

CHAPTER ONE: INTRODUCTION

1.0 Background to the Study

One of the most pronounced problems in Sub-Saharan Africa is poverty, which affects the lives of 275 million people (World Bank 2000). Given that most of the poor in Africa are found in rural settings, the development of the rural economy is of key importance to raising the welfare of most of the poor. Many of these rural economies are composed of agricultural livelihoods and it therefore becomes imperative that efforts to eradicate poverty center on agricultural development (World Bank 2001).

Agriculture is the lifeblood of Sub-Saharan Africa (Uma Lele 1991in World Bank 2001). Not only is it a source of employment, income, exports, savings, government revenue, and raw materials for industry but it also provides a market for goods and services produced in other sectors. Scholars argue that there is a negative correlation between the incidence of poverty and the level of value added per worker in agriculture. An estimate has it that $1 increase in agricultural income generates an additional rural non-tradable production of between $1 and $2 (World Bank 2001), a factor of greatest importance to rural poor of an ability to diversify income sources. Besides providing the primary direct source of income in the rural economy, the multiplier effects of agriculture also have a potent effect on the expansion of the rest of the economy and the development of off-farm sources of rural income. However, African agriculture, which is

predominantly small-scale, has proved to be too static to propel the broader growth of the economy. The question of what needs to be done to propel the small-scale farmer to takeoff from unsatisfactory subsistence to a self-sustained growth has been much debated.

The challenge to agricultural science in conclusion is to understand the rationale of the existing systems of production to enable them to devise innovations appropriate to the environment and more importantly to the particular social as well as economic contexts. In turn, this will enable farmers to increase output from the resources actually available to them.

The biggest problem facing Agriculture in the ASALs is thought to be water. Most people in these regions practice rain-fed agriculture that cannot dependent on highly unreliable rainfall and frequent drought. One of the more seriously considered options for intensifying production and bringing marginal lands under cultivation has therefore been irrigation. The Government of Kenya has been unable to realize its dream of sizeable irrigation development, however, and for some time its' irrigation scheme have not been functioning to their optimum potential. The major constraints have included low water availability and the rising cost of supplying water in the irrigation schemes, relatively low economic performances in the existing irrigation schemes, large funding requirements for project implementation overheads, and serious environmental and social

consequences not anticipated in the planning stages. There is therefore, a challenge for planners, managers and policy makers to chart a way forward on how to achieve efficient irrigation management in order to meet agro-economic goals while maintaining water resources of high quality and avoiding serious degradation to the physical environment as well as unacceptable social disruption (Onjala, 1999).

In Kenya, poverty levels have been recently estimated at 56%. Other estimates indicate that 47% of the rural populations were below the poverty line between 1982 and 1992, and that women were the most affected, in spite of the fact that many Kenyans depend on agriculture for their livelihoods.

Kenya's target of 200,000 hectares of irrigated land by the year 2006 in its 1981 National Food Policy Report remains beyond the horizon with only 41,000 hectares under irrigation by 1999, much of which was done by large-scale farmers (Onjala, 1999). To develop the small-scale irrigation alternative and apply it elsewhere one must first understand the conditions under which small-scale farmers develop and manage their schemes. This brings to focus the factor availability and mobilization for small-scale irrigation in the ASALs.

The Government of Kenya has examined means of intensifying agricultural production and bringing marginal lands under cultivation that form more than

three quarters of kenya. Analysts have noted that in agro-ecological, economic and socio-cultural terms, many large scale, centrally managed irrigation schemes are more costly and less effective than smaller systems developed and operated by farmers (Uphoff, 1986; Martin *et a,l* 1986; in Thompson 1991). An alternative would be to enhance small-scale farmer-developed irrigation systems. This alternative, like many other agricultural innovations, has however not been as widely practiced especially among the poor in the rural marginal lands.

Case studies on small-scale irrigation in Central Kenya (Thompson 1991) have revealed that factors such as the organizational and leadership capacities of water user groups and external support services are important determinants of the success of small-scale irrigation schemes. Agricultural extension services are also important in helping to guide the farmers not only in crop husbandry but also in water management particularly because irrigation is a relatively new practice among most rural communities.

The challenge of this study has been to identify the social and economic factors that determine the actualisation of small-scale irrigation beyond the availability of water and the push factor for more food availability. Kyuso Division of Kyuso District was a good fit for the research of the study.

1.1 Justification of the Study

In the recent past in Kyuso Division of Kyuso District, three NGOs namely AAK, GTZ and CDK along with the government and the beneficiary communities were involved in developing water sources for ten years since late 1980s. AAK, for example, recorded the following achievements during the years 1987-1999: 16 rock catchments, 18 sub-surface dams, 17 Earth dams, 54 wells, 4 spring protections and 5 boreholes in the Kyuso development area, half of which is within Kyuso Division. CDK on the other hand has recorded that during 1995-1999, it implemented 28 shallow wells, 3 rock catchments and 1 subsurface dam in Kyuso division with more activities still going on.

More recently Tana and Athi River Development Authority began a phase two of extending piped water for about 25km cutting across Kyuso District. In 2005-2007, JICA together with the government of Kenya put up 50 boreholes in Kyuso District. This does not include projects done through the Constituency Development Fund (CDF). The government is also doing an Arid Lands Management through Special Programs in the office of the President for last three years which aims at among other things increasing agricultural productivity in the arid and semi-arid districts in kenya including Kyuso District.

This has made it possible for communities in the division to have access to water within less than one kilometre from their households. This water availability is

recorded in at least 10 of the 12 months in a year (CDK). Most wells and boreholes have been installed with manual, wind or diesel pumps with access to a water technician from the Government Ministry or the CDK. The available water sources were prominently utilized for household purposes only rather than also for agricultural production purposes (Mwingi District Development Plan 1997-2002). Kyuso division also has agriculture and water government officers who are trained to offer training and expertise in irrigation.

There is underemployment of labour during the six months after harvesting and before planting every year in kyuso division. There are also frequent food shortages in the division as a whole, with heavy reliance on vegetables from outside the district. There has also been a poor record of fruit tree growing except along rivers. In essence, Kyuso Division has the potential to achieve irrigation since it has all basic requirements as stated by Thompson (1991). As at 2009 when this thesis is being completed, Kyuso District is famine stricken. Thus Kyuso District has the resources and reasons needed to achieve small-scale irrigation, yet it is not. There is therefore need to study the reasons why it is not yet happening.

1.2 Statement of the Problem

Although Kyuso District is semi-arid, there is easy access to water through community water projects in Kyuso Division. Such water availability coupled

with the presence of government technical officers in water and agriculture, gives the division the potential to ease food insecurity and unemployment through small-scale irrigation in the region. However, this potential has not been exploited; water sources are prominently utilized for household purposes only rather than for agricultural production as well. This study was therefore intended to unearth the social and economic factors that have lead to the lack of utilization of community water projects for small-scale irrigation in Kyuso Division.

1.3 Research Questions

The following research questions guided the study:-

1. Does control of access to utilization and maintenance of and the resolution of conflicts surrounding community water projects (CWPs) affect their utilization for small-scale irrigation (SSI)?
2. How does access to production resources including income, farm inputs, land, water and transport affect the utilization of community water projects (CWPs) for small-scale irrigation (SSI)?
3. Are there gender factors that dictate accessibility to ownership, decision making and utilization of community water projects (CWPs) and other production resources for small-scale irrigation in Kyuso division?

1.4 Study Objectives

The main objective was to establish factors that affect access to and utilization of community water projects (CWPs) for small-scale agricultural irrigation (SSI). Specific objectives included:

1. To examine of the management strategies of community water projects.
2. To determine how household economic status affect access to and utilization of community water projects for small-scale agricultural irrigation.
3. To examine how gender relations affect access to and utilization of community water projects for small-scale agricultural irrigation.

1.5 Assumptions

The study was based on the assumption that Community Water Management strategies, gender relations and household production resources affect access to and utilization of community water projects for small-scale irrigation. It was also based on the assumption that the people in the division appreciate the prime importance of water for irrigation.

1.6 Significance of the Study

The study is considered significant for the following reasons:-

1. Provide insight to government and policy makers on the specific interventions necessary for greater facilitation, maximization and equitable

access to and utilization of community water projects for small-scale irrigation that is non-scheme based.

2. Improve the community's ability to manage community water projects as agricultural production resources also but not for household use only.
3. Add to the existing information and data on agricultural extension services, community rural water access and utilization, and highlight further research questions in the area of study.

1.7 Scope and Limitations of the Study

The study was conducted in Kyuso Division of Kyuso District among households, community water project users associations, and agriculture related government and non-governmental agencies in the division.

It focused on small-scale irrigation that is community water point, farm and household system based, analysing the community water management strategies, household production resources, and gender in relation to the utilization of community water projects for small-scale irrigation.

The study did not however look into geo-physical factors like climate and soils as they affect SSI. It also did not look into crop types that are viable for irrigation in the particular region. Given that the study focused on only one division generalizations to the ASALS may be made only with caution.

Definition of Operational Terms

1. Community Water Projects (CWPs)- shall refer to water sources in the research area whether initiated by the government, Non-Governmental Organizations, communities or jointly by any or all of the above.

2. Gender- shall be understood to be socially formed beliefs and practices about masculinity and femininity that not only feed into individual identities but are also fundamental to social institutions- such as family and self help groups determining what they are supposed, able and allowed to do.

3. ASALs- Arid and Semi-Arid lands. Refers to ecosystems in Arid and Semi-arid regions. They receive precipitation ranging from 350mm-700mm per year and are prone to frequent and prolonged droughts. Rain fed agriculture combined with pastoralism is practised.

CHAPTER TWO: REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter includes literature review based on the study objectives. It brings out current trends and highlights in regard to community water management strategies, household production resources and household gender relations. The second part brings out a discussion on the Structuration theory and how its' tenets inform this study as depicted in the conceptual framework. The generic theme is that a people determine in a major way the extent to which resources available to them are managed to sustain their livelihoods.

2.1 Community Water Management Strategies

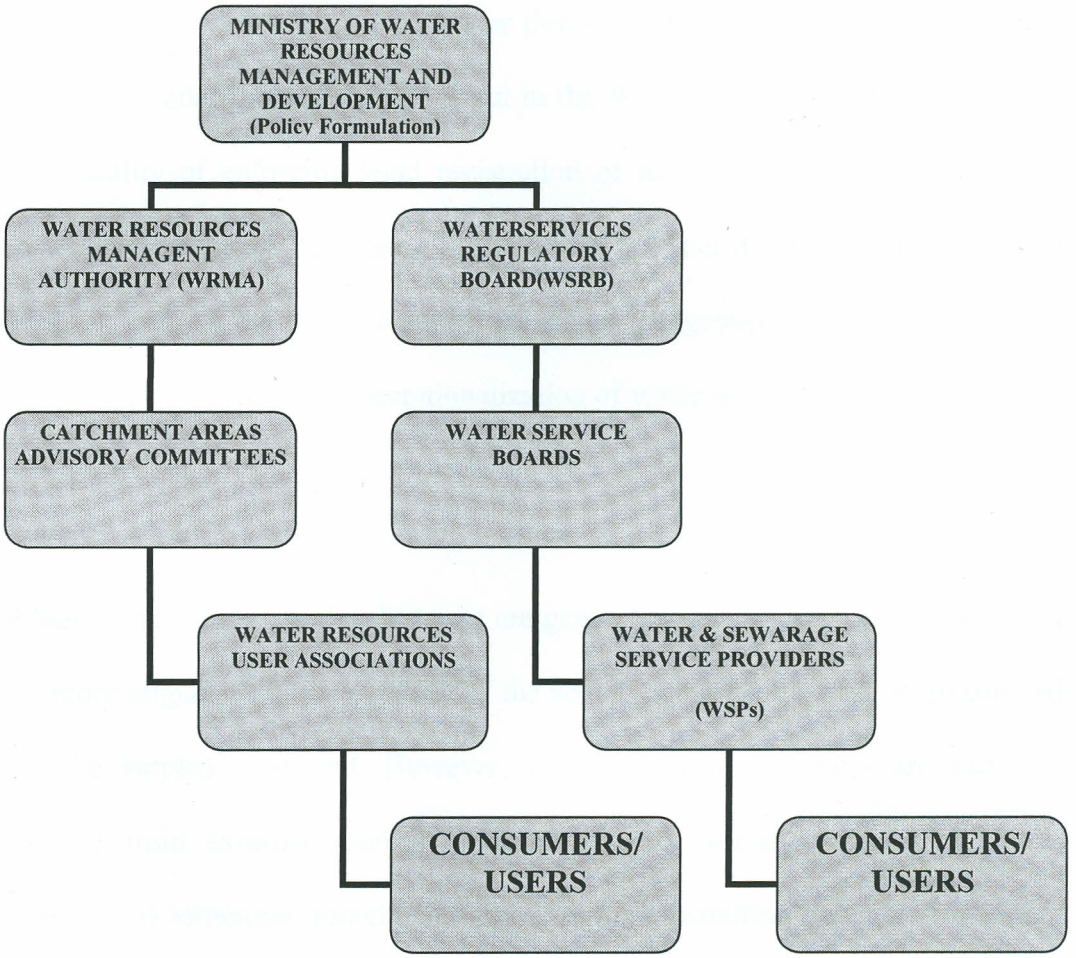
According to Bromley (1989), the ability to use ecosystem productively and sustainably depends critically on the local social organization forms and management patterns at work under one or other resource regime. A resource regime is a structure of rights and duties characterizing the relationships of individuals to one another with respect to the particular resource/s (Ojungu, 1992). Thus, resources such as water, land, labour, farm-inputs and technical know-how are critical for the success of small-scale farmer managed irrigation. This particular regime would revolve around a water source, the household and the water management institution.

Most irrigation strategies involve the management of a complex mix of physical and socio-economic factors. Central to these irrigation strategies are the water supply activities, maintenance and improvement of that supply and, where applicable, the collection of water charges. Much of the water supply in the ASALs is from underground sources such as boreholes and wells. In addition, surface water is collected through river abstraction, sub-surface dams and rock catchments.

