Master thesis

Title

COMMUNITY BASED MANAGEMENT OF SURFACE WATER SOURCES IN RURAL SOUTH WESTERN UGANDA: A STUDY OF MBARARA AND KIRUHURA DISTRICTS

By

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The master thesis is carried out as a part of the education at the University of Agder and is therefore approved as such. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Abstract

Introduction

When managed appropriately, water is a precious natural resource, vital for life, development and the environment. Community based management (CBM) is the style of management the Ugandan Ministry of Water and Environment recommends for most water facilities constructed in rural areas. Although community based management of water facilities is recommended, it is largely for government constructed facilities and many people in the two districts of Kiruhura and Mbarara communally use privately constructed surface water sources. The objectives of this study therefore were to establish; What rules and practices are important in managing government constructed surface water sources in the districts of Mbarara and Kiruhura?; What rules and practices are important in managing communal privately constructed surface water sources in the districts of Mbarara and Kiruhura?; How do rules and practices that are important in managing government constructed sources compare with those that are important in managing privately constructed sources?; What challenges are faced by communities in the districts of Mbarara and Kiruhura in managing surface water sources?

Methods

In order to achieve the above objectives un-structured interviews with 50 overseers of surface water sources, in-depth interviews with 2 district water officers, and 2 focus group discussions with surface water source users were conducted to gather data.

Results

With government constructed surface water sources, the practices included holding meetings to discuss the use of water sources, monitoring the use of the sources, establishment of water user committees to monitor the use of water sources. The study established that rules which guide water users could be divided into: daily maintenance rules/dos and don'ts (washing of clothes around the source should be done at a considerable distance from the source, sending very young children to collect water is not allowed, washing vehicles in or very near the sources is not allowed, animals are not allowed to drink directly from the source, bathing and playing in the water source is not allowed, drawing water for sale is not allowed, permission must be sought before drawing water for livestock, stepping into the water is not allowed), periodical maintenance rules and rules relating to land use patterns around the water sources.

The practices associated with managing privately constructed surface water sources included to a limited extent holding meetings to discuss the use of water sources, establishment of water user committees to monitor the use of water sources and to a large extent informal monitoring of the use of water sources. The study established that rules which guide water users could also be divided into: daily maintenance rules/dos and don'ts (washing of clothes around the source should be done at a considerable distance from the source, sending very young children to collect water is not allowed, washing vehicles in or very near the sources is not allowed, animals are not allowed to drink directly from the source, bathing and playing in the water source is not allowed, drawing water for sale is not allowed, permission must be sought before drawing water for livestock, stepping into the water is not allowed), periodical maintenance rules and rules relating to land use patterns around the water sources.

A comparison of the two types of surface water sources showed that government constructed water sources generally are subjected to more misuse than privately constructed but communally used water sources. With privately constructed sources, the possibility of

banning certain water users from accessing water sources remains very real and partly explains the better water use practices that they enjoyed over the government constructed sources.

Challenges faced by communities in managing surface water sources included drying up of the sources, difficulty of rallying water users to participate in maintaining sources, dysfunctional water pumping technologies. Other challenges emanated from conflicting land uses, the levels of water quality, and use of water sources stealthily at night.

Conclusion

Currently, an effective institutional framework governing the use of surface water sources in Mbarara and Kiruhura does not exist. This is mainly because there is a gap between the rules and the practices on the ground. Despite this, the potential for the development of effective institutions to govern the use of surface water sources exists. The rules and the potential to generate more "current" rules to respond to changing situations exist and now what needs to be changed are the daily practices in order for these to match with the existing rules.

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- My respondents who for reasons of confidentiality I can't list here, took sometime off their busy schedules to respond to my questions.

Notwithstanding my gratitude to the individuals and institutions listed above, this work has some limitations, some more obvious than others. I assume full responsibility for all of these.

Declaration

I hereby declare that this dissertation is a result of my own efforts, and where I use the works of other people, I have appropriately referenced those works. I also declare that this dissertation has not been submitted to any other university for any award.

Date: December 3, 2009

Sign: 
Christopher Tumwine (Student)

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LIST OF ACRONYMS

BMU	BOREHOLE MAINTENANCE UNIT
CBM	COMMUNITY BASED MANAGEMENT
CBNRM	COMMUNITY BASED NATURAL RESOURCES MANAGEMENT
CCC	CONTRIBUTION TO CAPITAL COST
CPRs	COMMON POOL RESOURCES
DANIDA	DANISH INTERNATIONAL DEVELOPMENT AGENCY
DWD	DIRECTORATE OF WATER DEVELOPMENT
FGD	FOCUS GROUP DISCUSSION
HIASS	HEALTH INSPECTORS ANNUAL SANITATION SURVEY
MWLE	MINISTRY OF WATER LANDS AND ENVIRONMENT
NGO	NON-GOVERNMENTAL ORGANISATION
NORAD	NORWEGIAN AGENCY FOR DEVELOPMENT COOPERATION
NWSC	NATIONAL WATER AND SEWERAGE COPORATION
PEAP	POVERTY ERADICATION ACTION PLAN
UDHS	UGANDA DEMOGRAPHIC HEALTH SURVEY
UNHS	UGANDA NATIONAL HOUSEHOLD SURVEY
UPHC	UGANDA POPULATION AND HOUSING CENSUS
VLOM	VILLAGE LEVEL OPERATION AND MAINTENANCE
WUC	WATER USER COMMITTEE

CHAPTER ONE

1.1 INTRODUCTION

Water is a very important natural resource that sustains life, and is important in sustaining development. When not well managed, it can bring destruction, misery and death; but when well managed it can foster economic development. It can be an instrument for poverty alleviation, lifting people out of the degradation of having to live without access to safe water and sanitation, while at the same time bringing prosperity to all. However, when inadequate in quantity and quality, it can rather serve as a limiting factor in poverty alleviation and economic recovery, resulting in poor health and low productivity, food insecurity, and constrained economic development. Thus what we get out of water depends largely upon what we put into it in terms of management and use (Economic Commission for Africa et al., nd).

Appropriate management and use of water resources is further emphasized under the Dublin Water Principles that came into place in the early 1990s. Solanes and Gonzalez-Villarreal (1999) the Economic Commission for Africa, African Union and African Development Bank (nd) bring out the Dublin Water Principles developed in 1992. These are; fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; water development and management should be based on a participatory approach involving users, planners and policy makers at all levels; women play a central role in providing, managing and safeguarding water; water has an economic value in all its competing uses and should be recognized as an economic good.

The management of water resources is further given due attention at the Millennium Summit in New York in the early 2000s. The Millennium Declaration that was made in September 2000 by up to 189 world leaders at the dawn of a new millennium in New York, set 2015 as the target date for achieving 8 ambitious goals all aimed at enabling the world's poorest people to escape conditions of deprivation. Under this Millennium Declaration, the desire to provide safe drinking water in the struggle to bring development to the world's poorest nations was given due importance. Specifically under this declaration, the idea of safe drinking water is emphasized by Goal number 7 (United Nations, 2007, United Nations, 2000). Under Goal 7, it is specifically targeted to halve, by 2015, the proportion of the world population without sustainable access to safe drinking water and basic sanitation (United Nations, 2007). This commitment is shown by statements such as;

> *We will put into place policies to ensure adequate investment in a sustainable manner in health, clean water and sanitation, housing and education and in the provision of public goods and social safety nets to protect vulnerable and disadvantaged sectors of society (United Nations, 2005).*

This study will obtain its overall inspiration from the spirit that guided the world leaders to recognise the centrality of safe drinking water and sanitation in an attempt to bring development to world's poorest nations especially in Sub-Saharan Africa.

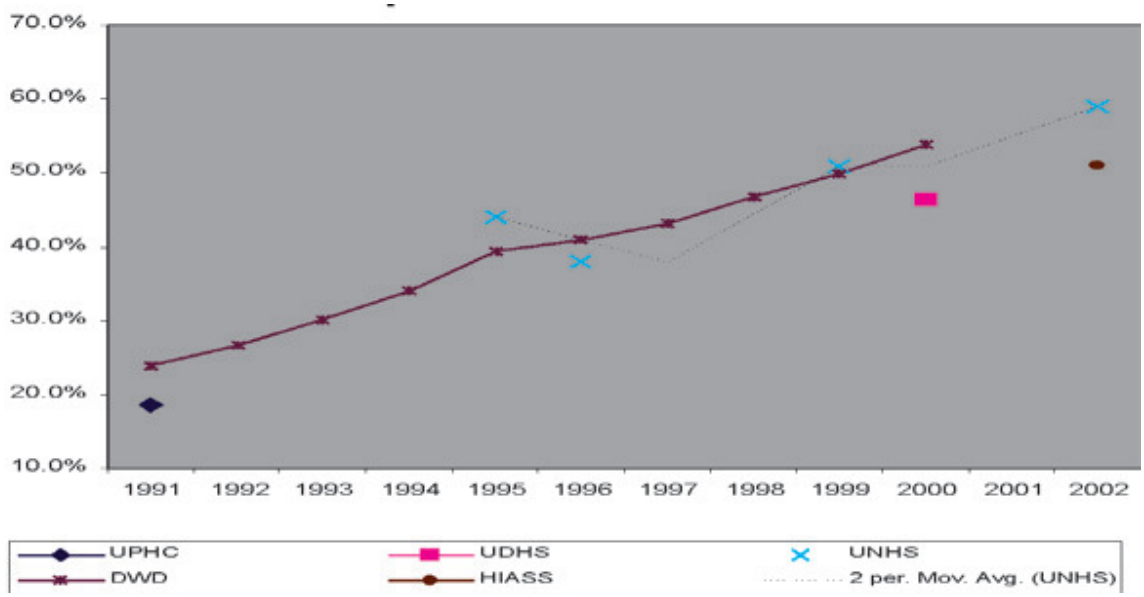
In Africa the fresh water situation is not encouraging; of the estimated 800 million who live on the African continent, more than 300 million live in a water-scarce environment. The key issues related to water in Africa include investing in Africa's potential water resources, reducing drastically the number of people without access to safe water and adequate sanitation, ensuring food security by expanding irrigation areas and protecting the gains of economic development by effectively managing droughts, floods and desertification (Economic Commission for Africa, 2006). In order to address the above issues there is need

for a strong commitment from the African governments to manage the threats the water sector on the continent faces.

The Africa water vision 2025 specifies the types of threats for the sustainability of the water resources on the African continent. These threats are categorised into two, that is the natural threats that include, the multiplicity of trans-boundary water basins; extreme spatial and temporal variability of climate and rainfall, coupled with climate change; growing water scarcity, shrinking of some water bodies, and desertification. The human threats the Africa water vision 2025 points out include, inappropriate governance and institutional arrangements in managing national and transnational water basins; depletion of water resources through pollution, environmental degradation and deforestation; failure to invest adequately in resource assessment, protection and development and unsustainable financing of investments in water supply and sanitation (Economic Commission for Africa et al., nd).

In Uganda too, the water sector is one of the important sectors that have now been prioritised by government as a strategy to provide the foundation for further economic development in the country. Current developments in the water sector are guided by the provisions of the 1995 Ugandan Constitution, the Water Policy 1999, and a number of other legal documents that recognise the centrality of water resources in the development of the country. The policy framework that becomes quite important when the direction of development that Uganda is supposed to take is the Poverty Eradication Action Plan (PEAP) which is supposed to guide all development efforts in the country. Under the PEAP, provision of safe water has been identified as one of the key priority areas that must be given adequate attention if the fight against poverty is to be won. The development of the PEAP in 1997 (revised in 2000 and 2004) coincided with the global wave of submission of Poverty reduction strategy papers to the World Bank, and the PEAP was the poverty reduction strategy paper that Uganda submitted to the World Bank (Government of Uganda, 2004, Ministry of Water Lands and Environment, 2005). Ever since its inception in 1997, the PEAP has guided development efforts in Uganda including developments within the water sector.