Development agencies have adopted the position of being providers of water through funding water supply projects such as those mentioned above. The responsibility is often passed to the government water agency on completion of construction (Jan *et al;* 1995). However, in many countries, long- term government support for the operation and management of water supplies cannot be guaranteed because of lack of adequate government resources; communities have therefore to take responsibility for managing their own supplies (G.O.K 2000). Communities have therefore, become important development partners and have their share of challenges. This includes; actual project management, as well as the need to develop capacities and skills necessary to utilize the project (resources) so implemented.

Currently in Kenya since the enactment and operationalization of the Water Act 2002 the names and roles of the different actors in water development is gradually changing. The new act has achieved the separation of policy formulation from regulation and service provision. Service provision is further divided into WSS (Water Sewerage Services) and WRM (Water Resources Management) services. Generally there has been a redefinition and a devolution of responsibilities. The organogram below depicts the current simplified institutional set-up.

Figure 1: Simplified Institutional Framework as in the Water Act 2002



Community water projects will have the role of bidding for services as a WSP from the water boards, operate and maintain facilities, comply with quality standards and service levels as well as billing and revenue collection. Operationalization of this act has not been completed to its lowest levels and it is already facing challenges.

In his paper on 'Kenya's new water law: an analysis of the implications for the rural poor' *(Mumma, 2005)* brings this across very well. In summary he mentions the risk of the elite taking over water development since the rural poor cannot meet the standard requirements set out in the Water Act 2002. He also evaluates the viability of enforcing legal registration of land on which water points are drilled given the fact that the government has not issued surveyed or issued title deeds in many parts of the country. He finally suggested a re-evaluation of the plural legal constraints the operationalization of water act 2002 will face and their harmonization.

When the resources for development are generated internally and gradually, they are more aligned with the capacity of the socio-economic structure to absorb and use the surplus generated. However, if the financial resources are suddenly injected from external sources while patterns of social organization or the institutional structures remain the same, and no matching change in the non-financial factors of development is sought, then serious discrepancies set in

(Chambers, 1997). Non-structural factors of development refer to, among other things, resource management strategies. Resource management may be defined as a process of decision making whereby resources are allocated over time and space according to the needs, aspirations and desires of man within the framework of his technological inventiveness, his political and social institutions, his legal and administrative framework (Orioran 1971 in Ojungu, 1992). Resource management strategies should therefore be designed to promote exploitation, enhancement and restoration of resources. This can well be achieved among the target group via the local institutional set-up relevant to the particular resource, in this case community water projects (Uphoff, 1986).

How these non-structural factors of development impact the utilization of Community Water Projects for small-scale irrigation is the concern of this study. It will help to redirect the efforts of the development partners as well as empower and enable the target communities to achieve small-scale irrigation. They can be categorised as accessibility, maintenance and conflict resolution.

Regarding access to community water projects, the potential benefits of a programme have been considered to be equally beneficial to the whole community. In reality however, this may not be the case. Special provision may need to be made for disadvantaged groups of people (Jan, 1995). The location of an improved supply may have a decisive effect on who benefits. In so far as water

development is concerned with equitable distribution of amenity, it must appreciate and attempt to correct the biases of geography and society.

Most commonly maintenance management functions may include group management, decision making, record keeping, fundraising, financial accounting, technical service provision and linkage with other agencies. Normally a management committee is set up to meet such challenges and may be enabled through training. Further group empowerment may be achieved by being registered with the local government authority, which gives it a legal standing. Standardization can also be achieved through a written code of management.

Frequently more than one use is made of water, including domestic supply, livestock and irrigation among other uses. These different demands on the resource are not always compatible; if one user alters the quality of water supply or restricts its flow it may well affect another user. One of the tasks of water resource management is therefore, to try and ensure that various uses are compatible, and if not, to weigh up the costs and benefits and decide how to restrict use (Bromley 1989, Uphoff 1986) in order to minimise conflict.

In Focus Group Discussions with management committees it was found out who constitute the management committees, how they operated, how they met their challenges and facilitated the utilization of the CWPs for SSI.

2.2 Household Production Resources

The household is an important facet in rural agricultural production since it is the main source of almost all required resources of production including know-how, land, labour and other farm inputs. It is also the recipient of extension services and other development projects. The main challenge to development has not only been finding out the availability of resources but also influencing their utilization for production. In other words, factors that influence the decision making process by which a household decides to employ its resources in one way and not in another for its continued sustenance. Such factors have been identified to include technological, economic as well as gender considerations.

It suffices to mention here that micro-financing has found its way into water development. This has been mainly attributed to lack of funds to finance capital for construction of water projects (). Pilot projects, legislation and awareness creation among financiers and key stakeholders is happening. Certain gaps are already notable. On the one side among water and sanitation players (Meeta, 2008) separated from the other hand of small scale irrigation schemes (Neubert et al 2006). However, separate sectoral approach is a sure way not to succeed especially when its different parties discussing the use of the same limited resource. Again, this may be difficult to achieve, partly because the need to ensure the benefits of improved access to water are large enough to cover the costs of those who bear them is often overlooked (GWC, 2007) . The financiers like the

World bank and KREP look forward to repayment of loans through water tariffs collected, however they have overlooked the fact that the water users need to be earning incomes to pay those rates. Such is the strategic place of SSI as an income earner.

One of the fundamental issues of resource development in developing countries relates to the lack of economic power or poverty. Inadequate provisions of food, shelter, clothing, drinking water, sanitation, health services, educational facilities and opportunities for employment characterize absolute poverty in developing countries (White, 2001). It is important to mention that there are very many processes, relationships and socio-economic structures underlying poverty in rural areas which include: landlessness, low wages, political powerlessness, vulnerable bio-physical environments, imperfect markets, adverse macroeconomic policy and elite controlled policy processes. The key determinants of poverty are difficult to identify because they remain specific to socio-economic and agro-ecological contexts. Being clear about the meaning and nature of poverty is also important because the definitions used and the measurements applied shape both how the problem is viewed and the policies chosen to combat it. In Kenya, most poverty studies done have achieved the measurement of poverty in its quantitative and qualitative aspects and this is evident in the national census of 1999, district development plans and more recently in participatory poverty assessments 2000, 2001 in consultation with the World Bank.

The conceptual issues surrounding the measurement of household income have been summarized in Living Standards Measurement Survey (UN) to include two separate but related accounts, that is, the production and accumulation activities of a household. However the qualitative aspects of poverty remain specific to a community. The production account is based on the assumption that households and household members' earn income by supplying production resources that they own to productive activities and by receiving current transfers. Accumulation on the other hand is the best indicator of what the household has to spare upon consumption of income so earned.

Household production resources have less economic aspects too. Among these is the level of dependency arising for example from landlord and tenant, employer/employee, husband and wife, man and woman. Both encompassing and going beyond these various aspects is social exclusion- which refers to the inferior access of the poor to state services and other collective provisions and to the labour market; inferior opportunities for participation in social life and collective decision making; and a lack of decision making power. Hopelessness, alienation and passivity are thus common among those living in poverty.

This study is concerned with how the economic status affects the household productivity with special regard to utilizing community water projects for small-scale irrigation. Measuring the economic status shall be achieved by acquiring

data about household economic status including income, farm inputs, land and water transport. Each economic aspect by itself would exhibit a positive relationship to the utilization of community water projects for small-scale irrigation. For example, if income was high then it would most probably mean an increased probability to utilize CWPs for SSI. At the same time, utilizing CWPs for SSI cannot be achieved by high income alone, such an achievement comes about by the fore mentioned factor combination. How well this is achieved or is achievable determines the attainment of small-scale irrigation.

2.3 Household Gender Relations

Gender has been defined as the masculine and feminine roles ascribed through socialization by the society, to male and female members respectively, for its continued existence (Imam, 1997). In this regard the existence of a society in all its spheres is based on gender roles and relations. Gender shapes the opportunities and constraints that women and men face in securing viable livelihoods and building strong communities across cultural, political, economic and ecological settings. Gender influences the roles and relationships of human beings throughout all dimensions of activity. Gender is central to positioning both men and women vis-à-vis institutions that determine access to land, to other resources, and to the wider economy.

Gender analysis acknowledges the inequality of social relations between the sexes and analyses the degree, forms and the consequences of that inequality in order to transform it. In gender analysis we assume not only the inequality but also its inherently social nature. Men and women are products of their culture, values and history. Conceptualising gender is therefore essential in disaggregating and interpreting information about the functioning of households and community organizations. With the growing numbers of female-headed households through out the world, and the increasing role of women as household providers in declining rural economies, it is essential to incorporate gender into the discussion of resources and sustainable development (Slocum *et al*; 1988).

There is a wide variation in the definition of the term 'household head'. There are major contrasts between female-headed households. Female headed households include households headed by single mothers, divorced or widowed women, women whose husbands have deserted them (de jure); and those headed by women whose husbands are away for an unspecified time including migrant husbands or whose husbands make only a marginal contribution to the household due to disability, unemployment etc (de facto). Furthermore, as female headed households are not homogenous, policies devised to address their needs should take into account the specific social, economic and political conditions and constraints which they face.

Another consistent factor that has impeded household gender relations progress in Africa has been the *lack of appreciation of the survival strategies* that are in place in households. A program or activity cannot just replace the power balance that holds household members together as a unit to provide basic necessities. Activities such as specific empowerment of women threaten this balance even if for those who can benefit from it. While development programs have the flexibility to design their programs towards specific beneficiaries, it is naïve to think that households will re-orient the way they work, relate, help and cooperate for daily survival as easily. Terms such as long-term sustainability hold no meaning to those who are faced with immediate survival (White, 2001).

Also the legal status of women plays a significant role in shaping the socio-economic position of women in the society. Women are legally less privileged than men and this explains their subservient position in the society. This is especially true in regard to contractual matters, inheritance rights, divorce and separation. Most Kenyan women live in the rural regions, lack educational advantages enjoyed by their male counterparts and generally remain under the authority of their fathers or husbands.

Finally, crucial data about women producers are not available to agricultural planners and policy makers. This is because data is not gender-segregated. Thus, national statistics are not available on men and women's access to agricultural

extension services, training, inputs, credit, technology and organizational membership in farmers' organizations etc. This has made it difficult to translate the empowerment programs into nationwide policies (World Bank, 2001). It is imperative therefore, for primary relevant information to be made available to program designers and to policy planners to facilitate the empowerment of women folk in light of their marginalized position. This must be made in consideration of the other family members as well as their household's local survival strategies.

2.4 Theoretical framework

The study was mainly guided by the Structuration theory as formulated by Anthony Giddens. It helps view the community as made up of individuals who's repeated activities trigger the formation of social structures and at the same time those structures determine the activities of the individuals. It concurs to a duality (two way) rather than a dualism (one way) where the making of a society and its institutions is concerned.

Giddens (1990) developed this theory and admits to have borrowed a lot from other interpretive as well as deterministic social theories. It has also been referred to as the 'new sociological rules'. In it he attempts to bridge the gap between agency and social structure. Actors are seen to be taking pre-given resources and

using them to reproduce interaction patterns over time, thus lending structural quality to their behavior.

The difficulty of previous agency theories according to Giddens, is that each accepts that social existence is constituted as a dualism of action and structure. He on the other hand proposes that action and structure are a duality, that is, simultaneous aspects of a single phenomenon. He, therefore, conflates social structure and systems to agency. The concept of duality of structure was developed in order to counter two main types of dualism (Giddens, 1993). One is that found among interpretive sociologies- they are strong on action, but weak on structure. They see human beings as purposive agents who are aware of themselves and as such have reasons for what they do. But they have little means of coping with issues such as constraint, power and large-scale social organization.

The second is found among deterministic sociologies which while strong on structure has been weak on action. Agents are treated as if they were inert and inept- the playthings of forces larger than themselves. The dualism of individual and society is therefore rejected here. Neither forms a proper starting point for theoretical reflection; the focus should be on reproduced practices (structuration).

Duality is dualism reconstructed. Duality of structure means that social structure is constituted both by human agency and yet at the same time the very medium of this constitution. That is, as both inferred from observation of human doings and yet also operating as a medium where those doings are made possible.

The society is viewed as made up of structures, which come about through the process of structuration. Structure is not a group, collectivity or organization as in functionalism: these have structural properties. Groups and collectivities should be studied as systems of interaction (interaction is constituted by and in the conduct of the subjects). It is not the descriptive analysis of the relations of interaction that compose organizations or collectivities; it is rather the generative rules and resources. Structures only exist as the reproduced conduct of situated actors with definite intentions and interests. Structuration is the reproduction of practices; it refers abstractly to the dynamic process whereby structures come into being (Stones, 1996).

The social reproduction of structuration process is explicated through strategic conduct and institutional context analysis. Context is central to the structuration theory. The context in which a social action takes place is definable not only in terms of time and space but also in terms of peoples' understanding of what they are doing. Strategic conduct analysis is analysis that places in suspension institutions as socially reproduced, concentrating upon how actors reflexively

monitor what they do; how they draw upon rules and resources in the constitution of interaction. It gives primacy to the consciousness of agents as expressed in their words (discursive consciousness) and in their capacity to do what they do (practical consciousness) always taking into account knowledgeability, motivation and power control relations. Institutional analysis on the other hand is social analysis that places in suspension the skills and awareness of actors, treating institutions as chronically reproduced rules and resources. Giddens (1990) argues that an observer of social phenomena cannot do so independently of drawing upon her/his knowledge of it. The researcher must therefore attempt to immerse herself/ himself into the form of life so as to generate description that can be mediated into categories of social science discourse (Giddens, 1993).

The structuration theory, therefore, recognizes the community as actively participating in its continual construction. It helps the social researcher understand that the praxis of social change is not only in the directive functioning of institutions but also in the participation of the people involved through communication, operation of power and moral relations to shape such institutions. Such recognition offers a theoretical guide to social research in identifying the agent and institutions as units of research, the collection of data as well as its analysis. These two aspects are the most practicable aspects in guiding social research.

In summary, structuration theory succeeds in considering the individual and the social structures as simultaneously involved in the making and continuity of the society; an aspect that previous social theories had thought impossible. More importantly it contributes to irrigation as a social structure by identifying rules and resources (allocative and authoritative) as the ones that enable social structuration. They cannot exist by themselves; they only exist by use and disuse by individuals and therefore, can be used or changed by the users. This is important for fact that a community is viewed as capable of change given its situation and having an ability to learn new means of sustenance both physically and culturally.

2.5 Conceptual Framework

Based on the literature review and structuration theory discussed above, a conceptual framework was developed which depicts a simplified duality (rather than dualism) view of how the various factors of analysis inter-relate as shown in figures 2 and 3.

The conceptual framework depicts dualism and duality respectively. In dualism thinking and practice (Figure 2), each of the sustenance aspects is developed independently irrespective of how it affects others. Each circle is therefore independent. This result in the attainment of one at a time, say resources, while

the other two, in this case management and utilization, remain a challenge thus making sustenance illusive.

However, in duality thinking and practice (Figure 3), which is proposed here, all the sustenance aspects affect each other simultaneously, thus the circles interact and create a stable center. This continues until a balance (sustenance or the stable centre) is attained. This balance is lost and regained as the need of the community and the three aspects change.

Figure 2: **DUALISM (One way)**

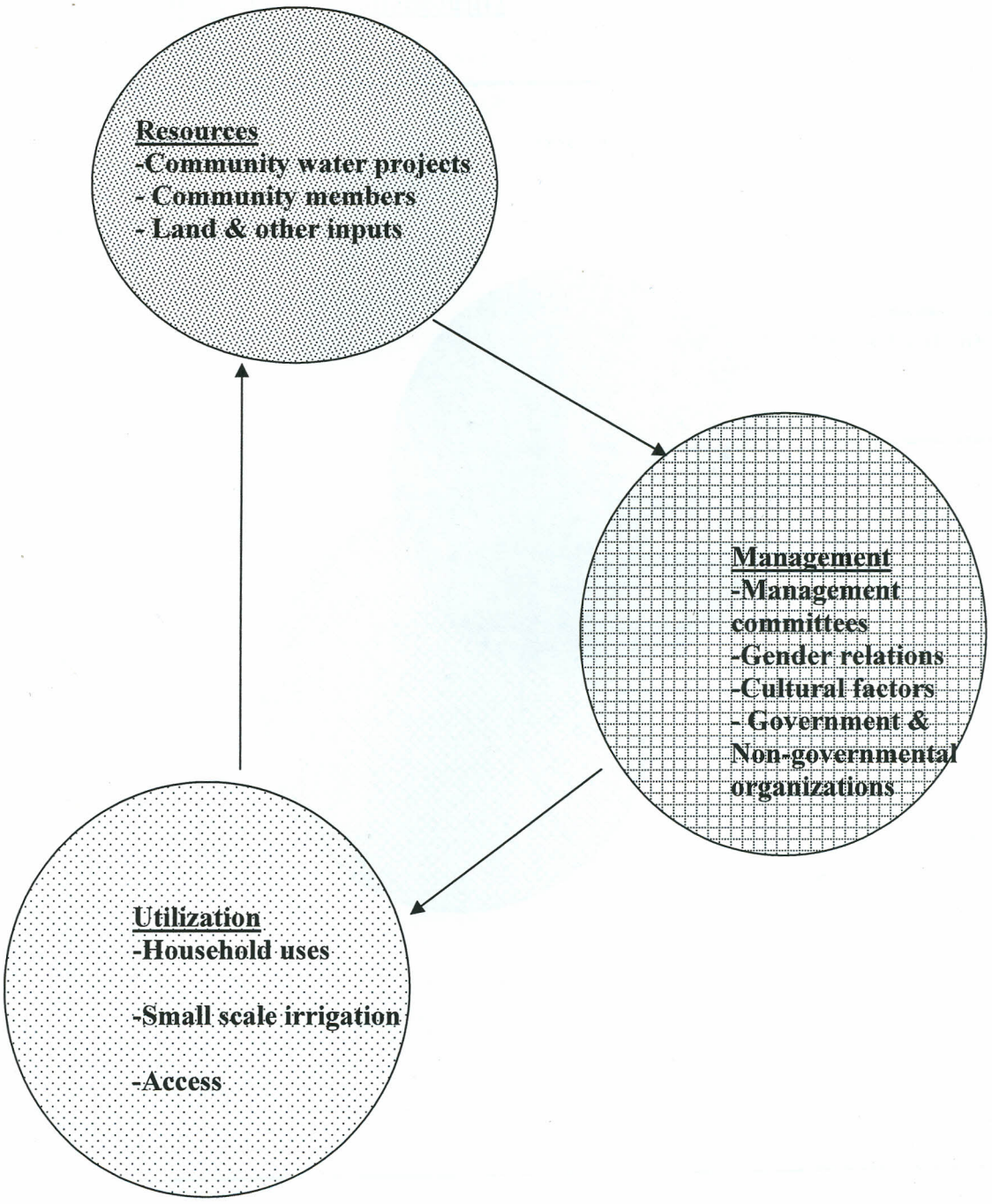
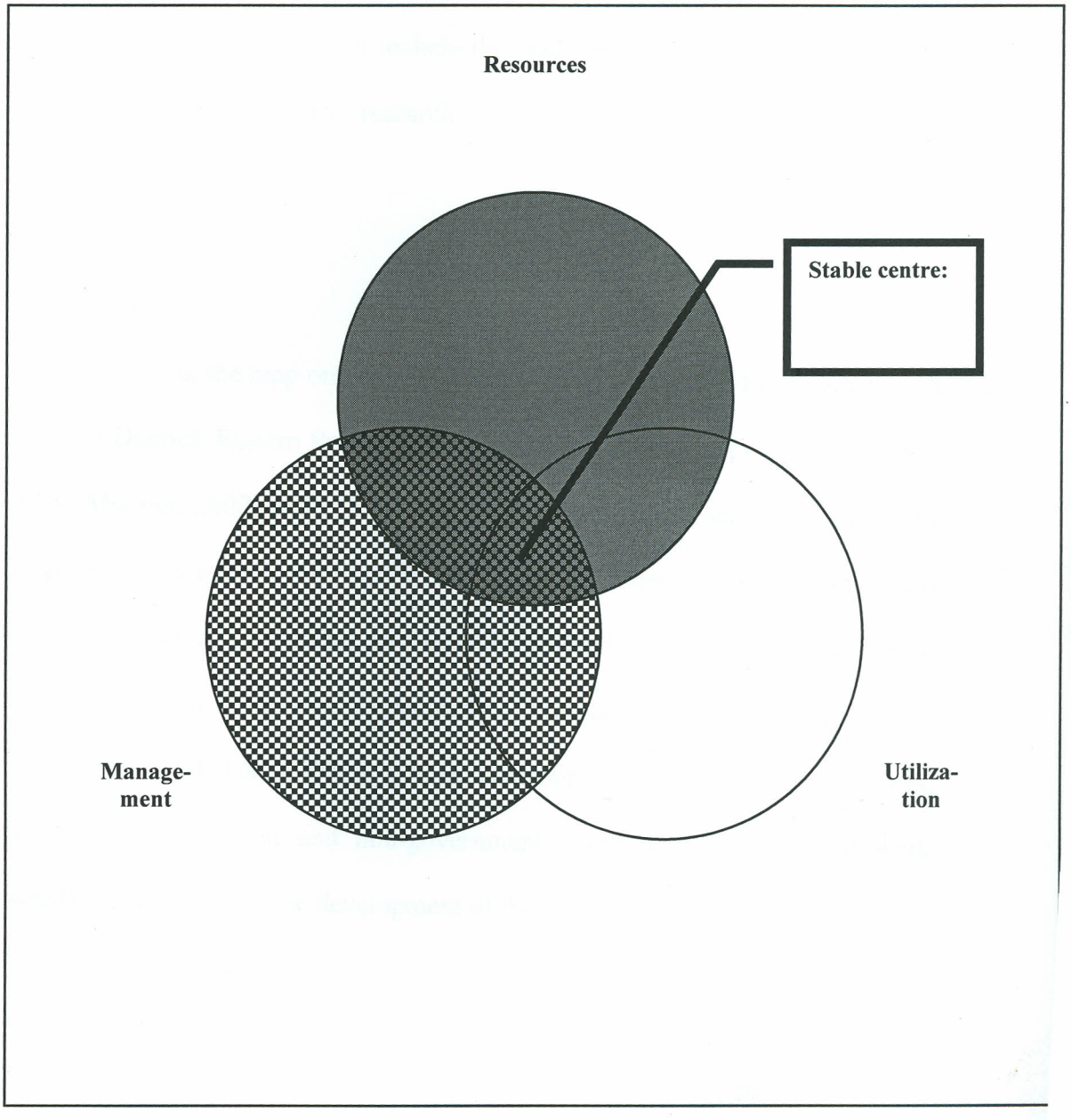


Figure 2: **DUALITY (simultaneously)**



CHAPTER THREE: RESEARCH METHODOLOGY

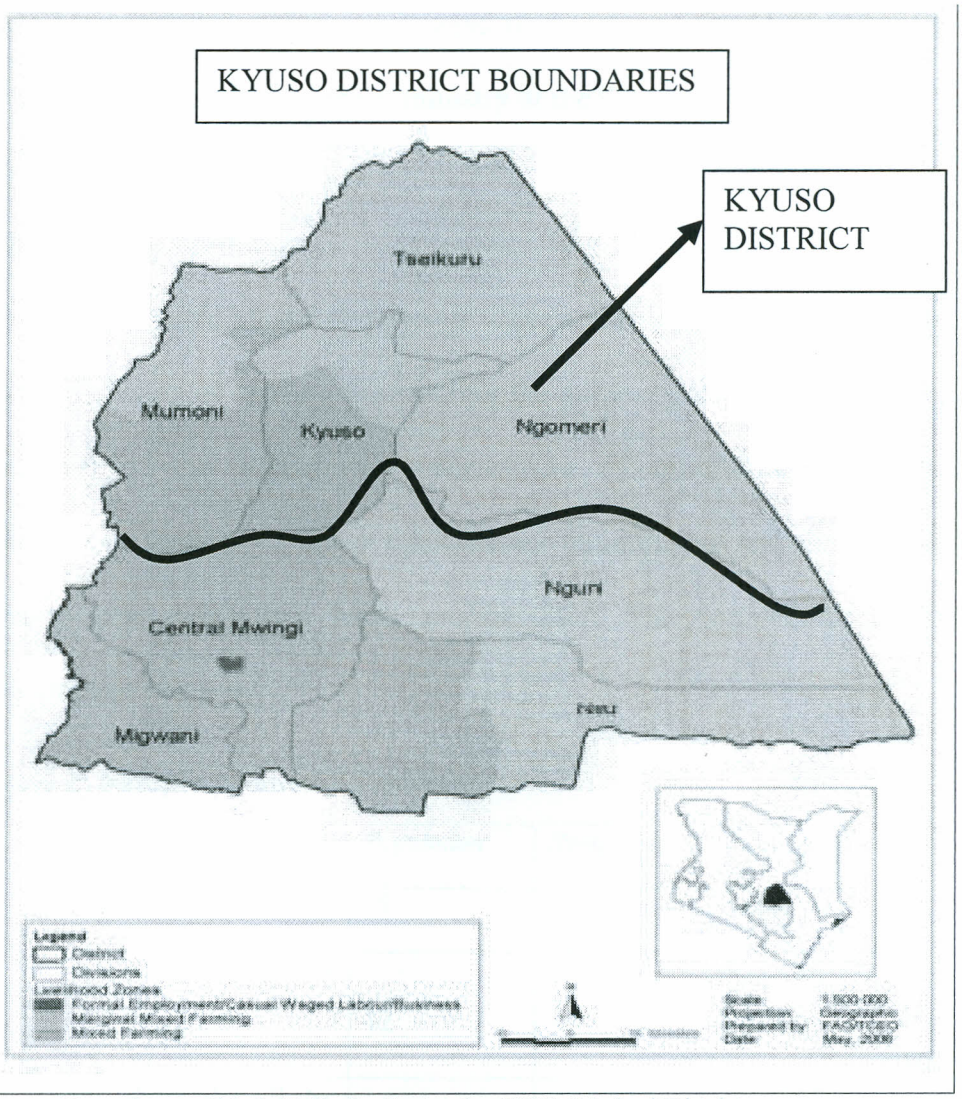
3.1 Introduction

This chapter describes the various aspects of the research methodology that were used in this study. The aspects include the study area, the target population, the sampling procedure and size, research tools used, the data collection procedure and the data analysis.

3.2 Study Area

As highlighted in the map on page 30, Kyuso Division is located in Southern part of Kyuso District, Eastern Province, Kenya. It has a human population of 34,643 (DIDO Mwingi, 2000) and is classified among the arid and semi-arid regions of Kenya. It is characterized by two wet and two dry seasons annually which fall during the months of October to December, March to April; and January to February, May to September respectively. Community institutions in the area range from households, self help groups, community based organizations, clans, churches to government and non-governmental agencies, all of which work towards the socio-economic development of the community.

Figure 3: Map of Kyuso District



Source: Drought monthly bulletin for September 2007, Mwingi District

Until 2001 three NGOs namely AAK, GTZ and CDK as well as the government had been actively involved in community water development in Kyuso Division the previous ten years. At least this made it possible for communities in the division to have access to water within a range of less than one kilometre. The water availability is recorded in at least 10 of the 12 months in a year (CDK

2002). Each water project serves 20 to 30 households. Most wells and boreholes have been installed with manual, wind or diesel pumps and are served by water technician from the government ministry or the CDK.

3.3 Target population

The study targeted all stakeholders of water and irrigation related development in Kyuso Division of Mwingi District. For the purposes of the study, the population consisted of the governments' department of agriculture and water, local community leaders, 12 water management committees, and the household and farm of the community water project users. The population distribution is summarized below:-

Table 1: Sample frames and sizes

Sample	*Population*	*Sample size*	*Percentage*
Sub locations	15	6	40%
Selected Water projects	12	12	100%
Respective Water mngt. Committees	12	12	100%
Households for selected CWPs	360	108	30%
Govt. sectors	2	2	100%

3.4 Sampling Procedure and Sample Size

Kyuso Division constitutes of fifteen sub locations. However, the study was conducted in six (6) sub locations selected randomly. This was achieved through random sampling, listing and sealing the fifteen names of sub-location and then picking six randomly. Two water projects were purposefully selected from each selected sub-location to form a sample of twelve (12) projects. The projects were selected on basis of high functionality, reliability and were done with the help of the divisional head of the Ministry of Water and of the Ministry of Agriculture. High functionality denoted that the water project was in use, with an existing management committee and a functioning pump; reliability on the other hand was denoted by water availability through out the year. Such projects were best suited for our study since it was based on the assumption of sufficient water availability for SSI. The respective water management committees (12) composed the sample size.