Although Uganda seems to be committed to the MDGs for 2015 and the Africa Water Vision for 2025, it is still struggling with providing safe water to her population of 30 million people. Access to safe water facilities in Uganda, is estimated at 57% for rural and 80% for urban areas. The Ugandan Ministry of Water Lands and Environment takes access as, the percentage of people within 1.5 km (rural) and 0.2 km (urban) of an improved water source. Using this indicator implies that almost half of Uganda's rural population does not have adequate water facilities. This largely explains the high infant mortality rate in Uganda that stands at 86 per 1000; a rate that is one of the highest in the world. This high rate has been largely explained by water related diseases such as malaria and diarrhoea (Ministry of Water Lands and Environment, 2005). Still the distance of 1.5 km for rural areas is quite unacceptable because this is still a very long distance for women and children who fetch the bulk of the water for household use in rural areas.



Source: Government of Uganda, 2004; p. 169.

Figure 1: Percentage of rural people served with improved water sources.

Although statistics coming from the Ministry of Water Lands and Environment show drastic improvements in the water coverage rates for rural areas (such as those shown in Figure 1) for the period between the early 1990s and early 2000s, on the ground access to improved water sources remains a dream for many of the people in rural areas. This inadequate access to water means that, children continue to spend long hours looking for water and as a result attend school irregularly, water use among households continues to remain low. Average water consumption ranges from 12 to 14 litres/ person/day in rural areas, compared to a national target of 20 litres/person/day. Shortage of water in rural areas also significantly affects the quality of health of the majority of the people (Sinclair, 2004).

In order to reverse such negative outcomes as shown above, many developing countries embarked on a change in a strategy in the delivery of services. Many countries abandoned a state led development strategy (that was blamed for these negative outcomes) and adopted a bottom up approach to development (Wickramanayake, 1994) to deliver services including water services to their populations. This bottom up approach to development like the concept of community based management has its focus on the potential of the community to organise itself to produce the much needed services and or manage the use of natural resources on a sustainable basis. Scholars like Thakadu (2005) support this view too by showing that the people better placed to manage resources are those living with those resources. Thakadu while citing the works of Christofferson and Johnson (1997) and Machel (1997) shows that indigenous communities in Africa had developed systems and practices, through careful observation of local conditions, and complex processes of experimentation and adaptation to suit dynamic socio-economic and natural environments. But these systems Thakadu points out were disrupted by the advent of colonialism on the continent that brought in a stronger hand of the external state to control natural resources.

In Uganda like in most other developing countries, community based management of natural resources including water resources obtained momentum in the recent past after the realisation that the interests of the local people must become central if sustainable exploitation of especially renewable resources is to be achieved. In the water sector in particular, Okuni and

Rochold (1995) for instance point out, " Development of water sources was generally treated as technical with little community involvement in decision making or actual construction. …Maintenance of rural water sources (especially hand pumps) was exclusively by the Borehole maintenance Units (BMU) of DWD. ...On realization of the serious problems faced with the breakdowns in water supply systems government and the various donor funded projects focused a lot of attention on developing communities to take up the ownership and maintenance of their water sources, hence the Development of the Community Based Maintenance System (CBMS)". With this system, communities are supposed to take an upper hand in the management of their water sources in order to ensure that they continue to operate smoothly.

Although the CBM of water sources is the fashionable approach to the management of water sources, when this approach is being written about, it is basically in reference to the management of government/local government constructed water sources. In Uganda however, a significant portion of the population that lives in rural areas do not have access to any improved water source constructed by the government/local government and in order to obtain water must attempt to fend for itself. The water sources that have been constructed by individuals and or communities after government has failed on her responsibility to provide her poorest citizens with the basic resource of water too are managed communally with what can be called community based management. This study will attempt to establish the rules and practices that are important in managing these communal surface water sources that have been constructed without government/local government support. The study will also attempt to compare the rules and practices that are important in managing government/local government constructed/expanded surface water sources with those that have developed to manage surface water sources constructed without government support.

1.2 Problem Statement

Management of water points is an important aspect of sustainable delivery of water resources to both the rural and urban populations in Uganda (Ministry of Water & Environment-Uganda, 2006, Sinclair, 2004, Tindimugaya, 2003). After the realisation that sound management of water points is quite important in the delivery of safe water to the population, the Ministry of Water Lands and Environment encouraged the adoption of the community based management of water sources especially in rural areas. This community based management of water sources according to the Ministry of Water Lands and Environment involves, a demand driven approach whereby communities apply to Government for their improved water source, contribution to capital cost (CCC) by communities, electing a water user committee (WUC) of 7-9 members including women, community operation and maintenance plan, and operation and maintenance managed and paid for by the community (Ministry of Water & Environment-Uganda, 2006).

Although the government and local governments have been recommending the adoption of the above management plan as a form of developing a robust institutional framework for the management of rural water points (including surface water sources) it has constructed, this institutional framework is not taking the form the ministry recommends (Ministry of Water & Environment-Uganda, 2006, DANIDA, 2007). This study will not only attempt to establish the form community based management has taken over the government constructed surface water sources, but will also establish the form community based management has taken over privately constructed but communally used surface water sources in rural south western Uganda.

Although the Ministry of Water Lands and Environment has been recommending the above form of Community Based Management of water sources (including the surface water sources) that it constructs, a significant portion of the population in rural areas have been "forgotten" by the government and the local governments and therefore do not have access to these improved water sources (Sinclair, 2004, Ministry of Water Environment & Natural Resources-Uganda, 2006). As a result of this, these "forgotten" communities use water sources that have been constructed by individuals and or communities without government support. This study will attempt to establish the rules and practices that have developed to manage these communal water sources that have been constructed by individuals and or communities themselves without any form of government support.

Specifically, this study will attempt to establish the rules and practices that have developed to manage government/local government constructed surface water sources in comparison to the rules and practices that have developed to manage community/individually constructed water sources. This will be done with the view to establish the appropriate institutional framework that can be encouraged for the sustainable management of surface water sources. This study will also attempt to establish the challenges that are faced by communities in rural south western Uganda in managing communal surface water sources.

1.3 Research Questions

- What are the rules and practices that are important in managing government constructed surface water sources in the districts of Mbarara and Kiruhura?
- What are the rules and practices that are important in managing communal privately constructed surface water sources in the districts of Mbarara and Kiruhura?
- How do rules and practices that are important in managing government constructed sources compare with those that are important in managing privately constructed sources?
- What challenges are faced by communities in the districts of Mbarara and Kiruhura in South Western Uganda in managing surface water sources?

1.4 Definition of Key Terms

Rules

Rules are principles or conditions that customarily govern behaviour. Rules regulate behaviour so that the interaction of people in any given activity can be able to go on smoothly. Rules for instance, aim to ensure that all the stakeholders using a given water source can be able to obtain benefits and that all shoulder the costs associated with maintaining the water source in question. In this study, rules referred to all the principles or conditions that governed the behaviour of individuals using surface water sources in Mbarara and Kiruhura districts.

Practices

Practices are customary ways of operation or behaviours. When behaviour is repeated over several times, it becomes institutionalised and is viewed as legitimate by all the stakeholders. In this study, practices referred to the customary ways of doing things related to the management of surface water sources.

Community Based Management

Community based management refers to management systems that rely on a community of users to manage or assist in the management of a resource (One fish, n.d). DANIDA (2007) while writing about CBNRM shows that this phrase is related to a number of terms, such as participatory, community based, collaborative, joint and so forth. DANIDA goes on to show that the term is mainly used when the focal point is the local community. Community based management of surface water sources has much to do with the collective efforts of households in the study areas to continuously have access to safe common surface water sources. In order to have these collective efforts to work, rules and practices must be established to regulate the behaviour of all the water users so that contamination of water sources is regulated and cleaning of the water sources is collectively done. In this study, community based management of surface water sources referred to all the rules and established practices that guided all the surface water users in the districts of Mbarara and Kiruhura.

Surface water sources

Surface water refers to water occurring in lakes, rivers, streams, or other fresh water sources. Surface water is precipitation that does not infiltrate into the ground or return to the atmosphere by transpiration or evaporation. It may be loosely defined as water that stands or flows on the surface of the earth and is commonly referred to as runoff. Surface water sources are opposed to ground water sources that refer to any subsurface water that occurs beneath the water table in soil and other geologic forms (Rail, 2000). This study only looked at valley dams, valley tanks and hand dug wells as forms of surface water sources.

Challenges

A challenge is a situation of being faced with something needing great mental or physical effort in order to be done successfully and which therefore tests a person's ability (Cambridge University Press, 1996). In this study, challenges will be taken as all demanding situations the community based approach to the management of surface water sources faces.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the available literature in the area of community based management of water sources. The gaps in this literature that this study attempted to fill are also presented in this section. The chapter is divided into 3 areas of community based management, community based management in the water sector and the theoretical framework.

2.2 Community based Management

While writing about small scale fisheries Berkes, Mahon, McConney, Pollnac and Pomeroy (2001) point out that it is increasingly being recognised that resources can be better managed when fishers and other stakeholders are more involved in management of the resources when use rights are allocated –either individually or collectively –to control access. The issue of use rights is very important as it informs the extent of ownership of those resources. When user rights are not clearly defined, the resources in question are bound to be misused by the communities.

Ostrom (1990) while writing about governing the commons, makes a strong case that institutions can be able to evolve to govern common resources under which it may not be easy to encourage the development of private property rights. Ostrom points out,

> *It is difficult to know exactly what analysts mean when they refer to the necessity of developing private rights to some common-pool resources (CPRs). It is clear that when they refer to land, they mean to divide the land into separate parcels and assign individual rights to hold, use, and transfer these parcels as individual owners desire… In regard to nonstationary resources, such as water and fisheries, it is unclear what the establishment of private property rights means.*

So, in cases where it is not easy to develop private property rights over certain common resources, Ostrom points out that community members acting collectively develop enduring institutions that manage these resources for the common good of everyone in the community. In short, communities can be able to escape the tragedy of the commons when these institutions develop, and therefore can enable the entire community to benefit from these common resources for quite a long time.

2.3 Community Based Management in the Water Sector

> *In the water supply sector, community participation and management have been identified as possible solutions to maintenance problems (Anschütz, 1996).*

Community based management of water sources ensures that communities which regularly use water sources own those sources, and when they own those sources, the issue of sustainability would largely be sorted out. Community based management has been emphasized in the water sector for a number of years (since 1981-1990 during the United Nations Water Decade) and in a number of different countries (such as Ethiopia, Guatemala, Ghana, Uganda etc) now. Community based management of water sources did not emerge

spontaneously but is underlain by a long history of trial and error (International Water and Sanitation Centre, 2003). However, when the phrase community based management of water sources is mentioned the most common meaning that comes to people's minds is the form of management that is encouraged for the water sources that external agencies such as government, local governments, NGOs construct for a certain local population but it seems to be more than this. This study in addition to examining the rules and practices that have developed to manage surface water sources constructed/expanded by the government and local governments also examined the rules and practices that have developed to manage communal surface water sources that have been constructed without any form of government support. The study attempted to compare the rules and practices that have developed in these two different circumstances with an aim of establishing the most appropriate conditions necessary to strengthen the practice of community based management of surface water sources.

Community based management of water sources has not only been applied in developing countries but also in developed countries. Weatherford (2005) while writing about the appropriateness of solar pumps to pump household-scale water from surface water sources notes how the National Health and Medical Research Council (2004) for Australia recommends weekly testing of water supplies for small communities in Australia. These small communities of indigenous populations Weatherford points out are supposed to manage their water sources collectively. While Weatherford brings out the requirement for regular testing of water to determine its quality in Australia, in many rural areas in Uganda, testing the quality of water from surface water sources is something that is unheard of. This study, attempted to establish what is currently being done by communities as part of the efforts to effectively manage surface water sources collectively.

Weatherford (2005) still while writing about household water supply from surface water sources in Australia raises important considerations that the management efforts should take care of. He points out;

> *This approach entails protecting the water source and transmission lines to prevent entry of pathogens. Regular monitoring of the area is necessary. Important things to consider are keeping animals out of the water source and catchment and ensuring that human or animal effluent does not enter the water source (Weatherford, 2005).*
>
> *It may also be helpful to avoid using the water source at certain times of the year. The most important of these would be the dry season if the water becomes stagnant during that time, and immediately after the wet season's first big rains as the runoff from these events will probably be carrying more contamination than at other times of the year (Weatherford, 2005).*

The community based approach that the Ugandan Ministry of Water, Environment and Natural Resources emphasizes should be adopted for all the water points in rural areas, also stresses the importance of keeping animals away from the water sources, ensuring that human effluent does not enter the water source. But as the earlier assertion by the same ministry indicated, the form community based management of water sources is taking is different from the form that is being recommended. Quite important in the forms of community based management are the differences in rules and every day practices. This study particularly was interested in establishing the rules and practices important in managing government constructed/expanded surface water sources. This study also examined the rules and practices

that are important in managing privately constructed but communally used surface water sources in Kiruhura and Mbarara districts.

Community based management of water sources emphasizes that an entire community should come together to manage a particular water source(s). In principle, the user rights of the water source should be spread throughout the entire community. When the user rights are spread throughout the entire community, the interests of the less privileged are protected, and in turn the entire community benefits. But when these user rights are spread throughout the entire community, the idea of common resources comes up which in itself is associated with a high level of inefficiency compared to when the user rights are held by individuals or individual households.

In relation to the above, in a discussion paper titled the changing meaning of reforms in Uganda: grappling with privatisation as public water services improve Gutierrez and Musaazi (2003) show how the Ugandan National Water Sewerage Corporation was able to achieve some high level of efficiency when it was still largely a government parastatal. The argument they put across is that not all agencies that are owned by the state (and therefore commons), get messed up as diehard supporters of privatisation would want us to believe. Although finally they support the idea that the National Water and Sewerage Corporation should increasingly move into private hands, they do show that a certain level of admirable efficiency can be achieved even when water is still being provided communally.

Still while writing about why full, sustainable coverage in the rural sector in Uganda will take longer, Sinclair (2004) also mentions issues of community based management of water sources as one of the reasons why sustainable coverage will be delayed. He points out;

> *…while the number of water supply installations has increased dramatically in the last decade, issues which affect long-term sustainability have been neglected …Unless there are significant improvements made in the quality of service delivery, in accountability, in community involvement and back-up support provided by local government, these problems will continue to undermine past achievements*

In short, community based management of water sources would help to ensure that water sources last longer because they are appropriately managed. This study attempted to examine whether the rules and practices that have developed to manage communal surface water sources are flexible enough to produce benefits for the communities for generations or the potential to experience the tragedy of the commons is very high.

Since most of the time, rural communities do not have all the technical expertise to construct and maintain certain types of water technologies, it is important that rural communities come into partnership with local governments and Non Government Organisations working in the water sector. Partnerships between institutions with a responsibility to provide water to the people are very important in ensuring success (Silkin, 1998). In support of this idea of forming partnerships in order to make community based management of water sources work better, Silkin (1998) still writing about the Ethiopian experience points out;

> *In this undertaking, government, WaterAid and the communities all had a role to play, and the scheme could not have succeeded without the contribution of three. Government was responsible for designing and constructing the scheme, WaterAid provided the bulk of the capital investment, and communities contributed cash and labour amounting to almost 20 per cent of the construction costs (Silkin, 1998).*

This water project in Hitosa was mainly using different kinds of technologies with high levels of sophistication in these technologies. With the surface water sources the levels of adoption of sophisticated technologies is limited, and it is only the software (management skills) that is quite important. The rules and practices that have developed to manage these surface water sources in rural South Western Uganda are different from those in Hitosa. The challenges are also different; this study attempted to examine the challenges that are faced in the management of communal surface water sources in the districts of Kiruhura and Mbarara in South Western Uganda.

Still while writing about the peoples project in Hitosa, Silkin (1998) highlights the important conditions that have to be present in order for a community based management of water sources to be successful. These conditions include a severe water problem that would mean high community motivation, a government policy environment that favours community management and strong existing institutions. Specifically in relation to this for instance he points out;

> *In 1992, when WaterAid agreed to assist people living in Hitosa wereda to build a water system that they could run themselves, they found a community ready and willing to respond to the challenge. The roots of their enthusiasm lay in six decades of water rationing. 'We even had to ration our children's drinking water' they said, 'and to bury our dead without washing their bodies'*
>
> *…Through experience, WaterAid has identified four conditions that need to be met for communities to manage water supply schemes successfully. The first of these is that lack of water should be a severe problem, to which the proposed technical solution offers the best or the only answer. Users must be involved from the outset of the project, through every stage up to evaluation of the finished project. There must be an organisation of users to run the completed scheme with local people being trained in management, as well as in maintenance and repair. This local organisation cannot survive in isolation but must be linked to a wider network of government or non government services (Silkin, 1998).*

Although nearly the same conditions exist in rural South Western Uganda and especially in the drier parts of the districts of Mbarara and Kiruhura which were the area of the study, the approach for the management of the water sources has not to taken the shape the Hitosa project took. This study particularly examined the rules and practices that have developed to manage government/local government constructed/expanded surface water sources in comparison with the rules and practices that have developed to manage communal surface water sources that have been constructed without any form of external support.

2.4 Theoretical Frame Work

Tragedy of the Commons

The first essay on the tragedy of the commons was written in 1968 in the Journal Science by Hardin. Hardin (1968) described the tragedy of the commons as the scenario in which individuals gain benefits from a particular resource, but at the cost of diminishing the total resource; in the absence of advanced policing or negotiation mechanisms, the prediction is that the resource will be continually reduced until it disappears entirely.

With the tragedy of the commons it is shown for instance that a firm may receive the full benefit of producing a pollutant if it is not required to pay the full social costs of polluting the environment. In this situation, the firm keeps all the benefits of an activity itself but shifts responsibility for the costs to all citizens and future generations. Such an activity would be rational because it would be profitable for the firm to over pollute, while letting others absorb the costs of its effects and cleanup. Under here, the market mechanism left to its own devices contains in-built incentives for over-destruction of the environment (Bruce and Ellis, 1993).

Ecological economist Robin Hahnel cited by tripatlas (n.d) enumerated what he considers to be basic defects of market economy in respect to the environment.

1) Over exploitation of common property resources
2) Over pollution
3) Too little pollution clean up
4) Over consumption

Although the tragedy of the commons theory points out that in the absence of advanced policing or negotiation mechanisms, the common resource continually gets reduced until it disappears entirely, the practice of depending on communal surface water sources seems to be resilient. To explain this situation that appears to counter the postulations of the tragedy of the commons theory, I will adopt most of Ostrom's (1990) design principles illustrated by long-enduring common pool resource institutions.

Design Principles illustrated by long enduring Common Pool Resource (CPRs) institutions –Ostrom 1990

The perspective offered by the tragedy of the commons would encourage those that are guided by it to recommend that resources that are utilised by communities as commons should be privatised so as to avoid the tragedy of the commons. Ostrom (1990) however, argues that neither the market nor the state can singly manage resources such as water resources sustainably for the benefit of communities. After a careful analysis of a number of common pool resources, she suggests a number of principles that are characteristic of long enduring institutions that evolve to manage common pool resources to avoid the tragedy of the commons, and these are;

1. Clearly defined boundaries

Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.

2. Congruence between appropriation and provision rules and local conditions

Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.

3. Collective-choice arrangements

Most individuals affected by the operational rules can participate in modifying the operational rules.

4. Monitoring

Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators.

5. Graduated sanctions

Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.

6. Conflict resolution mechanisms

Appropriators and their officials have rapid access to low cost local arenas to resolve conflicts among appropriators or between appropriators and officials.

7. Minimal recognition of rights to organise

The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

8. Nested enterprises

Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organised in multiple layers of nested enterprises.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research design that was used in the study, study population, the area of the study, sample size, data collection and data analysis, and the study procedure.

3.2 Research Design

A comparative research design was used to study the nature of both formal and informal rules and practices that have developed to manage surface water sources in the districts of Kiruhura and Mbarara in South Western Uganda. A comparative research design further helped to study the challenges faced by the communities and the opportunities that exist to strengthen the practice of community based management of surface water sources. The study used both un-structured interviews and focus group discussions (FGDs) to establish the nature of formal and informal rules and practices important in the management of surface water sources and the challenges faced by the communities in trying to entrench the practice of community based management of surface water sources.

3.3 Study population

The study population was largely consisted of overseers of surface water sources (overseeing privately constructed but communally used sources and government/local government constructed sources that are used communally by households) in the study area. These overseers of water sources are key individuals that constructed the water sources individually, but allow the water sources to be used by the entire community or oversee communally constructed water sources. These overseers of water sources also include individuals who allowed the government/local government to construct/expand communal water sources located on their land. This is the second category of overseers of water sources that were interviewed in order to compare their responses with those who over see the government constructed water sources. This study also interviewed two District water officers for Kiruhura and Mbarara and these two enabled the researcher to appreciate the nature of formal and informal rules and practices that have developed to manage government/local government constructed surface water sources in the two districts. I also interviewed 20 water users. These water users were 10 heads of households that draw water from government constructed sources, and 10 heads of households that draw water from water sources that have been constructed by individuals/or communities without the support of government.

3.4 Research Area

The study was conducted in the districts of Kiruhura and Mbarara in South Western Uganda. South Western Uganda is composed of 11 districts namely, Kabale, Ntungamo, Rukungiri, Kanugu, Kisoro, Ibanda, Kiruhura, Mbarara, Isingiro, Kamwenge, and Bushenyi.

Kiruhura District lies in the cattle corridor in south western Uganda. It borders with the districts of Ibanda and Kamwenge in north west, Kyenjojo in the North, Mbarara District in west, Isingiro Distrcit in the south, Rakai, Lyatonde and Sembabule districts on her East. Mbarara district too lies in the cattle corridor in south western Uganda. It is bordered by the

districts of Bushenyi on her West, Kiruhura on the North East, Ntungamo in the South, Isingiro in the South East and Ibanda in the North.

The main economic activity in the two districts of Kiruhura and Mbarara is rearing of cattle especially in the drier parts of the two districts. Growing of crops especially bananas and coffee is also another major economic activity. The area experiences low rainfall especially during the months of June to August every year and during this period, livestock, wildlife and human beings have to struggle to obtain water for consumption especially in the drier parts of the districts.