Each water project serves 20 to 30 households (this study assumed the higher figure). Each household was listed with the help of water management committees and validated by the investigator. One household out of every three was then randomly selected from each list to make a 30% representation. Simple random sampling was done, first by listing each household by its category and selecting every third household on that list. One adult member (male or female head) was then interviewed in each selected male headed household and one

member (male or female head) in the single parent households, making a total target of 108 respondents. Household heads were selected due to their place of authority in decision making about use of resources especially regarding utilization of water and other household resources.

Purposive sampling was utilized to select local leaders and Key informants from two of the representative sub locations who participated in the study. Purposive sampling was used to ensure only leaders who were active in water development were interviewed since they would share more relevant information. Divisional heads of government ministries namely: water and agriculture composed the study's sample size.

3.5 Research Instruments

The research instruments utilized in this study were adopted from research studies by Deepa Narayan 1996 and Grosh 2000 as discussed below. Both studies were found to be relevant as they focused on managing community water projects and establishing standard measures of household economic status.

3.6 Focus Group Discussion Checklist

One FGD checklist was used to acquire information from 10 water project management committees (each separately) which comprised of the 10 water projects in the study. The FGDs were guided by discussion topics that were based

on the questions and objectives of this study. Participants of these FGDs were elected members of the CWP management committees holding positions of chairpersons, treasurers, secretaries, their assistants and representative members.

Information gathered included history of the project, structure and functions of the management committee, operations, conflicts, gender, water uses and partnerships. Of the twelve intended FGDs, ten were successfully conducted (For details see Annex 1).

Table 2: Gender of Participants in FGDs

No.	Sub-Location	Name of water Project	Number of persons in FGDs	
			Male	Female
1.	Kimangao	Kyandani Well	8	4
2.	Kimangao	Maseki Water Project	9	4
3.	Itiva Nzou	Ya Nziani Well	4	8
4.	Itiva Nzou	Ngoolo Self- Help	5	2
5.	Gai	Kambusya Well	3	5
6.	Gai	Mauru B. Hole	10	3
7.	Kimu	Kalikana Well	9	3
8.	Kimu	Katambauku E. Dam	8	5
9.	Mivukoni	Muvingue well	-	12
10.	Twimiwa	Manzolo well	9	3
		TOTAL	65	49

3.7 Structured Interviews with household heads

Structured interviews were conducted among household heads of users of the community water projects using an interview form with listed questions to guide the interview. The preference of structured interviews was based on the fact that they were ideal in tackling widely defined issues. Those interviewed were also able to expound on a topic, focus on some of its aspects, as well as relate their own experiences. In addition, the interviewer was able to intervene for clarification of issues (Bless and Achola, 1987). The structured interviews were administered to the respondents individually. Issues surrounding water access and utilization of water projects for irrigation, management, gender and economic status were tackled. Seventy four (74) interviews of the 108 intended among household heads were conducted(See Annex 2).

3.7.1 Structured Interviews with Key Informants

Structured interviews were conducted with selected key informants using an interview form with listed questions to guide the interview. Key informants and local leaders included the local councillor, sub-chief and local CBO leader. The preference of structured interviews was based on the fact that they were ideal in tackling widely defined issues. Those interviewed were also able to expound on a topic, focus on some of its aspects, as well as relate their own experiences. In addition, the interviewer was able to intervene for clarification of issues (Bless and Achola, 1987). The structured interviews were administered to the respondents individually. Issues surrounding water access and utilization of water

projects for irrigation, management, gender and economic status were tackled. Twelve interviews were successfully conducted as intended with key informants (See Annex 3).

3.8 Questionnaires

One similar set of questionnaires were used for the government's agents in water and agriculture departments. This was done by formal introduction by the researcher to the respondents as well as the purpose of the study. Then they were issued with the questionnaire for self filling and a collection date was agreed on. Questionnaires consisted of both open and closed questions. Open-ended questions were an advantage and were well suited for case studies since they were not based on predetermined answers. Close ended questions on the other hand provided for easier clustering and coding (Bless and Achola 1987). Questionnaires also provided for coverage of various topics within the same issue. Areas covered in the questionnaires included policy issues, utilization of community water projects, field experiences, extension services and plans for future interventions. Four questionnaires were issued to department heads in ministry of water, ministry of agriculture, Catholic Diocess of Kitui (CDK), and Wishing For a Well Appeal (WFWA). Only one was returned from the CDK. (For details see Annex 4).

3.9 Data Collection Procedure

Data collection was done by the researcher with the additional help of a research assistant during structured interviews with household heads and a scribe during FGDs. The research assistant went through training before the actual fieldwork. The training was done during the piloting of the research instruments. Primary data were collected from sampled and selected respondents in the different clusters using the above-described combination of research instruments and methods. Secondary data were also obtained from published as well as unpublished sources including annual and project reports, district development plans, and minutes of water management committee meetings among other documents.

3.9.1 Data Analysis

Data analysis was done on both quantitative and qualitative data. The analysis of Quantitative data was done with the help of the SPSS computer program. Qualitative data analysis was done by coding and content analysis of data in case summary forms. Content analysis was done on secondary data from reports and minutes of reports. Data presentation was done through narratives, tables and pie-charts. Triangulation was done to compare and validate the different data from their respective sources. Conclusions and recommendations were drawn on the basis of the above-mentioned presentations.

CHAPTER FOUR: DATA PRESENTATION AND RESEARCH FINDINGS

4.0 Introduction

This chapter presents research findings. The findings are presented and discussed in the light of the three research objectives. Also discussed are the characteristics of the research sample as well as the attributes and nature of operations of the organizations dealing with water in the research area. The presentations and research findings are presented under the following headings:- Demographic characteristics of the respondents, Attributes of the target organizations in water development, Management strategies of community water projects, access to production resources, and the effect of gender relations on the use of community water projects (CWPs) for small-scale irrigation (SSI).

4.1 Demographic Characteristics of the Respondents

The main groups of respondents reached in this study were household heads in target community water projects in Kyuso division. The background characteristics of the respondents discussed include age and gender, household type, occupation and incomes.

4.1.1 Age and Gender of the Respondents

As depicted in Table 2, the ages of the respondents have been categorized in five clusters of a ten year range except the first and last clusters of below 20 years and

over 61 years respectively. The table depicts the range in age and gender of household heads involved in this study.

Table 3: Distribution of Household Heads by Age and Gender

Age	Gender				Total	
	Female (N)	(%)	Male N	%	Number (N)	Percent (%)
Below 20	1	1.4	0	0	1	1.4
21- 30	10	13.5	1	1.4	11	14.9
31- 40	20	27.0	2	2.7	22	29.7
41- 50	12	16.2	2	2.7	14	18.9
51- 60	11	14.9	4	5.4	15	20.2
Over 61	6	8.1	5	6.7	11	14.9
Total	60	81.1	14	18.9	74	100

Data in Table 3 shows that, 1.4% of the respondents were below 20 years of age, 68.8 % were between the ages of 31 years and 60 years and only 14.9% were over 60 years of age. Majority of the household heads of CWP users were 21-60 years of age and should therefore be targeted for SSI.

60 (81.1%) of the respondents were women while 14 (18.9%) were men. Thus for every five women involved in community water projects, there was only one man. This fact contributes to the view that in Kyuso division it is women who are involved in matters to do with community water development activities.

Traditionally among the kamba people as in Kyuso Division, the role of the woman is to procreate children and take care of them. They therefore take charge of all household chores including fetching water and cooking meals among other roles. Women would therefore participate in endeavours that will bring water closer to their homes thus saving on time and energy which may be employed elsewhere. The women also own the families' farming land to produce food supply. Rural urban migration mostly by men in search of jobs has led to the absence of men in the rural areas. Both of these phenomena help explain women popularity in water related matters. Sociological imagination warrants us to stretch this further, that if we are considering the use of water sources for irrigation, then, its women we should seek for analysis and greater understanding of the matter. It is also a confirmation of one of four internationally accepted principles of water management, that, women play a central role in provision, management and safeguarding of water.

4.1.2 Types of Households of Respondents

Four types of households' namely single parent, male headed, "kaweto" female headed households and child headed were found among the respondents as presented in Table 3. Operational definitions of these households have been discussed in the literature review of this study. The table depicts the distribution of households (HHs) by type.

Table 4: Distribution of HHs by type

Type of household	Frequency (N)	Percent (%)
Single parent	37	50.0
Male headed	30	40.5
'Kaweto' Female headed	5	6.8
Child headed	2	2.7
Total	**74**	**100.0**

As shown in Table 3, 50% of the households were single headed (those with only one parent), 40.5% were male headed (those managed by females but headed by males who were absent for a major part of the year), 6.8% were 'kaweto' female headed households (female to female marriages for economic/ child bearing convenience) whereas only 2.7% were child headed households (orphaned children). Most of the respondents were therefore from single parent households followed by male headed households.

A key finding was the special type of household called 'kaweto households' (6.8 %) is discussed in detail here. 'Kaweto' households differ from polygamous households, in that in the Kamba culture, the household wife who cannot bear children is allowed to 'marry' another wife of her choice to bear children, not necessarily with the husband, although the children are known by the husband's

lineage. The 'kaweto' has therefore, no legal ownership of land or property (except that which is allotted to the household wife) since they are married to the wife. It's a very lowly held household in the community and only girls from extremely poor families accept such marriages. The study established that these types of households were very poor and no special consideration was accorded to them in the community water projects.

This type of household has also been found in many parts of sub-saharan Africa. They have also been reffered to as woman to woman marriages (Cadigan, 1998). Interestingly, even with the strong forces of Christianity and modernization, such traditional structures still persist. This may be attributed to the associated benefits of the practice including getting children for barren women and economic support for the poor.

4.1.3 Occupation and Incomes

In this study, occupation types were identified by season, either the rainy or dry season. This is because the seasons dictate the kind of occupations the respondents could get engaged in to generate income. Whereas the rainy season is dominated by crop growing and weeding, the dry season is not and a lot of farm land is not under use, offering the possibility of use for irrigation. This makes the dry season a period with more potential for irrigation as compared to the rainy season (when land is in use for rain-fed agriculture) and was therefore given

priority in analysis. Occupation may be understood to mean activities that the household heads mainly engage in during dry seasons to earn income to support their families.

In Table 5, the left column depicts types of dry season occupation revealed during the study. The columns show the number of respondents in that occupation in descending order and their percentages.

Table 5: Dry season occupation of HHs in Kyuso Division

Occupation	Frequency (N)	Percentage (%)
Casual labour	30	40.6
Livestock keeping	16	21.6
Trade	14	18.9
Farming	9	12.1
None	5	6.8
Total	**74**	**100.0**

Different types of dry season occupations which included casual labour (40.6%), own farming (12.1%), own livestock keeping (21.6%), trade (18.9%) were identified. Respondents comprising of about 6.8% did not report any occupation, meaning they were unemployed.

4.2 Characteristics and Specialty of Target Organizations Providing Water

The organizations that were under study included Wishing for a Well Appeal (**WFWA**), Action Aid Kenya–Kyuso programme (**AAK**) and the Catholic Diocese of Kitui (**CDK**). The following discussion focuses on the objectives and modes of implementation for water development of each of these organizations. Information about the organizations was compiled from organizations field officers, documentation, key informants, CWP management committees and the CWP beneficiaries.

Table 6 is a summary of the projects that were involved in this study and are facilitated by the respective organizations, their objectives of water provision and presence of small-scale irrigation

Table 6: Organizational Profile of Agencies Involved in Water Development

Name	**Number of projects**	**Percent in study sample**	**Objective**	**SSI practiced**
CDK	6	60%	Drinking water	Partial
AAK	3	30%	Drinking, SSI	Present
WFWA	1	10%	Drinking water	None
Totals	**10**	**100%**		

As indicated, CDK had the highest number of projects with 60% of its projects randomly selected compared to 30% of AAK and 10% of WFWA.

It was also established that all the organizations had provision of drinking water as a main objective of their water development activities and while SSI was a complimentary activity. This trend may be attributed to government policies tending towards water and sanitation in the communities through community water point. At the same time food security was being sought from large scale irrigation schemes as opposed to also SSI using community water points (NETWAS, training@netwas.org). Thus efforts for water development were more focused on attaining household water for domestic use and sanitation as a basic human right (GTZ, 2007). This provision and its actualization were set apart and not related in any way even at the policy level with achievement of food security.

In regard to the kind of assistance the target organizations channeled to the respondents to enable them to achieve their objectives, household interviews revealed that 78.3% had not received direct household assistance from the government or the above mentioned organizations except as community groups. 50% of those household heads who received training in SSI from the facilitating agency were found engaged in SSI. As seen in Table 5, only AAK had Small Scale Irrigation (SSI) as an objective in its water development work and therefore its water projects were found with presence of small-scale irrigation. The partial presence of SSI in CDK projects could be attributed to linkages to the government agency of agriculture. WFWA however had no such linkages except administrative ones and it also had no objective to facilitate SSI, thus no presence

of small-scale irrigation was observed in its projects. This implied that utilization of water for SSI will only happen if deliberate efforts by the facilitator organizations (such as training for SSI) are made to actualize it. There is need therefore to make SSI an objective of water development organizations.

4.2.1 Wishing For a Well Appeal (WFWA)

The Wishing For a Well Appeal organization was based in Twimyua sub-location in Kyuso Division. Its activities were run by project coordinators in water and education under the directorship of Bryan and Majorie Cooper, a couple from the United Kingdom. Its activities usually ran on short term basis from July to October every year. It has been in operation since 1986. Its water projects, dubbed 'Water for Life', mainly targeted provision of drinking water through earth dams and shallow wells. Community participation included the formation of self-help groups, provision of a land for digging the well, provision of sand and an active committee working with the government's local administration. In Kyuso division the organization has facilitated a record 20 earth dams and ten (10) deep wells. This serves about 1,300 families or approximately 5,000 people. Other services by the NGO included medical supplies, veterinary services and education support. The study involved one of WFWA's CWP, a deep well called Manzolo water project in Twimyua sub-location.