Figure 2: A MAP OF UGANDA SHOWING THE LOCATION OF MBARARA AND KIRUHURA DISTRICTS

Figure 3: A MAP OF KIRUHURA SHOWING THE LOCATION OF SANGA SUB COUNTY

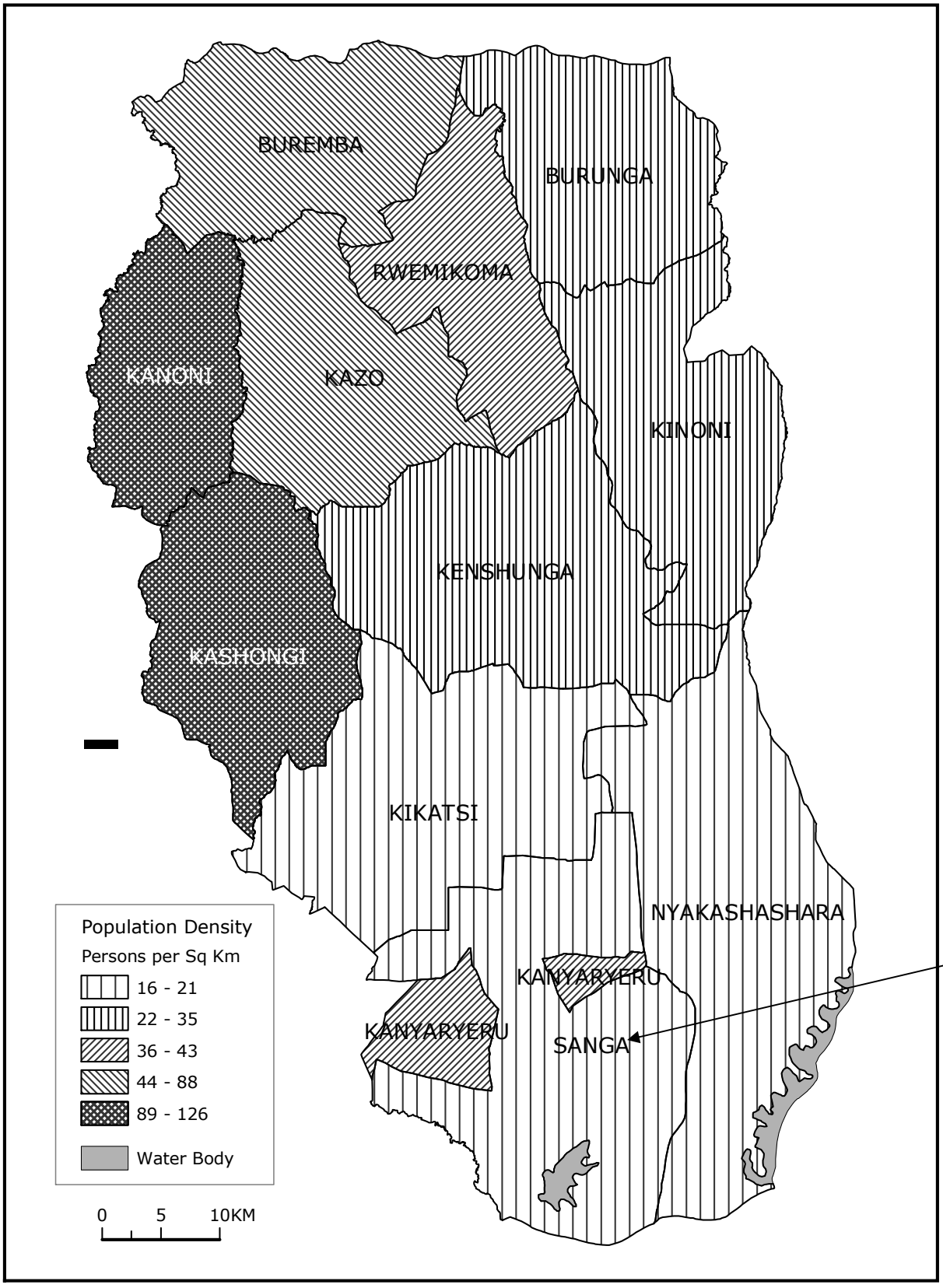
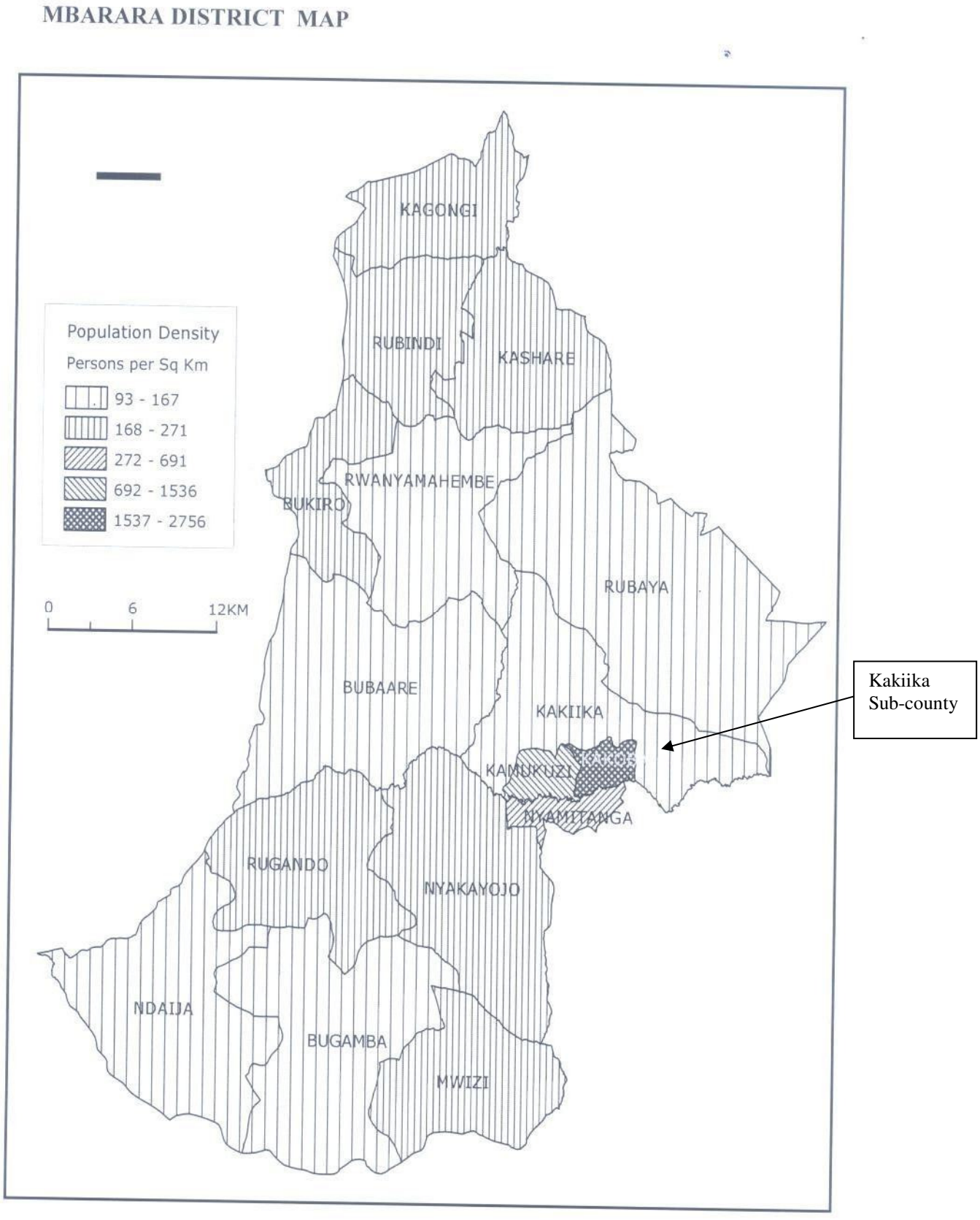


Figure 4: A MAP OF MBARARA SHOWING THE LOCATION OF KAKIIKA SUB COUNTY



3.5 Sample size

Table 1: Sample size and types

	Respondent type	Instrument
	District Water officers (2)	Interview guide
	Focus Group Discussions (2)	Focus group discussion guide
	Overseers of water sources (50)	Un-structured questionnaire

3.6 Data Collection

3.6.1 Research Instruments

The research instruments were of three types, namely; in-depth interview guide for the District Water Officers, Focus Group Discussion guide for the water users, and a questionnaire for the Overseers/Caretakers of surface water sources. The questionnaire for the overseers of surface water sources enabled me to collect data from these persons about the rules and practices that are governing the use of these sources. The in-depth interview guide for the District Water Officers enabled me to obtain data from 2 key individuals at the district level who were very conversant with water management at the district and the national level.

3.6.2 Data Analysis

Data that was collected using the semi structured questionnaire from the overseers of water sources was analysed using SPSS. The other data that was collected from the water users and the District water officers was analysed using the ATLAS t.i Computer Programme. Specifically, this second category of data got grouped into the broader themes of the rules and practices important in community based management of water sources and challenges to the practice of community based management of surface water sources.

CHAPTER FOUR

EMPIRICAL FINDINGS AND ANALYSIS

4.1 Introduction

The findings of the study and conclusions drawn are presented in the chapters that follow. I start with this chapter four that presents the social economic background characteristics of the respondents; the rules and practices important in managing both government constructed and privately constructed surface water sources. The challenges faced in managing surface water sources are presented in chapter five.

4.2 SOCIAL ECONOMIC BACKGROUND CHARACTERISTICS OF THE RESPONDENTS

4.2.1 Age of the respondents

Respondents were asked how old they were and the results from this question are presented in table 2 below.

Table 2: Age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	3	6.0	6.0	6.0
	32-39	16	32.0	32.0	38.0
	40-47	17	34.0	34.0	72.0
	48+	14	28.0	28.0	100.0
	Total	50	100.0	100.0	

Majority of the respondents were middle aged adults -(32-47 years); this is mainly because the study sought out overseers/caretakers of water sources. This kind of responsibility is usually entrusted with adults by the communities. Even still with the privately constructed sources, it is mainly heads of households (adults) that take on such a responsibility of constructing water sources for their households.

4.2.2 Marital status of the respondents

Respondents were also asked about their marital status and the results are presented in table 3 below.

Table 3: Marital status of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	47	94.0	94.0	94.0
	Single	3	6.0	6.0	100.0
	Total	50	100.0	100.0	

Majority 47 (94%) of the respondents reported that they were married. This is partly explained by the fact that all the respondents of this study were 18 and above. In the communities in which this study was conducted every person who is over 18 years is expected to be married. Although this study did not specifically investigate the relationship between marital status and community based management of surface water sources, it is believed within the study population that those who are married are usually much more responsible in many aspects of life than those who are not.

4.2.3 Gender of the respondents

At the start of the study it was suspected that ones gender could be an important criterion to determine who can oversee a given water source or not. So, respondents were categorized by gender and the results are shown in table 4 below.

Table 4: Gender of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	46	92.0	92.0	92.0
	Women	4	8.0	8.0	100.0
	Total	50	100.0	100.0	

The study established that 46 (92%) of the caretakers for the water sources were men. This is largely because the study population is a patriarchal society where the most important resources are owned and controlled by men. Women here, for instance rarely own the most important resource –land, and because of they rarely own land, they cannot own water sources which are constructed on land. However, women and children are the biggest portion of the population that collect water from these surface water sources.

4.2.4 Main occupation of the respondents

Table 5: Main occupation of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Farming (Livestock)	24	48.0	48.0	48.0
	Farming (Cultivation)	26	52.0	52.0	100.0
	Total	50	100.0	100.0	

Respondents were purposively selected to get nearly an equal number to represent the views from the two main livelihood activities –livestock farming and cultivation of crops. This nearly equal number of respondents from the two main livelihood activities is also influenced by the composition of the population from the study areas; Sanga Sub-county is mainly a cattle keeping area and therefore most of those who reported that they were in farming (livestock) came from here; and with Kakiika sub-county the population here can be said to be equally involved in rearing of livestock and cultivation of crops. Most of those who reported they were involved in farming (cultivation) came from Kakiika sub-county.

4.3 RULES AND PRACTICES IMPORTANT IN MANAGING GOVERNMENT CONSTRUCTED SURFACE WATER SOURCES

Government constructed surface water sources include valley dams and valley tanks that have been constructed by both the Directorate of Water Development and local governments with the support of the entire local communities to provide water to these same local communities. Because these water sources are constructed by the government, they are supposed to serve everybody who lives in the community in which they are located. Such a water source is therefore used communally and is supposed to be maintained by the entire community of users that draw water from it. This section attempts to explain the rules and practices that govern the use of these government constructed surface water sources.

Meetings

Regular meetings are very important if government constructed water sources that are supposed to be used by many kinds of users are to be appropriately managed. These meetings are supposed to start even before the water source is constructed to concretise the idea of the need for such a water source. After hatching the idea, the community through its leaders is supposed to approach the local government to request for such a water source. In response to this request the local government prepares to meet the community to ascertain the level of need and the amounts of resources the community itself can provide towards the construction of such a water source. Through community meetings the resources (including the land on which the water source is to be located) that the community can provide are gathered and directed towards the goal of constructing the water source.

After the water source has been constructed, more meetings are supposed to be held between the local government officials and the entire community to hand over the water source to the community. During this meeting, water user committees are put in place and trained on how to manage the water source. During this meeting, all community members are sensitised about their rights and responsibilities in far as far the water source is concerned. And from this

point on wards, the local community takes over the management of this water source. This management of the water source is largely done with the help of a trained and well equipped water user committee.

In order to manage this water source appropriately the water user committee is supposed to hold meetings every month to discuss the water source, but on the ground all the respondents pointed out that this was not happening. All water users are supposed too to meet regularly to discuss issues related to the use of the water source. Meetings were reported to take place only when urgent issues to the water sources became apparent. These urgent issues tended to come especially during the dry season when water sources start drying up. Although the water users were not meeting regularly as they had agreed, the findings still support Ostrom's principle which points out that individuals affected by the operational rules can participate in modifying these rules. But by the mere fact that when urgent issues present themselves, water users rally themselves to hold meetings to discuss these issues, is evidence enough that these users are interested in the sustainability of their surface water sources.

Water user committees

Generally, the study established that water user committees that were functioning very well were largely absent. Many government constructed sources did not have committees to talk of. It was only an identifiable caretaker who in all the cases was the owner of land on which the water source was located or the Chair person of the local council that was in charge of looking after the source.

Ideally, water user committees are supposed to be trained and caretakers availed with necessary skills to ensure that the water source is well maintained. These committees are supposed to be in charge of funds collected every month or any other period agreed upon by the users from every household to cater for the maintenance of the water source.

The government constructed surface water sources that had water user committees to oversee their use generally had the following members;

- Chairperson
- Secretary
- Defence secretary
- Treasurer
- 2 committee members (sanitation)
- 2 committee members (hygiene) around the source

Where the water user committees existed they were said to perform the following roles;

- Mobilisation of water users
- Collection of user contributions
- Enforcing operation and maintenance regulations
- Reporting operation and maintenance issues to district/sub-county
- Over see utilization of water
- Plan for operation and maintenance

Rules

The rules that guide water users include –daily maintenance rules/dos and don'ts, periodical maintenance rules, and rules relating to land use patterns around the water sources.

- Washing of clothes around the source should be done at a considerable distance from the source.
- Stepping into the water is not allowed.
- Sending very young children to collect water is not allowed.
- Washing vehicles in or very near the sources is not allowed.
- Animals are not allowed to drink directly from the source.
- Bathing and playing in the water source is not allowed.
- Drawing water for sale is not allowed.
- Permission must be sought before drawing water for livestock.
- In case the water source has fish in it; not every individual users is allowed to fish from the source.

In relation to the above, when asked what the most important rules that those who use the government water source have to be aware of, a male FGD participant aged 37 pointed out;

> *You see sometimes you find some one coming with a dirty container and the person wants to fetch water. That means if that container is placed in water it will contaminate the water. So you have to make sure that your containers are clean. Two, there are people who fetch water especially the children, when they reach the well they want to play from the water. So you tell them, if you have come to fetch water, don't play around the source.*

Maintenance

Maintaining a water source is important in order to remove the invading vegetation and silt. Maintenance in the form of removing silt and invading vegetation is supposed to be done after a period of about 3-4 months. With this in mind, respondents were asked about how maintaining the sources was being done. In response to this question, a respondent overseeing a government constructed source pointed out;

> *It's done by the community. I remember when I was still young there was an old man we used to fear, he used to mobilize people, he would go around the village calling people and they would come and clean it. There were special days may be after two or three months, he would move around calling people and people would come and clean. And he was the same person responsible for hygiene and sanitation around the source.*

Still in response to the above question, another respondent who was overseeing a government constructed source pointed out;

> *Now we found that maintaining it as an entire community would be very difficult. So we hired some one to maintain it. So we all collect a maintenance fee. So if you refuse to contribute that fee, then we stop you from collecting the water because it's maintained by that fee. We collect, and then give the person who slashes the tall grass around the source and for him he knows when to attend to the source. And as we fetch water, we can also notice that the source needs attention and we therefore remind the person in charge to do his work.*

From the above, it becomes clear that maintaining government constructed sources is the responsibility of the all the water users that the sources serve.

Monitoring

Every individual who uses the water source to water their animals, irrigate their crops or to collect water for household use has a responsibility to ensure that they monitor how other water users are behaving while using the source. If the other water users are breaking the

rules, and therefore contaminating the water, the person who notices them has a responsibility to remind them about the rules or to report them to the water user committee.

It was reported that members from households near the water sources played a greater role in monitoring how the water sources were being used. This was mainly because such individuals were always not very far away from the water sources. Water sources are always located on the farms, so, when individuals from these households are working on their farms they can be able to monitor what is going on at the water sources. This still supports Ostrom's principle that monitors, who actively audit common pool resource conditions and appropriator behaviour, are accountable to the appropriator or are the appropriators. Although it will be shown later the monitoring that is carried out is not completely eliminating all the deviant behaviour, the water users themselves do the monitoring themselves as they go about their daily business.

Sanctions for those who break the rules

Individual water users who are found breaking the rules that are enacted by the water user committee are told to change by the individual who finds them breaking the rules. The individual who finds the other breaking the rules has the responsibility to ask them whether they knew that they were breaking rules. On the basis of the response, then they advise them what to do next time. It may not only be one individual that advises this person breaking the rules, but two persons that got the individual breaking the rules.

In case, the individual continues to break the rules set up by the committee or in case the extent of the damage caused to the water source is deemed to be grave, then the individual is reported to the water user committee. The water user committee summons the individual to appear before it to defend him/herself. When the water user committee gets enough evidence that the individual is indeed continuously breaking the rules and therefore contaminating the water source, the offending individual is either asked to pay a small fine and or cautioned never to repeat the same kind of mistake.

Asked, what happens to those who break the rules, an FGD participant pointed out;

> *Most of the time when they break those rules, what we do is that we give them like one month of cleaning the water source and then we stop paying the person who is supposed to clean up the source; and we monitor their cleaning to see if they are doing the real work as it is supposed to be done. It's really shameful to see the family of so and so is the one which broke the rules and now is in charge of cleaning the source for the whole month.*

Asked, whether because of this kind of shameful punishment people don't break the rules, the FGD participant pointed out;

> *Of course it happens once in a while. It also depends on who has broken the rule. If it's a kid you accept that the kid has done it not knowing. But an old person could have done it intentionally saying, "What can they do to me?" There we have to show you that you have to be responsible by disciplining you; by giving you one month of cleaning.*

When those who monitor to see that the rules governing the use of water sources finish their work, they report the habitual culprits to either the water user committee or the Local Council (LC) committee. Although the LC system performs many other roles, it has an important role

in enforcing sanctions against those who break the rules set to manage surface water sources. In a number of cases, the committee that was managing surface water sources was the same committee as the Local Council 1 (LC1) committee of a particular village.

How does the Local Council (LC) system work?

The local council system is composed a detailed framework of local level governance and is at the heart of the decentralisation programme in Uganda. From the lowest unit/the village level there is a Local Council 1, which has 9 elected members to see issues such as environment, women issues, water, land etc. This is followed by the LC 2 which too has elected members to oversee the governance of the parish. After the parish level, the next level with another vibrant Local council is the sub county. This is the LC 3 that oversees governance issues at the sub-county level. Then the next vibrant LC is the district council –the LC 5, which is in charge of governance issues at the district level.

The district level government collects taxes and in return provides services including providing safe water to the people in the district. With the decentralisation of provision of services, the local government at the district is supposed to provide water sources such as bore holes, valley dams, springs to the local communities. It is also supposed to oversee how the facilities it constructed are being utilised by the communities. Because the district local council cannot be present in every community where a water source was constructed, the village local council which exists in every village oversees the use of such water sources especially when the water user committee is non existent or weak.

Instead of having two committees, one in charge of overall governance of the entire village and another with water management in some villages, the functions of both are fused together and left to be performed by the Local Council 1 committee. In support of this, when asked why their water source had no water user committee, one focus group participant pointed out;

> *Why I think there is no water user committee, its because largely I see it is the local council persons that come around especially when the well has got so bushy, may be the water is not flowing well enough, they are the ones who come around and get a few people or take the message around in the village. It is easier for the Local council to know which household draws water from here and it would be easy for them to track and see which house hold didn't do the cleaning up. So that's why I would say that there is no user committee because the local council one chairman who takes around the messages for immunization, is the very man taking the messages for cleaning the well.*

Where the local council committees are not completely monitoring and sanctioning those who break the rules concerning the use of water sources, they are always ready to support the water user committees to effect the punishments that are supposed to be meted out on those who break the rules.

The LC system was not only important with government constructed sources but also with the privately constructed water sources, it was found to be important in helping to manage such sources. This was being done too through stand by support that can be called upon to reprimand those that exhibited water contaminating tendencies. Members of the local councils too, managed private water sources that were being used communally. Up to 40% of the respondents who were caretaking privately constructed sources were also Chair persons of LC committees or holding other positions on these committees.

The chair persons and members of LC committees are usually the elite members of the community. They have more resources than the rest of the community members and therefore can afford to construct their own private surface water sources. But because they occupy contestable positions, they cannot stop other members of the community from accessing their private sources; otherwise they would not get votes at the next election.

The findings above still support Ostrom's design principles illustrated by long enduring common pool resource institutions where it is asserted that, "Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both". Individual water users who break the rules set are sanctioned by the water users themselves, the water user committee and or even the Local Council committee.