4.2.2 Catholic Diocese of Kitui (CDK)

The organization had extension offices for water development in Kyuso town and was based in Kitui District headquarters. The organizations water development objective included provision of drinking water within a 5 km radius, and the training of community leaders and water artisans (technicians). The types of water projects CDK engaged in included shallow wells, rock catchments, ferro-cement water tanks and spring protection. The community participated in the program by providing local construction materials, labour, and food for the artisans and was expected to maintain the project after completion. The organization worked with self help groups with elected working committees.

During 1995-1999, CDK facilitated 28 shallow wells, 3 rock catchments and 1 subsurface dam in Kyuso division and more activities were still going on. This helps serve about 1,000 households with water. The organization was still active in Kyuso division at the time of this research. Six of their community water projects were studied, namely Ka-mbusya, Ya-nziani, Maseki, Kalikana, Kyandani and Muvingue, all of which were shallow wells.

4.2.3 Action Aid Kenya- Kyuso Programme (AAK)

The Action Aid Kenya- Kyuso programme was handed over to Community Based Organizations (CBOs) in 2002 when the NGO left. The CBOs remain the umbrella bodies for CWPs but have not been involved in their functioning. The

study did not focus on the CBOs but rather on the water projects. This was mainly because it was found out that the CBOs only acted as umbrella bodies for self-help groups and CWPs in the region and as such were not involved in actual water project management and utilization which was the intrest of the study.

AAKs water development objectives were the provision of drinking water for its target communities, water for livestock and irrigation as well as empowering the local leadership through CBOs. Types of projects completed included shallow wells, ferro-cement tanks, spring protection, earth dams, bore holes and piping water to common pools. The organization fostered networks between the water projects and the local CBOs, the administration and agriculture government agencies. AAK recorded the following achievements during the years 1987-1999, 16 rock catchments, 18 sub-surface dams, 17 Earth dams, 54 wells, 4 spring protections and 5 boreholes in Kyuso development area, half of which is within Kyuso Division. This serves about 4,500 households or approximately 27,000 people.

The CWP groups had to show willingness to work with government agencies. During the study, 3 AAK facilitated community water projects were involved in the research including Katambauku earth dam, Mauru borehole and Ngoolo shallow well.

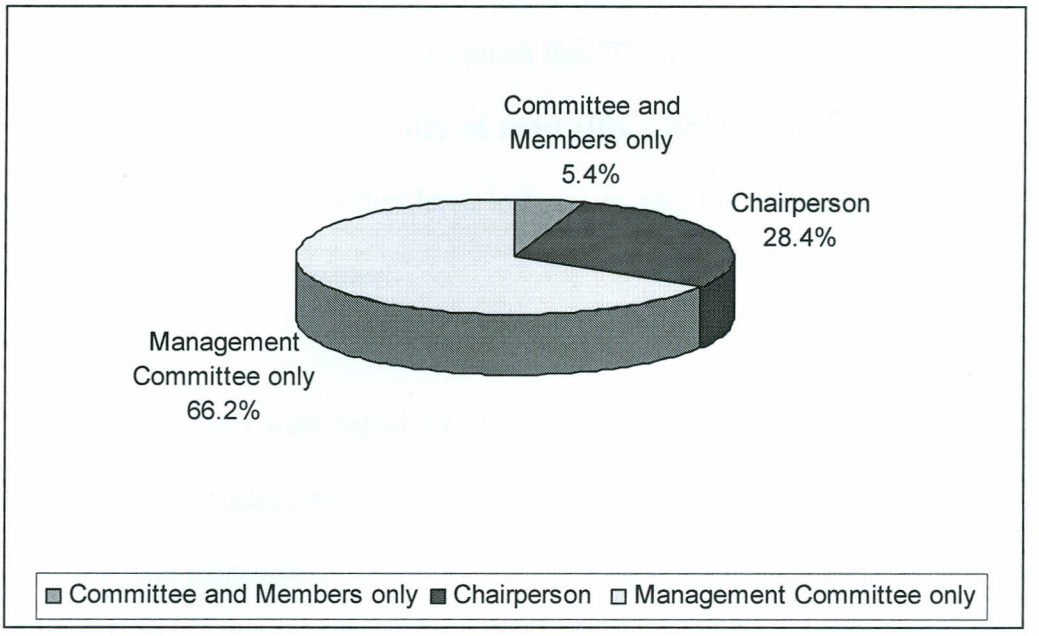
4.3.0 Management Strategies of Community Water Projects and their Impact on Small-Scale Irrigation.

The management strategy of community water projects was analysed on aspects of management, accessibility (social or geographical), maintenance, utilization and mechanisms to resolve conflicts surrounding community water projects. Management strategies are significant because they determine how the CWPs may or may not be utilized optimally to support SSI.

Information was gathered from the management committees of the CWPs using FGDs and also through interviews with household heads. Information elicited indicated that management of water projects was done mainly through management committees. Management committees were elected through simple majority by the CWP membership periodically to provide leadership and management of the projects as per their constitutions.

It was observed that all CWPs were mainly managed by management committees but with different levels of membership involvement. The Pie chart in Figure 5 depicts who is in charge of community water management. The data is based on information gathered from interviews with Household heads aimed at finding out whom and how decisions were made in their CWPs as well as their levels of involvement.

Figure 5: Who is In Charge of Community Water Project Management



It was established that the chairpersons to these committees managed more than 28% of the CWPs with little involvement of the rest of the committee and members. This may be explained by the fact that leadership is upheld and deemed powerful since they also know more and are influential, more so democratically elected. As established from interviews with household heads, the management committees without member consensus managed about 66.2% of the CWPs and only 5.4% sought the membership opinion. This was also confirmed by the Focus Group Discussions (FGDs) held with management committees and water agency department heads. This may again be explained by the fact that Management committees knew a lot more about the origins and development of the CWPs than

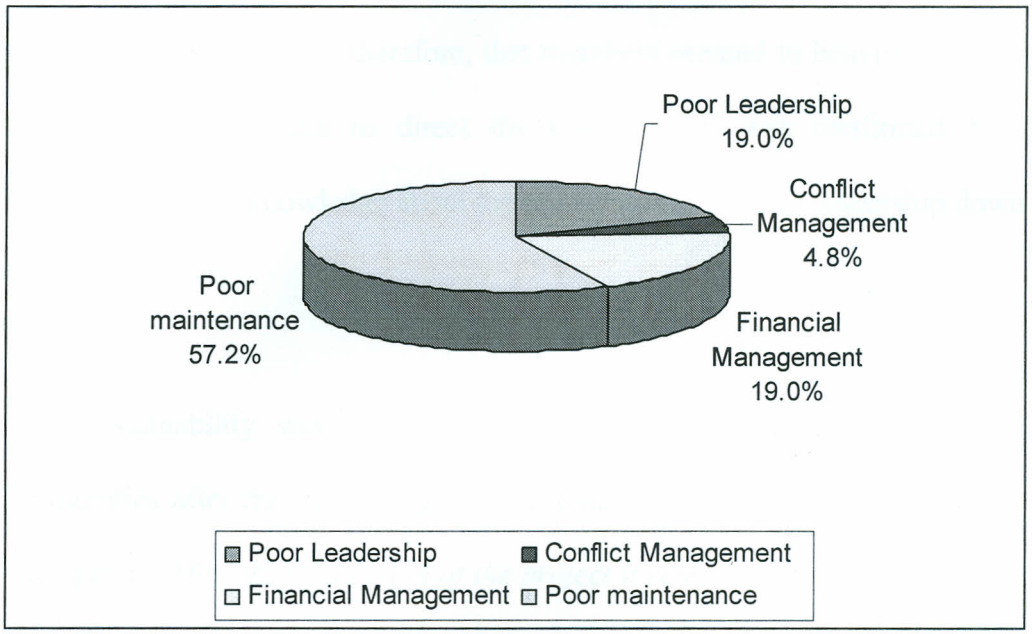
the membership. Such knowledge becomes a source of power and control by the management. Lack of enforceable by-laws to help control such self-help groups do not exist in the societies act, so much that if funds are misused the concerned may only be kicked out of office at most (IRC, 2000). This is a demotivation especially to communities that have to learn to pay for what was thought of as free for a long time like water.

When the members were asked whether they were satisfied with how the project was run by the management committee, 78.4% of them were satisfied but 21.6% were not. The respondents were also asked to suggest the areas of discontentment that needed improvement in their CWP. The results revealed complaints in regard to pump maintenance (16.2%), utilization (6.8%), and financial management tied with poor leadership at (5.4%) and conflict management at (1.4%). However (62.2 %) of the respondents chose not to comment on complaints. Such fear may be attributed again to social powers attributed to the management committees since majority (78.4%) of membership is still supportive of them, the minority can do little about it. The tragedy of democracy is depicted here and worse still if the minority is the group that is aware and the majority ignorant of inefficient leadership.

Figure 6 depicts the complaints on management committees of CWPs by the respondents whom they served. Such listed complaints are of help in identifying

areas of gaps in the management committees and in turn advice their strengthening. Data was collected from interviews with household heads.

Figure 6: Complaints on Management



Poor maintenance of projects was one of the highest with (57.2%) complaints from members against their management committees. Financial misuse in management committees was cited by 19% of the respondents; other members mentioned poor leadership, conflict and financial management. This may be explained severally, primarily because the rural livelihoods are not monetary based for majority may lead to prejudice on financial management and inability to meet financial obligations for mechanical maintenance. Secondly, water point

management was never a traditional form of leadership and has to therefore, be learned by the management committees.

Decision making in the management committees was mostly by consensus of members. It was observed therefore, that members seemed to heavily rely on the management committees to direct the CWPs. This was confirmed by the decreasing level of knowledge about the projects from those in leadership down to ordinary members.

CWP sustainability was also found to be a management challenge to the communities after the facilitating organizations left. As one project officer with CDK put it, *'After the completion of the project it remains with the Community to maintain'*. The management committee however noted that community members do not attend meetings that often slacken once the donor leaves. In this regard, a committee member commented:

'Groups are active before getting water wells and pumps, but after, they are inactive'

It was also observed that wells stop functioning and meetings slacken due to lack of agenda. One of the committee members portrayed this with the following statement:

'*Meetings have slackened due to lack of agenda main agenda was water we have it! why should we continue to meet'*

The above sentiments can be explained by the kamba community culture, water was available from the river and didn't need much organization, meetings or payment. Water was for free. This attitude still prevails with the community members falling back to own cultural practices after the facilitating agency is gone. Also that maintenance meetings were viewed as more of fee payment meetings for water the community deems should be for free.

This has been explained by previous studies severally. Overwhelming evidence exists that water supply services that do not respond to demand are not properly supported and used (Abdullah and Boot, 1989; Andersson, 1984; Fernando, 1985; Jayasinghe et al., 1983; Job and Shastry, 1991; LBDA, 1983; Oendo, 1983; Tunyavanich et al., 1987; Versteylen, 1991; Wijk, 1985). Such reactions cannot be attributed merely to a lack of interest, cultural barriers or the inherent conservatism of poor rural people. On the contrary, their behaviour is often the result of one-sided design decisions by the agency without attention to the ways in which men and women in households make their choices. The rationale for such choices is different from and more comprehensive than that of the 'experts' (Golloday, undated). If water agencies want to see their facilities used and supported they need to be responsive to what users want and can afford to use and maintain - in socio-economic, financial, technical and managerial terms. (operationalization of a gender approach,) (IRC, 2006)

Failure to attend meetings was as commonly cited as committee resolutions to terminate membership especially if one had been involved in many disciplinary cases. Both rated at 11% as regards reasons for terminating membership.

All the 10 management committees suggested the need for more training. They observed that 'Trainings were done only at initiation'. Community leaders also felt that groups were unable to initiate development by themselves but instead wait for someone else to mobilize them. It was clear that CWP groups face various challenges during the process of managing the water points. Some of these include inactive groups and the inability to make initiatives after project donors and facilitators leave.

This level of inactiveness and inability to make initiatives in turn means the community's cannot be able to begin utilizing the water that has come closer to them for other purposes like small-scale irrigation; they only stick to use of water for drinking, household and watering livestock.

Thus, the committees are currently central to the management of CWPs and can therefore be good vehicles for facilitating their (CWPs) optimal utilization for SSI. However, there is need for training by the relevant government departments to reactivate CWPs and their beneficiaries. Such areas of training based on

expressed needs include leadership, ownership, financial management, conflict management and pump maintenance.

4.3.1 Social Accessibility of Community Water Projects and Its Impact on Utilization for Small-Scale Irrigation

Accessibility was viewed in regard to who qualifies to use the resource. Access could only be obtained through membership of the community water project (CWP). This was the same in all the CWPs. Membership was determined initially by the facilitating organization during preliminary mobilization and later by the management committee.

It was established that at the start of CWPs, water development facilitators required the provision of local materials, and/ or labour from the community as their contribution and qualifications for membership. For example, the Catholic Diocese of Kitui required that the community members give sand, ballast and casual labour as well as provide food for the water technicians digging and building their wells. The community members who did not to contribute towards these requirements meant that their households were excluded from accesing such water sources. Management committees through the authority of membership also determined access. This was through a maintenance fee of between Kshs.30 – Kshs. 100 paid every month which was mandatory for every member. Failure to pay led to denial of access to the water.

It was established that in all CWPs, community members who were interested in joining after the project was complete and operational were required to pay a higher fee ranging from Kshs. 2000 – Kshs.5000 to become members. Family members who wished to join the CWP had easier access if their parents had been members. This implies social networks especially at family level were critical in accessing water. Families are therefore still critical units in continuity of voluntary organizations in the communities. This also shows the punishment laid on those that ignore voluntary community initiatives to meet critical needs like water at start yet will want to join in later after it succeeds.