4.4 RULES AND PRACTICES IMPORTANT IN MANAGING COMMUNAL PRIVATELY CONSTRUCTED SURFACE WATER SOURCES

Privately constructed surface water sources include valley dams, valley tanks, shallow wells/hand dug wells that have been constructed by private individuals/households and are owned by these individuals. Despite the fact that these water sources were constructed privately by one household, they continue to be used communally. This section attempts to explain the rules and practices that govern the use of these privately constructed but communally used surface water sources.

Meetings

Meetings to discuss privately constructed water sources were indicated to be very rare. Out of the 25 respondents that I interviewed who were caretakers of privately constructed water sources, only 8 indicated they have ever held a meeting with water users to discuss the use of the water sources. Even most of these 8 caretakers pointed out that they had ever held one meeting or very few meetings to discuss the use of the water sources. When this is the situation on the ground, rules that govern the use of the water sources are not clearly laid down by the users.

Rules

The rules governing surface waters sources constructed by private individuals were not very well spelt out. The major reason why they were not well spelt out was because for most, water sources' users were not holding meetings to discuss the use of the sources. When some respondents were asked what rules those using private water sources had to be aware of they, pointed out the following; One respondent, pointed out;

> *Are there any rules any way! Since it's a village well the rules are not all that many. Only that if you want to use the well, you go and ask for permission from the owner; and they must be aware that so and so is using the well for watering like cattle, goats and nothing more. But for those fetching for household use, they don't need to ask for permission.*

Another respondent pointed out;

> *I wouldn't say that there are really written down rules but at least all the members in the community would agree that when you are caught may be misbehaving, then you would be blamed for that. Now one of the rules I remember is that, when you go to wash at the well, you don't wash near the source so that the water you are going to pour flows back. You fetch water in your basin and then wash a bit far from the*

well and pour away the water. Then two, you are not supposed to bring cows or goats to drink from this water source where people draw water that they use at home. If you are caught doing that, you are blamed and if you did it several times, action can be taken against you. Thirdly, you are not supposed to come and bathe at the source. You know in the village people like bathing at the wells so much. You are not supposed to come and bathe from this place where people are going to draw water to use in their homes. You are supposed to draw water and bathe from where you are supposed to bathe from. Then you have to come with a container that you can use in drawing the water. Because some people can come with no container, so you have come with your container and it's serving ten people hence wasting on your time.

But when respondents were further asked for some of the things that they expected water users to do or not do when they are collecting from their water sources they generally pointed out the following:

- Washing of clothes around the source should be done at a considerable distance from the source.
- Stepping into the water is not allowed.
- Sending very young children to collect water is not allowed.
- Washing vehicles in or very near the sources is not allowed.
- Animals are not allowed to drink directly from the source.
- Bathing and playing in the water source is not allowed.
- Drawing water for sale is not allowed.
- Permission must be sought before drawing water for livestock.
- In case the water source has fish in it; fishing from the source is not allowed.

For the very few water sources whose users were meeting once in a while to discuss the use of those sources, pointed out the following;

- Although the users can have free access to the sources, they should always remember that these sources belong to private individuals.

Although most of the rules governing the use of private water sources are meant to maintain the source in good condition primarily for the benefit of the person who constructed it, the other water users benefit when these rules are in place. Water users here however have limited capacity to participate in modifying operational rules governing the use of these private but communally used water sources, since meetings to discuss such sources are limited.

Maintenance

In order to maintain the surface water sources in good working order two types of efforts are needed. The first effort requires that water users should attempt to use the water source well without introducing contaminants into the source. The second requires that when contaminants are introduced the water users should willingly participate in cleaning up the source to ensure that it gets back to a good condition. So, when respondents were asked how private surface water sources were being maintained in good condition, it was largely pointed out the overseers played a bigger part in maintaining the sources. Even when the other water users participated in cleaning up the sources, it would be at the initiation of the overseer of the water source. In most of the instances, the overseers of water sources have to go and start cleaning up the source as they wait for whoever comes to collect water for household use and livestock consumption, and request them to join in the cleaning up exercise.

In support of the above, in response to a question on how the water source they draw water from is maintained an FGD participant, he pointed out;

> *…as I have said, since its owned by one person, he has to hire the people to clear the bushes, to clean it seasonally especially they do that during the dry season when the well is not full. That's how they are maintained to make the make the water clean since we also use it for domestic use.*

A respondent who was overseeing the use of a privately constructed when asked whether neighbours who were drawing water from the source participated in maintaining the source, pointed out;

> *Our neighbours don't use it every other time. It's on mutual agreement. When it's a time of a water crisis an individual will come and ask, "Can I water my animals for three or four days?" This is usually not an on running arrangement. And because of this, they do not participate in maintaining the source.*

Another FGD participant when asked how maintaining the source is done, he pointed out;

> *But still what I know is that most times that whole thing is initiated by the owners of the land. If we are going to have the cleaning of that well, there is no committee for example in the community that sits and says that after this interval we should be cleaning our well but normally the owners of the land initiate that. They make announcements that tomorrow we are going to be cleaning the well. So who ever goes to get water that day from that water source has to clean.*

Another FGD participant when asked how maintaining the source is done, he pointed out;

> *…there can be mobilization in the village and say on such and such day we are going to clean the well. Most times it used to be on Sundays. The local council chairperson would pass around telling the women that there would be cleaning of the well. A few men if they wanted would come but it was mostly for women when it would come to cleaning up. Then some times when the well gets too bushy and they feel that by the time they make announcements it would take a very long time for people to come they just go to the well; then the local leaders ambush who ever is coming for water. When you come for the water they say put there your jerry-can, you first dig a certain portion and then fetch water and we are very serious. So you put there your jerry-can and dig a bit and if they see that you have done a considerable work, then its okay. If you are two, they say since you are two and you didn't know, let one take the water home and inform the rest that the other is working. So you go to the well to fetch water and you find people are busy cleaning the well and you join them*

4.4.1 The conscience of the individual users

Internalisation is the acceptance of the norms of a group or a society as part of one's identity. Once a social norm has been internalised successfully, a person generally continues to obey it even when no one is watching (Popenoe, 2000). The successful internalisation of social norms causes people to refrain from for instance urinating into a water source not because they are afraid of being caught by other members of the community, but because they believe urinating into the water source is wrong. Their conscience acts as an internal mechanism of social control (Popenoe, 2000). The idea on the conscience of the individual water users acting as the main means of ensuring that they do not contaminate water sources, was well raised by the focus group discussions. Asked what he meant by the idea of moral conscience where it is within every other user to keep good hygiene of the water source, an FGD participant pointed out;

> *You can be beaten. It can be your own mother beating you up for contaminating*

a public water source which your self is also using. Its like you your self urinating in the plate you are using when you are eating or you are about to eat. Some one will really take a disciplinary measure and you can not appeal to any one. You can't even sue some one for slapping you after urinating in the public resource.

Monitoring

The monitoring function is important to ensure that the rules and acceptable practices regarding how water sources should be used by all the users are followed. With the privately constructed surface water sources, the monitoring function is highly fused in the daily activity of the water users. Every water user is supposed to perform the monitoring function to ensure that the water sources are being well used. In short, monitoring is largely done informally, with every water user and community member performing part of this function. When participants of a focus group discussion were asked how they were monitoring to see that the water sources were not being misused, a participant pointed out;

To be sincere we don't have the mechanism of monitoring. May be if it happens that when you are just moving around and you happen to see some one bathing or stepping in the source that's when you can act. But there is no formal mechanism that is there to monitor people who always play around the source.

This kind of monitoring where everyone who uses the water source helps to look at how the water source is being used complements the role played by the internal conscience of the water users mentioned earlier. This too supports Ostrom's design principles where it is pointed out that monitors, who actively audit common pool resource conditions and appropriator behaviour, are accountable to the appropriator or are the appropriators. As shown above, the water users themselves monitor the use of these private but communally used surface water sources.

Sanctions for those who break the rules

Individual water users who are found breaking the rules that are enacted by the water user committee are told to change by the individual who finds them breaking the rules. The individual who finds the other breaking the rules has the responsibility to ask them whether they knew that they were breaking rules. On the basis of the response, then they advise them what to do next time. It may not only be one individual that advises this person breaking the rules, but two persons that got the individual breaking the rules. When asked, if a water user breaks rules, what happens, a respondent pointed out;

I would say that there is nothing really legal. May be let's go to the court, why did you do this? But the community will look at you as a deviant. So like you become a topic in the village and that's how they would control it. Can you imagine so and so brought his cows to drink from this water yet we draw from this well. So in the process as the talk goes around the village some how some where you see this was wrong and doesn't repeat it. That's what they would do.

Another respondent in the process of answering how maintaining the water source pointed out;

When you don't complete your plot then you get ashamed. Then the other measure though I have never seen it being taken is that you don't fetch from the water source because you don't want to clean it. Probably the reason why I have never seen it being taken is because every body cleans it up.

When water users do not obey the rules governing the use of water sources, they are not let to go without any form of control. Informal means of control as shown above remain the most widely used means to correct the behaviors of those who break the rules. This supports

Ostrom's design principles where it is stated, "Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both". With these privately constructed but communally used sources, the sanctions tend to be regularly imposed on individuals than with government constructed sources.

4.4.2 The spirit of a community –we survive as a community

Individuals construct their own hand dug wells, while others use tractors to enable them dig big and deeper wells/dams but allow other members of the community to access the well without paying anything. Although water is largely seen as a free commodity that nature provides, water harvesting that is done through digging of wells/dams is realised to have costs associated with it. Individuals that have constructed their own wells but which are used communally point out that in the spirit of good neighbourliness that is when they can be able to survive.

In relation to the above, a respondent from Sanga sub-county when asked why he does not charge those who use his water source had this to say;

> *I can't charge those who use my shallow well because everyone in this community uses the other's well with the understanding that today it is me without water but tomorrow it might be another person whose well might be dry and they need water from other community members' sources. So, I allow them to use my well because these wells dry up at different times; so, when my well is dry, I also fetch water for domestic use and for my cows from my neighbours' wells.*

Still in line with the above, one of the District Water officers pointed out;

> *Once a person has harvested water, the point of selfishness ceases; most of the people here have some water to take them for about 3 months in the dry season. So, when the dry season is very harsh, a neighbour who has plenty of water can share with others. Or they charge a small fee on the use of their water source. But they tend to share when there is a problem.*

The desire to maintain water resources as communal resources pushes those who own private water sources to allow other members of the community to access their private water sources.

Water user committees

For some, water user committees similar to those that had been encouraged to come up to manage communal water sources had developed.

Others preferred to allow members from the community to continue using their private water sources, but made efforts to ensure that the water source does not become a communal source. In this case, these private individuals cannot allow committees, or meetings meant to discuss the use of the water source to take place. If a meeting was to take place it would mean that increasingly the water source has moved from the hands of the private individual to the hands of the entire community.

4.5 A COMPARISON OF RULES AND PRACTICES MANAGING GOVERNMENT CONSTRUCTED SOURCES AND COMMUNAL PRIVATELY CONSTRUCTED SOURCES

4.5.1 Main occupation

The main economic activity taking place in the two districts of Mbarara and Kiruhura is farming. This farming can be divided into two, livestock farming and cultivation. In both Sanga and Kakiika sub counties where this study was specifically conducted, livestock farming in the main type of farming, but with this type being very pronounced in Sanga sub-county. The table below shows a comparison of the two main farming activities by who constructed the surface water sources that are being used.

Table 6: Main occupation of the respondents

	Main Occupation		
	Farming (Livestock)	Farming (Cultivation)	Total
Government sources	9 (36%)	16 (64%)	25 (100%)
Individual sources	15 (60%)	10 (40%)	25 (100%)
Total	24 (48%)	26 (52%)	50 (100%)

A comparison of the two main livelihoods –that is livestock farming and cultivation of crops, which are predominant in the two districts of Mbarara and Kiruhura, shows that those who are involved in farming (cultivation) (16 respondents compared to 9 respondents for farming (livestock)) are more likely to be using government constructed water sources. According to the table above still, 15 respondents who reported to be largely involved in farming (livestock) also went ahead to point out that they were largely using individually constructed water sources.

The movement from the rearing of the long horned Ankole cattle to the rearing of exotic cattle partly explains why those who are involved in farming (livestock) have now opted to use individually constructed water sources. The exotic cattle are more susceptible to diseases, so when they are moved around for long distances to look for water at government constructed sources, they end up contracting diseases.

Irrigation of crops is not widely practiced in the two districts of Mbarara and Kiruhura. So, when respondents who are largely involved in farming (cultivation) reported that they were mainly using government constructed water sources, they indeed were pointing out that they draw water from these sources for household use. Unlike their pastoralists' counter-parts who are involved in using water sources for production (watering animals) and therefore forced to construct their private water sources, the cultivators are able to continue to draw water for household use from the communal government constructed sources.

The changes in land use patterns which is also related to the increment in the population in the two districts also explains why the pastoralists increasingly are resorting to individually constructed water sources. Changes in land use patterns have necessitated the farmers to paddock their land for instance, and this makes it had to move cattle over long distances to search for water from government constructed sources. Due to population pressure from both livestock and human beings, pastoralists have now been forced to construct their private water sources.

4.4.2 Do you know all the water users of this water source?

Knowing all the water users of a particular source is quite important if a person overseeing a particular source is to mobilize these users to for instance clean up the source, or even to attend a meeting to discuss the source. So, respondents were asked whether they knew all the water users of the sources they were overseeing and the results are presented in the table that follows;

Table 7: Do you know all the water users of this water source?

	Knowing all the water users of a particular source		Total
	Yes	No	
Government sources	25 (100%)		25 (100%)
Individual sources	24 (96%)	1 (4%)	25 (100%)
Total	49 (98%)	1 (2%)	50 (100%)

Although surface water sources remain common resources in the two districts of Mbarara and Kiruhura, the boundaries in terms of who can and uses a given water source are clear to all the users. According to the table above, all the respondents who reported that they were overseeing government constructed water sources reported that they knew all the other water users that also drew water from the same government water sources. Even the boundaries for those who use individually constructed water sources were quite clear because only one respondent pointed that there was a possibility he might not be able to know all the other water users that were drawing water from the source they were overseeing.

When communities achieve this high level of precision in defining who is using a given water source and who is not, they can be able to act collectively to protect that water source. It means that such a community of users has the capacity to act as one entity to safe guard their collective interests. When this happens, then the skepticism provided by the tragedy of the commons thinking becomes less relevant since the community can be able to act collectively to safeguard its own collective interests. This still supports Ostrom's principle where it is stated that, "Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself." With the surface water sources, the boundaries in terms of who can draw water from these sources were quite clear to most of the overseers of the sources.

4.4.3 How do households gain the right to draw water from a water source?

Since all the surface water sources that this study focused on were being used communally, I asked respondents how the water users gained the right to use these sources. This was mainly because I thought the conditions that were necessary for one to gain the right to use any surface water source were quite important in case there was need to review who should or shouldn't use any particular source. This reviewing of who should or shouldn't use any particular source can be quite important in instances where the water source is not being used properly, and therefore there is need to weed out those who are contributing too much in as far as polluting the source is concerned. Those using a particular source it was pointed out gained the right to draw water from a particular source by participating in cleaning the water source, by being neighbours to the water source and therefore in many cases neighbours to the caretaker; and by also asking permission to use the source from the caretaker, as shown the table that follows.

Table 8: How do households gain the right to draw water from a water source?

	Government sources	Individual sources	Row total
Participate in cleaning the source	15 (83.3%)	3 (16.7%)	18 (36%)
By just being neighbours	13 (46.4%)	15 (53.6%)	28 (56%)
By asking permission	13 (48.1%)	14 (51.9%)	27 (54%)
Column Total	25 (50%)	25 (50%)	50 (100%)

*Multiple response was possible
*Percent and totals based on respondents

Participating in cleaning a water source in order to continuously have the right to collect water from the source is a good requirement for the sustainability of the water source itself. By participating in the various activities meant to ensure that the water source remains clean the water source user earns their right for future access as shown in the table above.

With government constructed water sources, it is quite important that individuals who are to continue using these sources (both as sources for water for production and household use) should participate in cleaning the water source. According to the table above, of those respondents who pointed out that in order for one to be use a particular source continuously they have to participate in cleaning that source, 15 (83.3%) were overseeing government constructed sources compared to 3 (16.7 %) who were overseeing private sources.

While with the government constructed sources it was very important that for one to continuously use the sources they should participate in the periodical cleaning of that source with privately constructed sources it was not that important. Individuals who constructed their own sources fear that when they compel all those who use their water sources to participate in the periodical cleaning of these sources, then the community will take these sources and the portions of land on which they are located as theirs. So, in order for the entire community not to claim ownership of a privately constructed water source, the individual who constructed it, ensures that they continue to clean the source alone.

Surface water sources that have been constructed by private individuals are usually quite small compared to those that have been constructed by the government. Although the owners of these private water sources continue to allow other members of the community to use their sources, these members do not usually use one water source. And because they use other numerous small water sources, the individual cannot easily call them to participate in cleaning their source.

Also by being neighbours with the water source and in most cases neighbours with the care taker of the water source earned a person the right to use the source. This emanates from the spirit of community members that they need to use certain resources as a community, because then they can be able to survive as a whole. The table above too compares government and private constructed water sources on the aspect of just being neighbours in order for one to gain the right to use a water source.

The idea of being good neighbours with the rest of the community members is quite important in order for one to continuously use both government and privately constructed surface water sources. According to the table above, 15 (53.6%) of the caretakers of privately constructed

sources reported that for the other community members to be able to access the water source they just only needed to be their neighbours. So, longer as an individual lived within the vicinity of the privately constructed surface water source they were free to draw water from this source. Still, 13 (46.4%) of the respondents who were care takers of government constructed surface water sources, reported that for one to be able to access the water source they just only needed to be their neighbours.

In relation to the above, when asked how those who collect water from a particular private water source gain the right to use the source, a male FGD participant aged 53 for instance remarked;

> *For me I would say that there is nothing official about permission. Any one can come and fetch water from this well. What would determine who comes and who doesn't come is the distance. How near is it from your home? It's like people would wonder if you leave a near by well near your home and come and fetch water from this well? But what determines is the distance from the household to the well. The nearer the well, the more people feel free, and find it easier to collect water from such a source.*

This confirms that when considering water resources unlike many other resources, individuals in the districts of Mbarara and Kiruhura continue to hold these resources in trust for the benefit of all the community members.

The above situation is partly true because of the need to obtain harmony in the communities. This is based on the understanding that those downstream must cooperate with those upstream since a limited number of people can always own land downstream where surface water sources can be viably constructed. Since the water flows from the higher areas to the low lying areas, those in the high lying areas believe they can have a share on the water that flows to the low lying areas. And this belief has been well entrenched in the minds of the community members to the extent that those who want to run private water sources as completely private sources end up suffering water poisoning as a reminder that these water sources must be used by the bigger community.

Asking permission from the caretaker or the water user committee (as shown in the table above) is also another major way through which one could be able to gain a right to collect water from a communal surface water source they did not construct. This many times applied to those who wanted water in large quantities, either to construct a house, water animals, irrigate their gardens and so forth.

According to the table above, asking for permission to use both government and privately constructed water sources was important. According to the table above, 13 (48.1%) of the respondents who were care takers of government constructed surface water sources, reported that for one to be able to access the water source they needed to ask for permission from the caretaker and or the water user committee. This condition of asking for permission to use the government constructed sources, the caretakers pointed out largely applied to individuals who would be coming from outside the community the water source was constructed to serve. An upsurge of potential water users is usually registered during the dry season at government constructed sources, and when this happens, the water user committees sit to decide who to allow to use water sources and who not to allow. Also 14 (51.9%) of the respondents who were care takers of privately constructed surface water sources reported that for one to be able to access the water source they needed to seek for permission from the care taker. This was so, because sometimes an individual may need water in big quantities to water their animals, to

construct a house or even to irrigate some crops. In cases where a household just required water for household use, it was reported by many respondents that it was not even necessary to seek for permission to collect water from a privately constructed water source.

4.4.4 Ever Hold Meetings

When water sources are used communally, it is important that the water users have regular meetings to discuss the use of those water sources. When this is done, the meetings help to put down the regulations governing the use of the water sources, and the standards that are expected to be observed by every water source user. This brings predictability in the use of the water sources, which is good for every user. With this in mind, respondents were asked whether individuals/households using the water sources they were overseeing have ever held meetings to discuss those sources and the results from this question are presented in the table below.

Table 9: Ever hold meetings

	Ever hold meeting(s)?		
	Yes	No	Total
Government sources	25 (100%)	0 (0%)	25 (100%)
Individual sources	8 (32%)	17 (68%)	25 (100%)
Total	33 (66%)	17 (34%)	50 (100%)

All the respondents 25 (100%) who were overseeing government constructed water sources pointed out that individuals/households that draw water from the sources that they were overseeing had ever held meetings to discuss the use of the sources. However, only 8 (32%) of the respondents who were overseeing individually constructed water sources reported that individuals/households that draw water from the sources that they were overseeing had ever held meetings to discuss the use of the sources.

The differences in terms of whether water users of a particular source had ever held a meeting or meetings to discuss the source(s) that can be seen above were clearly explained by the respondents as resulting from the following. With government constructed surface water sources, it is imperative that water users hold meetings to discuss the maintenance of these sources. After construction of these sources, the government takes it upon itself to facilitate the establishment and training of water user committees to oversee the management of water sources. With privately constructed water sources, it was pointed out by the respondents that the desire to retain the sources as private property by those who constructed them compels them not to call meetings to discuss these water sources.

With up to 66% of all the overseers of communal surface water sources reporting that they have ever held a meeting(s) to discuss the water sources, one of principles Ostrom put forward is supported. The principle which states that, “Most individuals affected by the operational rules can participate in modifying the operational rules” becomes very relevant when the idea of holding meetings to discuss water sources is seen as important. It is at these meetings that operational rules that affect water users can be modified by these users.

4.4.5 Most important things discussed in Water meetings

All the respondents that reported that they had ever held meetings with water users of the sources they were overseeing were further asked what they discussed in those meetings in

relation to the water source. The issues that they discussed they pointed out, were related to periodical maintenance of the water sources, daily maintenance (dos and don'ts) of the water sources, and land use patterns around the water sources.