Management committees required all members to meet their membership obligations without special consideration to the disadvantaged. No special attention was given by the agencies to take care of disadvantaged groups like the elderly, children and the very poor who were not able to participate or contribute like the rest of the community. They remained most vulnerable to loosing their rights if at all they got the membership. According to accord signed by the Kenyan government in regard to provision of water as a right, this amounts to violation of human rights. It still remains the obligation of governments to facilitate the welfare of the disadvantaged. Traditionally among the kamba, needs of such disadvantaged groups were met through extended families but economic poverty has eroded such care and concern due to inability to pay rates for water.

Poverty can thus be viewed as a threat to the extended family and its ability to care for its own.

Access to income, and consequently the ability to pay rates was found to be a major hindrance to utilizing the water from the CWPs. Most of the respondents (77%) felt that payment rates were not affordable.

Thus accessibility has its' implications on utilization of CWPs for SSI. Inability to afford the rates for example may mean that water may be bought only for immediate household use and not for short term investment such as SSI. Yet such investments' returns would enable the member to pay their rates. Thus service provision may best survive where an enabling income is earned by the payee. Again, provision for access should be in place for disadvantaged households.

4.3.2 The effect of distance to CWPs on their Utilization for Small- Scale Irrigation

Access to CWPs was also considered in regard to its' location. Hindarance occurred where land was not completely and legally given for community use by the donating individual. This happened where owners who had initially donated the land for community development changed their mind afterward. This was the case with Kyandani well (Kimangao sub-location) which had existed for 23 years with the CWP members using the immediate surrounding land for irrigation. However the sons of the person who had given the land decided to restrict use of

the land to only a path to the well alone. This made the utilization of the CWP for SSI difficult. Traditional practices of sale or donation of land ought not be ignored especially where those of the enacted law in a country are not utilized, otherwise the contracts entered into may be ignored without recompense.

Further, with time the original membership to a CWP fluctuates if other water sources are established closer to the households that were originally further away. Table 7 shows membership fluctuation in the eight CWPs over time as new, closer CWPs were established.

Table 7: CWP membership fluctuation over time

Project name	Membership at (start year)	Membership at study year 2005	Fluctuation percent
Katambauku	349 – (1998)	64	- 81.6 %
Muvingue	36 – (1996)	18	- 50.0%
Maseki	124 – (1995)	68	- 45.1 %
Ka mbusya	30 – (1998)	18	- 40.0 %
Kalikana	62 – (1995)	43	- 30.6 %
Ya nziani	45 – (1996)	35	- 22.2 %
Ngolo	30 – (1995)	24	- 20.0 %
Mauru	84 – (1997)	360	+328.5 %

As shown in Table 7, most groups involved in this study had a fluctuating membership. Membership that was initially high reduced in the succeeding years. This was mainly due to the distances involved with members moving on to new and closer water projects. On the other hand, Mauru CWP borehole increased its membership during the dry season. This was because the nearby rivers dried up and the locals needed to water their livestock at the borehole. Membership

fluctuation may therefore be attributed to distances. A CWP will in the end serve those members who are at closest distance; the future is in pipping water to the households.

Table 8 shows the distances the respondents had to travel to get water. It also shows the number and percentage of those who were doing SSI given their distances to the CWPs.

Table 8: Household Distance to the water source and practise of SSI by HH

HH Distance to CWP	No. of HH in CWP	No. of HH doing SSI	Percent
Less than 100m	2	0	0
100m– 500m	15	5	33.3%
501m- 1km	11	3	27.2%
More than 1km -2km	46	11	23.9%
Total	74	19	

The interviews further solicited information that the percentage of respondents doing SSI at shorter distances to the CWP was higher than those further from it. The percentage ranged from 33.3% for those closest to 23.9% for those who were farthest. We can therefore conclude that, distance from households to the CWP determined access to the water, the quantity utilized and the variety of uses including SSI.

These findings show that distance to the water source influenced the capability of a household to utilize water for SSI negatively, distance to water source should

therefore be continually reduced. Increased income and/ or reduction of rates could increase accessibility of water from CWPs by user households. On the other hand, the disadvantaged in the communities especially the poor and the elderly should be given special consideration to enable them access water.

4.3.3 Maintenance of Community Water Projects and How it Affects their Utilization for Small-Scale Irrigation

Maintenance of CWPs, which was the most crucial function, was done by the management committee. Maintenance was determined initially by the facilitating organization and later by the management committee and the CWP membership. The organizations determined the type of pump technology brought into the project, which then determined suitability in terms of wear and tear, availability and cost of spare parts, as well as artisan availability for repair and maintenance. The most common type of pump technology was Afri –dev for shallow well pumps (80%), wind mill pumps for bore holes (10%) and earth dams (10%). The wind mill pump that had been installed in only one borehole (Mauru borehole) had broken down and the management was unable to afford its' repair. Some organizations like the CDK provided for the training of local artisans for Afri-dev water pumps repair.

Maintenance was also determined by the set bylaws and how well they were observed by the membership. Membership contributions determined the ability of

the management committees to maintain and repair the given pump technology in their CWP. This was mainly so because only monthly rates by the membership raised finances to help meet the costs of maintenance.

Like any other resource, the management had to also handle conflicts arising from the utilization of the CWPs. Some common conflicts related to leadership, utilization, finances, land, and meeting attendance. It was observed that whenever conflicts occurred, they were mostly handled by management committees as per the set by-laws. When not sufficiently resolved, headmen, subchiefs and chiefs assisted to punish or restrain those involved. Conflict resolution occurred mostly through fines and penalties which included loosing membership, paying a goat (as a fine) and mending broken fence around the project (as a punishment).

Leadership and financial conflicts were found to be the main causes for failure to repair pump breakages and poor functioning of projects. Conflicts however did not occur where other stakeholders like government agencies and the local administration were involved. A case in point was Manzolo CWP in Twimyua sub-location. The project management committee had its project site well maintained, the pump was in good condition, records and contributions by members were up to date, their annual elections had been done and committee attendance was 100%. This was attributed to the involvement of the area chief and sub-chief who ensured all laid out procedures were followed and that the utility

was not run-down. The local administrators are viewed as more enabled enforcers of by-laws in Kyuso communities.

It may be concluded, therefore, that pump maintenance remains a key duty of the CWP management and its membership. Pump breakdown could lead to inability to utilize water for drinking and/ or SSI. The credibility of the management committees' determined the ability of membership to regularly pay rates. Also those conflicts surrounding public utilities may best be enforced by recognized arms of law like the local chiefs rather than management committees who are not viewed as sufficient enforcers of group by-laws.

When asked for suggestions for improving the management of CWPs, 50% of the respondents had no suggestion as depicted in Table 9. The table lists suggestions made by the user household heads in order of reducing popularity. This implied that majority of the CWP users had no idea or concern for the CWPs potential to serve their water needs. Proposals for leadership improvement included involving members in management, involving the local administration and management re-election. Proposals for improving maintenance such as the installation of generators, repair of pumps and well rehabilitation were least popular.

Table 9: Respondents suggestions for better Management

Suggestion	Number	Percent
No suggestion	37	50%
Involve members	7	9.5%
Promote other uses	7	9.5%
Pump repair	6	8.1%
Training & re-election	5	6.8%
Protect site	4	5.4%
Involve administration	4	5.4%
Deepen well	3	4.1%
Install generator	1	1.4%
Total	**74**	**100%**

We can learn from the above analysis indicates that water management is not so much the physical infrastructure alone but that it also a power relationship affair that will improve as more members are enabled.

4.4 Impact of Availability of Production Resources on the Utilization of CWPs for Small-Scale Irrigation

In this section, we discuss the findings in regard to production resources available to a household, how much/ many and how available they were for use for SSI. Production resources were clustered to include household income, farm inputs, land and transport. Relevant information was mainly gathered from household heads' interviews and FGDs with management committees.

4.4.1 The Effects of Household Income on the use of Community Water for Small-Scale Irrigation

Households were clustered in three categories namely the poor, middle or rich with the help of the management committees during FGDs. Members in formal employment, having shops and livestock were considered rich whereas those who were employed in the food for work projects, Kawetos' and orphans were considered poor. The middle class were those that were considered neither in the rich or poor cluster. Those randomly selected for the study consisted of 32% from rich households, 34% from the middle class and 34% from the poor households.

Based on monthly occupational incomes analysis, only 9% of rich households, 16% of middle class households and 36% of poor households randomly selected for this study were doing SSI. Thus the poor were more involved in SSI. This may be attributed to the fact that adversity is the mother of invention, the poor may be driven by search for better livelihood and thus be open to new ideas such as SSI.

4.4.2 The Effect of Farm Inputs on the use of Community Water Projects for Small-Scale Irrigation

Farm inputs were generally understood to include all irrigation requirements including technical knowledge, labour, farm tools and equipment. When interviewed about what irrigation involved, many of the respondents were not well versed. For example one woman thought a 'jembe' would not help in irrigation farming and that one would need a forked jembe instead. Farming tools

were considered to be either insufficient or expensive by the respondents, yet very similar tools used in rain fed farming would be used for irrigation farming.

Case summaries from household interviews showed that 72% of the respondents felt they did not have sufficient tools to do SSI. '*the soil is infertile'* was a middle aged woman's response to the reason why she didn't practice small scale irrigation, whereas she utilized the same land for rain fed farming. This could be attributed to lack of knowledge about irrigation or on hearsay about irrigation. Some of the household heads interviewed expressed the following concerns.

'The water is not enough, the community needs bigger water structures to do irrigation',

Thus the concept held was that irrigation could only be done with large quantities of water. This is not necessarily true since there are technologies to facilitate minimal use of water for irrigation farming.About 78% of the respondents were not well versed with necessary requirements for irrigation and so felt they didn't have sufficient inputs to do SSI.

The findings may be attributed to the fact that majority of people in lower Ukambani have traditionally practiced rainfed agriculture and livestock keeping. Scanty irrigation may be found along seasonal rivers. This in turn means irrigation is not a hands on practice, neither the knowledge about it.

If SSI is to be widely practiced in this community, there will be need for technology transfer and popularizing irrigation. This may be through demonstration farms to enable the targets break from faulty traditional points of view that irrigation is not possible in their setting. This should be done with the awareness that SSI is not as culturally acceptable to say livestock keeping.

4.4.3 The Effect of Means of Transporting Water on the Utilization of CWPs for Small-Scale Irrigation.

The study sought to establish how water was transported from the CWPs to the households and farms and relate its effect on practice of SSI. This was significant information since it helps identify means of transport as well as define level of labour involved to make water readily available for SSI. Such data was collected from household heads during interviews.

Table 10 shows the means of transporting water among the respondents in declining order by numbers and percentages.

Table 10: Means of Transporting SSI water

Means of Transport	Number (N)	Percent
Animal	58	78.1%
Human (by back)	15	20.3%
Bicycles	1	1.4%
Totals	**74**	**100**

The study established that 78.1 % of the respondents used animal (Donkeys and cows) transport while 20.3% use human transport mostly by women's and children's backs and only 1.4% use bicycles. Thus, though majority of the households utilized donkeys to transport water from the CWPs to their homes or farms.

Regarding human labour involved in water transportation, the elderly (those above 60 years of age who were 14.8%) in the households felt irrigation requires more human effort to fetch water, which they were unable to provide. Women felt that they had a lot more to do at home and were thus not able to do irrigation. The laborious nature of manual irrigation was also mentioned as a hindrance compared to traditional rain fed farming. It was observed that 55% of the household interview respondents felt they didn't have sufficient human labour.

4.4.4 The Effect of Land Availability on the Use of CWPs for Small Scale Irrigation

The study sought to establish whether the target households had land available to use for SSI and also as to whether the quantity of land so held determined level of practicing SSI. This was considered a necessary resource for practice of SSI not

only for households but also for joint user groups. Information was gathered during FGDs and interviews with household heads and key informants.

All households interviewed were found to have farm land during the dry season which could in theory be available for dry season irrigation. Land was not therefore, considered to be a hindrance to individuals' ability to practice SSI. It was observed that small as well as large (ranging from less than 1ha to more than 10 ha) pieces of farm land remained idle and available for use. This is shown in Table 11 as land size in hectares alongside how many with such land sizes available were practicing SSI.

Table 11: Land Size in Relation to practice of SSI

Land Size	**HH doing SSI**		**HH not doing SSI**	
	Number	**Percentage**	**Number**	**Percentage**
Less than 1 ha	0	0	5	100
1- 5 ha	14		40	
6- 10 ha	3	25	6	75
Over 10 ha	2	100	0	0
Others	0	0	4	100
Total	**19**		**55**	

As demonstrated in Table 11, a bigger number (54) had between 1 and 5 Ha, only 25% (14) of those were doing SSI. Those with less than 1 Ha did not practice SSI at all whereas 50% or more of those with more than 5 Ha practiced SSI. The last

row labeled as 'Others' was mainly referring to 'Kaweto' households who did not own any land, though they would have land for use. We may therefore deduce that increased land size increase the probability that a household would practice SSI.

The second factor affecting the utilization of CWPs for irrigation was the project land ownership, which was a common source of conflict. It was found that 100% of the project sites were on land donated by community members. This occurred especially when water was found on their land. The FGD discussions revealed that proper documentation was needed especially when an individual donated land for the water source. They said:

> *'If land is somebody's and proper documentation of transfer is not done, then this would be a problem.'*
>
> *'Land tenure around the site should be changed if it does not belong to the project members'.*

As depicted by the above quoted statements made by a councilor and a local chief, it was respectively established that 60% of those sites were given by goodwill without any formal/ legal agreements, which could be withdrawn later. As a result, 20% of these donations resulted in conflicts with the original owners claiming back their land after the facilitating organization phases out.

An innovation by Ngoolo CWP group seemed to be a solution to the problem of donated land use. Here members' had personal vegetable plots at the project site that benefited them first. An individual's portion with 30 kale (sukuma wiki) plants would mean 25 belonged to the member and five to the land owner as a gratitude for letting them use the land. As established in FGDs with committee members, making land agreements could help in avoiding conflicts between the land owners and CWP management.

4.5 The Effect of Gender Relations on the Utilization of Community Water Projects for Small-Scale Irrigation

To establish the effect of gender relations and how they were found to impact on the access and utilization of CWPs for small-scale irrigation, discussions were carried out with management committee members during FGDs and interviews with household heads and key informants focusing on types of households and decision making as below.

4.5.1 Types of Households Doing SSI

Table 12 shows the number and percentages of the respondents in each type of household and the percentages of those households practicing SSI. Considering that the household is the beholder of resources that can be used for SSI, then how the different types of households utilized them for SSI was the interest of this study.

Table 12: Type of Households and Practice of SSI

Type of household	Practicing SSI (N)	Percent (%)	Not Practicing SSI (N)	Percent (%)	Total (N)
Single parent	9	24	28	76	37
Male (Joint) headed	9	30	21	70	30
Kaweto Female headed	none	none	5	100	5
Child headed	1	50	1	50	2
Total	**19**		**55**		**74**

As depicted, the type of household of the respondents and as to whether they did SSI revealed that only nine single headed households, one child headed household and nine male headed households were involved in SSI.

Male headed households were generally considered the most active in the CWPs. Reasons cited included that they had more human labour available for meetings and that they had variety sources of income to support the project financial contributions required.

It was also observed for instance that single headed households were likely to benefit from SSI. This was well articulated in two of the statements below made

by household heads in response to the question as to who they thought was best placed to do SSI.

> The respondents made comments like *'I would say the single headed households would perform better because of realizing an income avenue. They would foster on hard work to achieve income.'* Still another concurred saying, *'The single headed households would do good in practicing irrigation as it will be the only source of income for family support'* (farming as only source)

It was also established that of all households that practiced SSI, 50% of them were male headed households. This was again explained by the reason that they had more income and labour available. On the other hand lack of involvement of the Kaweto households in SSI was attributed to social exclusion and lack of ownership of land.

4.5.2 Women in Leadership and How Its Effect on the Utilization of CWPs for Small-Scale Irrigation

In this section participation of women in leadership and decision making in the CWPs is discussed. It features offices held by women in the management committees and discusses the popularity of women as compared to men in water development projects. Data was mainly collected from FGDs with management committees and interviews with key informants.

Although the Kamba culture dictates that more women be involved in community development activities and especially water projects than men, they were less involved in CWP leadership.

In all the 10 committees studied of at least 12 members, there were only one to five women. Of these women, only 33% were in influential positions like the chairperson and treasurer while the rest were assistant secretaries or just committee members. This is depicted in table 13.

Table 13: Committee Offices Held by Gender

		Offices Held			Total	
No.	Name of committee	Secretary	Treasury	Chairperson	Male	Female
1.	KALIKANA	male	Female	male	2	1
2.	KATAMBAUKU	male	Female	male	2	1
3.	KAMBUSYA	male	Male	female	2	1
4.	KYANDANI	male	Male	male	3	-
5.	MAURU	male	Male	female	2	1
6.	MASEKI	male	Female	male	2	1
7.	MANZOLO	male	Male	male	3	-
8.	MUVINGUE	female	Female	female	-	3
9.	NGOOLO	male	Female	male	2	1
10.	YA NZIA	male	Female	male	2	1
	TOTAL				20	10

In the Muvingue CWP all members were women and consequently the leadership consisted of women only. They had succeeded in running the CWP and starting up other complimentary projects like merry go rounds for financial support. FGD discussions established that where a committee constituted fewer and less powerful women; men seemed to dominate. This meant that there remained a gap between the directors of a CWP (who were mostly men) and the users (who were mostly women). This could offer an explanation to the failure to facilitate Small Scale Irrigation by the male dominated CWP committees which would otherwise benefit households (women and children) in terms of income and nutrition.

Observations on gender relations were therefore made from different angles including the home and the CWPs. Primarily it was observed that more women (81%) than men who were only 18%, were involved in water development activities. Cultural factors explained this because water is seen as a domain for women. It therefore followed that men were less involved in the access and utility of water including irrigation.

A common statement made in this respect by the male respondents was:

'Iveti nisyo sisyi vata wa kiwo' kamba for "It is women who know the purpose of water."

It suffices therefore to say women were more active in project activities than men. In one project Muvingue CWP, there was a women only water project because the men were unavailable.

All community stakeholders interviewed mentioned that women were more active, had a concern for the family and were a majority in the community. There were no purely men groups involved in water projects. Men were described as lazy in FGDs with management committes. Women therefore remain main users of CWPs. They should therefore, be considered the best targets for small-scale irrigation using CWPs if other determining factors are adjusted for.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter brings to a close the foregoing research study. It recaptures the rationale of the study and discussions in the literature review as well as salient findings and respective conclusions. The conclusions and recommendations are discussed based on management of CWPs, production resources of households and gender relations themes which are also the objectives of the study. The chapter ends with suggestions for further research, preceded by recommendations and starts below with the conclusions.

5.1 Conclusions

Agricultural development is imperative to overcoming poverty among the subsistent farmers in Arid and semi-arid lands. However the potential in utilizing CWPs for SSI in those lands has not yet been achieved, why? In the foregoing work we sought to answer the question about the nature of the factors such as management, production resources and gender and how they inhibit the utilization of community water projects for SSI in Kyuso district Kenya, a famine stricken region. In this research study, answers were sought from respondents including the water projects management committees, user households, water and agriculture departments in government and non-governmental agencies.

The literature review revealed that the government of Kenya has sought to enable this through legislation and application of the water act 2002 and drafting of the irrigation act.

Government departments have previously concentrated on meeting water and sanitation goals and have ignored the potential of community water projects for food security. Other Studies show the water for free mentality still exists (IRC 2006), that micro-financing may well facilitate the maintenance of water projects (KREP 2007, Mehta et al 2007) since the government is unable to do so and that women are necessary partners in water development and should not be ignored in decision making (IRC 2006).

Some of the salient findings of the study include the fact that management of water projects by local communities is a challenge given capacity gaps in technical know-how, high levels of ignorance, in leadership which is compounded by poverty making it difficult to maintain the technologies. If communities can learn and achieve income generation from water available in the CWPs, they will most likely pay for the maintenance of the technologies.

Poverty is destroying the social networks such as extended families meaning that the government must take up the welfare of the disadvantaged like the poor, elderly, PLWHAs and the physically handicapped. Yet such poverty may be

overcome by viewing water resources as potential income sources rather than just a cost incurred in acquiring drinking water which should otherwise be free.

New laws enacted need harmonization – especially the user associations and the resource managers. Water for drinking and water for irrigation is one and the same thing in kyuso district. The water act is not known about and its actualization is yet to happen.

Voluntary organizations such as CWPs if registered under the societies act or any the water act must facilitate for accountability in leadership. Those that misuse community resources must be able to be prosecuted or pay back public monies misused.

Community water projects, small in scale as they may be must begin to be viewed as potential resources for not only household and livestock drinking water but also for food security both by the communities and government agencies.

Irrigation is not a tradition of the ASAL communities. It is a new technology. The poor are embracing new technologies for better livelihood.

Ignorance and relegation of responsibility to leaders is still alive in the rural communities. Need for teachings and creation of awareness cannot be underestimated, otherwise democracy is destructive to an ignorant populace.

Thus to improve the livelihood of those living in the famine stricken ASALs through propelling the utilization of CWPs for SSI, a combined effort is needed by all key stakeholders. A new technology sharing, management that is enabled and accountable, gender responsive and an integrated approach to development rather than sectoral alienation is the best way forward.

5.2 Recommendations

Action oriented recommendations have been listed below and are informed by respective findings of the study. They are discussed as per objectives of the study. As a key overall recommendation is the fast tracking the popularizing and operationalization of the water act 2002. This is based on the finding that CWPs involved in the study were still viewed and managed as self-help groups, water service and water resource management boards were not in existence as at October 2007 in Kyuso district.

5.2.1 Management of community water projects

Recommendations on community water project management focus on how to achieve technology sustainability, complimentary services, resolution of conflicts

surrounding utilization of water as well as ways to deliberately increase geographical and social access to CWPs by the marginalized.

1. It was established that all the facilitating organizations had provision of drinking water as a main objective of their water development activities but SSI was only a complimentary activity to 30% of them. Further, 50% of those household heads who received training in SSI from the facilitating agency were found engaged in SSI. This implied that utilization of water for SSI will only happen if deliberate efforts by the facilitator organizations (such as training for SSI) are made to actualize it. Thus the recommendation that Water development organizations should include enhancement of small-scale irrigation as an objective in CWPs development in the ASALs.
2. Making of by-laws in the CWPs which should be participatory and specifically include and consider the provision of water to the marginalized (the women, the elderly, the very poor and the orphans). This will be a fulfillment of fundamental human right to sufficient supply of water as signed by the Kenyan government towards the achievement of the millennium goals.
3. Study findings listed common conflicts related to leadership, utilization, finances, land, and meeting attendance. It was observed that whenever conflicts occurred, they were mostly handled by management committees as per the set by-laws. When not sufficiently resolved, headmen, sub-chiefs and chiefs assisted to punish or restrain those involved. The local administrators

were viewed as more enabled enforcers of by-laws in Kyuso communities. It is recommended that the local administration should recognize the agreed upon by-laws and rulings made thereby. CWPs should be required to maintain a continual link and accountability to the local administration authorities including headmen, chiefs and their assistants.

4. Networking of the CWPs with complimentary organizations/agencies is the best way to ensure that there is continuity and sustainability of the projects. This would also guarantee the facilitation of small-scale irrigation projects. At phase-out, agencies should link CWPs to government agencies and also private service providers to continue supporting the water technologies installed.
5. It was found that 100% of the project sites were on land donated by community members. As a result, 20% of these donations resulted in conflicts with the original owners claiming back their land after the facilitating organizations phase out. Therefore it is recommended that CWP site (land) agreements whether through donation or purchase must be a requirement for CWPs. Use of public land for CWPs would minimize such conflicts. If possible such land should be large enough to allow small-scale irrigation by the CWP membership.
6. The study established that 78.1 % of the respondents used animal (Donkeys and cows) transport while 20.3% use human transport mostly by women's and children's backs and only 1.4% use bicycles. Regarding human labour

involved in water transportation, the elderly (those above 60 years of age who were 14.8%) in the households felt irrigation requires more human effort to fetch water, which they were unable to provide. Women felt that they had a lot more to do at home and were thus not able to do irrigation. It is recommended that CWP development can facilitate greater access to water in a community through conveyance, for example piping to households and or at least common pools near households. Such accessibility to water reduces labour costs and time making SSI easier to do.

7. There is need to provide training in financial bookkeeping, management, public relations, opportunity/need identification and irrigation methods. CWP management committees should receive training on financial accounting, management and project leadership. For example, CWP management committees should be trained on mobilization techniques for members to pay for maintenance comfortably over long term rather than strenuous short-term notices only when pump breakages occur.

5.2.2 Household Production Resources

In order to optimally mobilize the utilization of production resources available in the households for SSI the following was recommended.

1. About 78% of the respondents were not well versed with necessary requirements for irrigation and so felt they didn't have sufficient inputs to do SSI. This was attributed to a rainfed agriculture tradition among the Kamba

peoples found in the district. Thus it suffices to recommend that Normative affective factors should be recognized in how they affect economic decisions, for example farming cultures, social exclusion and lack of know-how. For example the Kyuso communities should be mobilized and taught about small-scale irrigation and be withdrawn from total traditional rain-fed agriculture in light of current challenges facing them.

5.2.3 Gender Relations

The optimum utilization of CWPs for SSI can be best accelerated and sustained if the full productive potential of both men and women, young, middle aged and the old are mobilized in the households. Provision to target the socially excluded, like 'Kaweto' households as was found in this study, should be made.

1. According to study findings women comprised 81% of the water users. In the Muvingue CWP all members were women and consequently the leadership consisted of women only. They had succeeded in running the CWP and starting up other complimentary projects like merry go rounds for financial support. Therefore, Government and non-governmental development organizations should help conceptualize on the gender factor and its reality to the rural setting and how it impacts on the development of the CWPs for small-scale irrigation.
2. The study established that in most management committees of at least 12 members, there were only one to five women. Of these women, only 33%

were in influential positions like the chairperson and treasurer while the rest were assistant secretaries or just committee members. Affirmative action is needed to cater for the special challenge that rural women face regarding occupying decision making positions to express their challenges and unmet needs. Thus there should be deliberate effort to ensure that women are not only represented but also heard in all decision making structures of the community.

Further Research Questions

The following areas are recommended for consideration for further research:-

1. Study on the possibility of micro-financed farmer driven small-scale irrigation as a sustainable regime.
2. Economic viability of crops grown by individual small-scale irrigation farmers.
3. Ways and methods of popularizing small-scale irrigation in non-irrigating communities in the ASALs that is less labour intensive with minimal water use.
4. How well known and practiced are the provisions of the water act 2002 in rural communities. What challenges of operationalizing the act are being faced.

REFERENCES

Abraham, Francis M. 1992. *Modern Sociological Theory: An Introduction.* New Delhi: Oxford University Press.

Barrow, Chris. 1987. *Water Resources And Agricultural Development In The Tropics.* UK: Longman Scientific and Tropical.

Bell, Judith. 1990. *Doing your Research Project: A Guide to First Time Researchers in Education and Social Sciences.* 2nd ed. Philadelphia: Open University Press.

Bless, Achola. 1987. *Fundamentals of Social Research Methods: An African Approach.* Zambia: University of Zambia.

Bromley, D.W. 1989. *The Management of Common Property Natural Resources.* Washington DC: USA.

Cadigan, R. Jean. 1998. *Woman to woman marriages: Practices and Benefits in Sub-saharan Africa.* Journal of comparative family studies 29:

Chambers, Robert. 1997. *Whose Reality Counts? Putting the first last.* Britain: Intermediate Technology Publications.

Chambers, Robert. 1996. *Rural development: Putting the last first*

Giddens, Anthony. 1993. *New Rules for Sociological Method,* 2nd ed. Oxford U.K.: Blackwell Publishers.

Global Water Challenge(GWC). 2007. *Assessing the Costs and Benefits of Investment in Water and Sanitation Infrastructure.* www.globalchallenge.org

Government of Kenya. 1997. *Mwingi District Development Plan 1997-2001.* Nairobi: Government Printers.

Government of Kenya,UNICEF. 1998. *Situation analysis of Children and Women in Kenya 1999.* Nairobi: United Nations.

Government of Kenya, 2007. *Drought monthly bulletin.* September. Nairobi. Office of the president, Special programs (ALRMP II)

Grosh, Margret and Glewwe, Paul. 2000. *Designing Household Survey Questionnaires for Developing Countries: Lessons From 15 years of Living Standards Measurements Study.* 2. World Bank:

GTZ. 2007. *Kenyan-German development cooperation in the water sector. Assessment from a human rights perspective*. Eschborn: Germany.

Haralambos, Holborn, Heald. 2000. *Sociology: Themes and Perspective.* 5th ed. London:

Imam, Ayesha . 1997. *Engendering African Social Sciences.* CODESERIA

IRC. 2000. *Community Management of Water Supplies in Kenya.Case Studies.* NETWAS. www.irc.nl/manage/manuals/cases/Kenya

IRC.2006. *Resource Guide: Mainstreaming gender in Water Management.* www.genderandwater.org/

Jan, Gerry and Micheal. 1995. *Oxfarm Development Guidelines No.8 – Developing And Managing Community Water Supplies.* Oxfam:

K-REP. 2007. *Micro-finance for community managed water projects-Krep Bank.* Accelerating access to sanitation conference. 27th-28th November

Mehta, Meera. 2006. *Financing Rural water supply: Exploring the potential of micro-finance in Kenya*

Mehta, Meera. Kameel Virjee, Barbra Evans, Kingori Wathobio. 2007. *Bussiness Development services for community managed small water enterprises: From post construction support to business development services in Kenya.* Communicating development research. ID21.

Miles and Huberman. 1994. *Qualitative Data Analysis.* U.K. Sage Publications.

Mumma, Albert. N.d. *Kenyas' New Water Law: An analysis of the Implications of Kenyas' Water Act 2002, for the Rural poor.*

Narayan, Deepa. 1995. *The Contribution of Peoples' Participation: Evidence from 121 Rural Water Supply Projects.* World Bank:

Narayan, Deepa. 1996. *Towards Participatory Research World Bank Technical.*

paper no.387. Washington D.C:

Neubert, Susanne . 2007. *Poverty Oriented Irrigation Policy in Kenya: Empirical Results and Suggestions for Reform.* Discussion Paper. December.

Nyanchaga, Ezekiel Nyangeri. Seppala, Osmo.N.d. *Lessons and Prospects derived from the case studies- KENYA* (accessed March 11, 2009)

Ojungu, Peter Omara H. 1992. *Resource Management in Developing Countries.* U.K: Longman Scientific and Technical.

Onjala, Joseph. 2001. *Water Pricing Options In Kenya : Cases Of Mwea And West Kano Irrigation Schemes.*Nairobi: Centre for Development Research.

SASOL and MAJI NA UFANISI. 1994. *Where there is no water: A story of Community Water Development and Sand Dams in Kitui District, Kenya.* Kenya: SASOL Kitui.

Toori. N.d. *Governance of Water Resources in Kenya.* Ecopolicy 8.

Uphoff, Norman. 1986. *Local Institutional Development: An Analytical Source Book.* U.S.A: Kumarian Press.

Van Koppen, B. M. Giordano. J. Butterworth.Editors. N.d. *Community based water Law and Resource Management Reform in Developing countries.*

Warner, Dennis. 1976. *A Preliminary Assessment of the Impact of Rural Water SupplyUpon Households and Villages.* Dar-resalaam: Economic Research Bureau.

White, Howard and Killic, Tony *et a.l* . 2001. *African Poverty at the Millenium: Causes,Complexities and Challenges.* Washington DC: World Bank.

Wikipedia. N.d. *Kamba*.Facts, discussion Forum. www. Absoluteastronomy.com (accessed Maarch 10, 2009)

Zey, Mary ed. 1992. *Decision Making: Alternatives To Rational Choice Models* London: Sage Publications.

ANNEXES

Annex 1: Instruments

Focus Group Discussion Checklist: Scheduled for Community Water Project Management Committees

1. Introductions - names, purpose of study, introduce the methodology of group discussion
2. Project History
    a. Name of project
    b. When it was started?
    c. Which organizations were involved?
    d. Listing member households – labeled single, joint headed or other
    e. Area covered by project?
3. Structure of management committees
    1. Composition of the committee- offices held, members,
    2. Gender composition- how many men, women, offices held?
    3. Decision making procedures in the committee
4. Offices Held
    1. Are the offices held by appointment or election?
    2. Descriptions of how it is done (Whether appointment or election)
    4. What is the office term?
    5. What roles are involved in each office in the committee?
    6. Has any training been received for the roles in offices mentioned above?
    7. If yes, who did it and how long ago?
    8. Was any recognition awarded? What kind?
    9. Is training necessary for your effective functioning?
    10. What kinds of training would you wish to receive?
5. Operations
    11. What activities are involved in normal operations of the project?
    12. How often does the committee, general meetings occur?
    13. What issues are discussed then?
    14. How does one become a member of the project?
    15. When does one cease to become a member?
    16. What requirements must members meet- attendance, usage, payments, labor.

6. Conflicts
   17. Do conflicts occur in your project?
   18. What types occur, which is most common?
   19. Who is most commonly involved in conflicts-men, women, children?
   20. How come?
   21. Who (office, members) is responsible for resolving such conflicts?
   22. If conflict is not satisfactorily tackled what further steps can a member take?
   23. Do members withdraw from community project due to conflicts?
   24. What happens to their money, other contributions?
   25. Is the local government involved in resolving conflicts?
   26. If yes, how?

7. Gender
   27. Are men and women equally active in the attendance, project committee, utilization of water for income generation?
   28. If not, what are some of the reasons for that occurrence?
   29. How well do single headed and joint headed households compare in regard to meeting attendance, office holding, payments, utility of water for income generation?
   30. Are the poor, women, single-headed households given any special consideration in the project requirements and activities?

8.Uses
   a. What are some of the uses of water by the project members?
   b. Is irrigation possible/ done?
   c. If yes, how many members?
   d. If not, what are the reasons for not doing irrigation?
   e. Is there an express law against using water for irrigation? If yes, what is its reason?
   f. What are some of the requirements you would need to have if you were to do irrigation in your project?
   g. Are all these requirements available/equally available to you among the project members?
   h. Do single headed and joint headed households have the following resources adequately, fit for irrigation during the Rain and Dry seasons? Land, water, labour, transport, and know how, tools, seeds, herbicides, and fertilizer, access to market.

9.Partnering
a) Which other organizations/ agencies or groups are you working with in the project?
b) What activities are you doing together?

c) What are some of the benefits/ difficulties you have experienced as a committee in working with other organizations/ agencies?
d) Is there any organization/agency facilitating irrigation?
e) If yes, how far have you accomplished?

Annex 2: Structured Interview with Key Informants

Scheduled for selected community Leaders

1. Introductions- names, purpose of study/ interview, procedure of interview
2. Name _____
   Position/ role in the community_____
3. What types of community water projects exist in the community?
   _____
4. Which is the most commonly affordable type?
   _____
5. Is water given for free or cost sharing?_____
6. If cost-sharing, is it affordable to all community members for
   a) Home use_____-
   b) Income generating activities_____
7. Which community members are most disadvantaged in regard to cost sharing?_____
8. How?
   _____
   _____
   _____
   _____
   _____
9. Which organizations are helping do water projects in your community?
   _____
   _____
   _____
   _____
10. Uses
    i. In what ways is water availability facilitating development in your community currently?
       _____
       _____
       _____
       _____
       _____

ii. What other possible uses can the water be put into?_____

_____

_____

iii. In what ways has water provision brought about income generation in the community?

11. Management

a) How is the community water project day to day management achieved in the community?

_____

_____

_____

_____

_____

_____

b) What are the most problematic issues about community water projects in your community?

_____

_____

_____

_____

_____

_____

c) Do you think those management structures are able to achieve their purpose? Yes, No _____

d) If not, why?

_____

_____

_____

_____

_____

_____

e) Give some suggestions for their improvement

_____

_____

_____

_____

_____

_____

_____

12. Irrigation
    a. Has irrigation been practiced previously in the community? Yes/No _____
    b. Is irrigation using community water projects done in the community currently? Yes/No _____
    c. If yes, where, _____
    d. How commonly _____
    e. If not, Why?

    _____
    _____
    _____
    _____
    _____
    _____

    f. In the community do you have access to an
       a) Agricultural technical officer? Yes/No _____
       b) Water technician? Yes/No _____
    g. If yes how does one access them?

    _____
    _____
    _____

    h. Any fee paid? Yes/No _____
    i. Are they accessible to all members in the community? Yes/No. Explain

    _____
    _____
    _____
    _____

    j. What are some of the resources needed for irrigation in your local setting?

    _____
    _____
    _____
    _____
    _____

    k. Of those resources listed above, are they available/ accessible to community members equally? Yes/No_____
    l. To whom would you say they are inaccessible?

    _____
    _____
    _____

m. What would you say are the reasons for inaccessibility?

_____

_____

n. Can practice of irrigation in the community –improve utilization of available resources, improve living standards, improve income?

_____

_____

_____

_____

_____

o. How well do single headed households compare to joint headed households in regard to practicing small-scale irrigation?

_____

_____

_____

_____

_____

_____

_____

p. Do the following factors affect possibility of irrigation through community water projects in your community, If yes, how?

Factor	If yes, How
Religion	
Politics	
Seasons	
Culture /traditions	
Market	
Ownership of land	
Gender	
NGOs	
Government	
Other (specify)	

Annex 3: Structured Interview with Household Heads

Scheduled for Household Heads of water project users

1. Introductions- name, purpose of interview, procedure
2. Sex –male/ female _____
3. Marital status- (tick one) a) single ___ b) married ____ c)separated _____
   d) divorced _____ e) widowed _____
4. Do you manage and make household decisions a) alone always ____
   b) alone sometimes _____ c) with spouse _____
   d)with spouse and children_____
5. Type of household-a)single _____ b)joint _____ c)other (specify)_____
6. List occupations and income per occupation- during rain season, dry season.

DRY SEASON		RAIN SEASON	
Occupation	Income	Occupation	Income

7. Type and number of livestock owned by household and its members

Type of livestock	Number

8. Land available for farming during rain seasons_____(in ha.)
9. Land available for livestock keeping during Rain _____Dry seasons _____
10. Land not in use during rain seasons_____ Dry _____
11. Where (name of source, distance, means of transporting) do you get water for household, livestock, farming, and other uses?

	Name/Distance (Kms)	Means of transport
Household		
Livestock		
Irrigation		
Other (specify)		

12. Is it for free or do you pay? ____ If you pay, how much per gallon_____. Is it affordable to you? Yes/No _____
13. Do you use water for irrigation in your household? Yes/No
    If yes, how

_____
_____
_____
_____

Who does it family member or hired?_____
If not, given a chance would you do it? Yes/No _____
What are the hindrances currently

_____
_____
_____
_____
_____

14. Who manages the water project you draw water from?

_____
_____
_____

15. Are you satisfied with the way they run the water project? Yes/No _____
    If not, what are some of your complaints

_____
_____
_____
_____
_____
_____

Suggestions for improvement of above matters

_____
_____
_____
_____
_____
_____

Does the management allow you to use water for irrigation? Yes/No

_____

If not why

_____

16. Have you ever been involved in a water conflict? Yes, No

_____

If yes, what was it about

_____

_____

_____

_____

_____

_____

Who handled it _____

What was the resolve_____

Were you satisfied,

discuss_____

_____

_____

_____

17. How do you compare your household (if Single headed) to (a joint headed household and vise versa as applicable) in utilization of community water projects for irrigation in regard to,

Making decisions

_____

_____

_____

_____

Ownership of land

_____

_____

_____

_____

Use of land

_____

_____

_____

_____

Labor

_____

_____

_____

_____

Transport of water

_____

_____

_____

_____

Irrigation Know-how

_____

_____

farming tools

_____

_____

_____

_____

Market of produce

_____

_____

_____

_____

18. Who is more advantaged (Men or women) in regard to using community water projects for irrigation? _____
19. If Men, how

_____

_____

_____

_____

_____

20. if women, how

_____

_____

_____

_____

21. In what ways have organizations been of help to your household as far as utilizing community water projects for irrigation is concerned.

_____

_____

_____

_____

_____

_____

_____

22. In what ways have government been of help to your household as far as utilizing community water projects for irrigation is concerned.

_____

_____

_____

Annex 4: Questionnaire to Water and Agriculture Agency Heads

Scheduled for Water and Agriculture government division heads of department

1. Agency _____
2. Officers name _____
3. Objectives of agency for the division currently

_____

_____

_____

_____

_____

_____

1. Sections and activities of the agency

_____

_____

_____

_____

_____

_____

_____

2. Types of projects done by the agency

_____

_____

_____

_____

_____

_____

3. Most reliable types of water projects (lasts whole year, least maintenance, most uses)

_____

_____

_____

_____

_____

4. List stages of implementation of water/irrigation projects

_____

5. In what ways are the communities involved in --- of agency water/irrigation projects
   i. Management
   ii. Financial/other contribution
   iii. Maintenance
6. Is monitoring and evaluation done? Yes/ No
7. If yes, what indicators are used
8. How is the community involved in monitoring and evaluation?

9. Who else is involved in the monitoring and evaluation

10. How long does it take to phase out of a community water/irrigation project?

11. How is project continuity ensured beyond agency involvement?

12. What is the nature of community utilization of agency projects/ services?

13. What are the existing strategies for capacity building (training, financial loans, farm inputs, management) to enable the community (local NGOs, CBOs, water groups, individual farmers) to better utilize the water/irrigation projects?

14. How does the agency compliment with the following groups in the community?

Group/Agency	Activities jointly done
Agriculture Water Social services Livestock Local NGOs CBOs Self Help groups Individual farmers Markets Others (specify)	

15. What specific constraints are faced in water/irrigation development in the division and what corrective suggestions do you propose?

Category	Constraints	Corrective suggestion
Policy Institutional Financial Expertise Community mngt. Culture /traditions Gender Household-economic status Politics Seasons Other (specify)		