Table 10: Most important things discussed in water meetings

	Periodical maintenance	Daily maintenance/ dos and don'ts	Land use patterns around the source	Total
Government sources	24 (96%)	25 (100%)	13 (52%)	25 (75.8%)
Individual sources	8 (100%)	4 (50%)	4 (50%)	8 (24.2%)
Total	32 (97%)	29 (87.9%)	17 (51.5%)	33(100%)

*Multiple response was possible
*Percent and totals based on respondents

When respondents who had pointed out that they had ever held meetings with water users of the sources they were overseeing were asked what they discussed in relation to those sources they pointed out a number of issues. Some of the issues they pointed out such as; discussion on whether or not to allow more users/intruders during the dry season, desilting the water sources, fencing the water source, clearing the bushes around the water source and contributing money towards the maintenance of the sources, I categorize them as periodical maintenance of the water sources.

According to the table above, 24(96%) of the respondents overseeing government sources compared to 8(100%) of the respondents (who reported to have ever held a meeting) overseeing private sources pointed out that they discussed matters relating to the periodical maintenance of the sources. Discussion of the periodical maintenance of the water sources was consistently high for both the government constructed and individually constructed water sources.

Periodical maintenance activities were seen as activities that the water users can engage in after a given period such as a month. Although, government recommends that water users should meet regularly to discuss the use of water sources, it was consistently pointed out by the respondents that they were not meeting regularly as required but only when the above issues present themselves as very urgent issues.

Discussion on aspects such as, how washing of clothes around the source should be done, no stepping in the water, no sending very young children to collect water have been categorized as daily maintenance/dos and don'ts. The dos and don'ts also included, no washing of vehicles near the sources, not allowing animals to drink directly from the source, no bathing or playing in the water source, discussion on stealing fish from the water source and drawing water for sale. The table above too shows the extent of the discussion of daily maintenance/dos and don'ts of water sources among those who hold meetings to discuss water sources.

According to the table above, 25(100%) of the respondents overseeing government constructed sources compared to 4(50%) overseeing private sources of those who pointed out

that they had ever held a meeting(s) to discuss the use of their water sources reported that part of their discussion was on daily maintenance/dos and don'ts of the water source. When these dos and don'ts on how the water sources are supposed to be used become widely known and accepted by those who use surface water sources, then one can comfortably point out that an institutional framework to guide water users has developed.

Appropriate land use around surface water sources is very important for the quality of water not to significantly deteriorate. The land use patterns those who oversee surface water sources pointed out included ensuring that those around the water sources had appropriate latrines. With government constructed dams where the land was first secured by the entire community, the boundaries of the land on which the water sources are located are discussed so that individuals whose land neighbour it, do not shift the boundaries at the expense of communities' land. Other land uses that are discussed include for instance the distance that can be allowed for one to construct a shade to spray their livestock against ticks.

Although surface water sources do not have safe water for household use, attempting to regulate the land uses around the sources prevents the water from deteriorating to levels where even animals cannot consume it. Although surface water sources are pointed out as having unsafe water for human consumption, a significant portion of the people in the two districts of Kiruhura and Mbarara continue to depend on these sources for household water. Therefore, attempts to regulate the land uses around these surface water sources help to ameliorate the worrying situation on the quality of water that is provided by these sources.

Respondents were also asked what the most important rules that households/individuals who draw water from the water sources they were overseeing must follow and the rules were similar to what is discussed in the meetings. The meetings that are held to discuss the water sources basically are meant to provide the rules that should guide everyone using the surface water sources so that as many people benefit from these sources. The rules that were pointed out included aspects of periodical maintenance, daily maintenance and land use patterns around the water sources.

4.4.6 What happens to those who break the above rules?

In order to maintain the quality and quantity of the water, those who break the above rules receive some form of punishment as a way of correcting their behaviour. Individuals that do not break the above rules on the other hand receive the reward of avoiding the punishment. With this in mind, respondents were asked what happens to those who break the rules that water users put in place during their meetings, and the table that follows shows the responses.

Table 11: What happens to those who break the above rules?

	Government sources	Individual sources	Row total
Caution/Talk to the individual to change	25 (50%)	25 (50%)	50 (100%)
Reported to the committee/pay a fine	22 (73.3%)	8 (26.7%)	30 (60%)
Never allowed to use the water source again	0 (0%)	10 (100%)	10 (20%)
Total	25 (50%)	25 (50%)	50 (100%)

*Multiple response was possible

*Percent and totals based on respondents

According to the table above, all the overseers of both government constructed and privately constructed water sources pointed out that those who break the rules are cautioned/the culprit is talked to to change. Overseers of government sources consistently pointed out that this was the first step that they had to take if an individual grossly misused the water source. Talking to the individual who would have broken the rules helped to clarify some of the rules that would not have been clear to the individuals and also to remind the individuals about the rules. An FGD participant in relation to this pointed out;

> *Of course when you find some one has broken the rules you just caution them, if he continues doing the same then the only solution if you are the one owning the source is to suspend him. In most cases you tell them not to continue coming back to your source. You can tell them, if you want a source where you can play go and have yours'*

Cautioning the individual to change their ways was reported by the respondents as being the main means of correction they have had to employ since nearly all community members are responsive to the rules that are set.

Individuals who did not go by the rules that were put up by the users of surface water sources faced the risk of being reported to the water user committee and or made to pay a fine. According to the table above, 22 (73.3%) of the respondents who were overseeing government constructed sources reported that an individual who breaks the rules can be reported to a water user committee and or made to pay a fine compared to only 8 (26.7%) from those overseeing privately constructed sources. Therefore individuals using government constructed surface water sources faced a bigger risk of being reported to a water user committee and or made to pay a fine than those who were using privately constructed water sources.

The above situation was largely because government constructed sources had to have water user committees while privately constructed sources did not need to have such committees. Since the person overseeing the private source had more rights than the rest of the users including the right to exclude water users they deemed very detrimental as far as the water source was concerned, that's why the respondents did not mention frequently the idea on reporting to the committee or making water users to pay fines. Reporting to the committee and or making those who break rules to pay fines with government constructed sources is largely meant to correct the actions of those break the rules but not to chase them away. While with privately constructed sources the option of excluding water users completely from using a particular source remains viable.

According to the table above, differences can be seen between government constructed sources and individually constructed sources in terms of whether a person who breaks the rules that are set by the users can be allowed to use the water source again. According to the table above, 10 (100%) of the respondents who reported that when an individual breaks the rules that are set, there is a possibility of stopping that individual from using the water source again were overseeing privately constructed sources. While with the government constructed sources, no respondent pointed out that they can stop an individual that has broken the rules from using the water sources again.

When the above kind of situation where it is difficult to stop individuals from accessing a water source when they break rules prevails, it becomes hard to maintain the quantity and quality of a water source. Although the idea on internal conscience of the individual water

users also holds for the government constructed sources and to some extent controls the amounts of misuse individuals can subject such a water source to, its effectiveness compared to privately constructed water sources is low. Government constructed water sources generally are subjected to more misuse than individually constructed sources. The end result of this kind of situation is deterioration of the government constructed sources and when this happens everyone in the community looses.

In support of the above, while answering the question on what happens to those who break the rules regarding the use of the water source, an FGD participant pointed out; *If your animal is found in the middle of the water source actually you may be banned from taking your animals to drink water from there. That's the most serious one that I have seen. But the one who claims ownership of the land on which the source is located has a right to stop you from taking the animals there again.* With privately constructed sources, the possibility of banning certain water users from accessing water sources remains real and partly explains the better water use practices that they enjoyed over the government constructed sources.

4.4.7 Who and how is the monitoring done?

When rules are put in place and the punishments to be received by those who break the rules by the water user committee and all the water users, what becomes important next is the monitoring how the water sources are being used. Respondents were asked about how the monitoring to ensure that those water users who break the rules are corrected and the results are shown in the next table.

Table 12: Who and how is the monitoring done?

	Government sources	Individual sources	Row total
Workers on the farm	6 (40%)	9 (60%)	15 (30%)
The water user committee	0 (0%)	1 (100%)	1 (2%)
Everyone who uses the source	25 (62.5%)	15 (37.5%)	40 (80%)
Column Total	25 (50%)	25 (50%)	50 (100%)

*Multiple response was possible
*Percent and totals based on respondents

Monitoring to see how the water source is being used was reported to be done by mainly people who were geographically close to the water source. All water sources were located on the farms of the owners for individually constructed sources and still for government constructed sources they were located on the farms. For both types of water sources, the workers/labourers on the farms in which the sources were located were quite important in monitoring how the water source was being used. This is mainly because these workers were always near the source everyday. Also, households that were quite close to the water sources (for both types of sources), in terms of distance were reported to be quite important in regular monitoring of how the water sources were being used.

As the workers/labourers on the farms go about their business, they can be able to also monitor who using a water source and how it is being used. This is because these workers/labourers and households are near the water sources, but not because it is part of their well established mandate to monitor how the sources are being used. According to the table above, up to 15 (30%) of the respondents pointed out that labourers on the farms and

households near the water sources carried out the monitoring to ensure that the water sources are not being misused.

Most of the monitoring function to ensure that the water sources are not misused was reported to be done by everyone who uses these sources. According to the table above, majority of 25 (62.5%) who mentioned that it was every one who uses the source that is supposed to monitor its use were those who were overseeing government constructed sources. This means that all the respondents who pointed out that they were monitoring government constructed water sources, reported that it was every user's responsibility to ensure that the rules regarding how the water source should be used are followed. Also 15 (37.5%) of the respondents who were overseeing privately constructed sources pointed out that it was every user's responsibility to monitor to see whether rules and being followed or not.

This monitoring is supposed to be done as everyone goes about their business and most especially when they go to the water source to collect water or to water their animals. It was only during the dry season that water users guarded their water sources at night to ensure that those who are not supposed to use the sources do not use them stealthily at night. Water users here, take turns to guard the water sources; one group watches the water source from dusk up to around 1 am and another group watches the source from 1 am to dawn.

Although the water user committees exist for especially government constructed sources, the mandate to monitor the use of the water sources lies with everyone in the communities. This is largely because a committee or even its chairperson cannot sit next to the water source to monitor how it is being used.

In support of the above, when asked how the monitoring is done to ensure that the water source is not being misused, an FGD participant pointed out;

> *There is no formal system of monitoring really. But what we have is that people just have an ordinary eye on each other. Like some body goes to the well and finds something is not good, and he or she raises the issue with the owner of the land –that this seems not to be good. But I haven't seen like some body is there and is particularly in charge. Its actually I would say members of the community have an eye on each other to ensure that the water source is clean.*

Another FGD participant also remarked;

> *Monitoring is done in such way that people spy on each other. That's the method I would really talk of. If you come to the well and find so and so washing and yet she is pouring the water she was using back into the well its your duty also to tell her that what your doing is wrong; you are not supposed to do that. So when some one persists on doing that it, he/she has to be taken to the chairman, then the chairman would caution them that what they are doing is wrong. I would say that there is no strict monitoring. And there are those people whom we told you about that have their land up to the well, -as they dig and tend their gardens they are also observant on what is taking place on the well.*

Another FGD participant pointed out;

> *There is no special monitoring that is done. It's simply every body's responsibility to make sure that the water source is clean and safe. When you go there to collect water make sure you do what you are supposed to do. If you have gone to fetch water, do it, if you see some one doing bad things then rebuke or correct the person.*

This proves that the monitoring function cannot be easily separated from people's daily activities. As water users go about their daily business they can be able to detect those who are bent towards misusing water sources are help to correct these kinds of behaviours for the common good of every body in the community.

The above findings support Ostrom's 1990 design principles illustrated by long enduring common pool resource institutions where it is stated, "Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators". In this case, the water users themselves are the ones actively involved in monitoring how the water sources are being utilised and bringing to book all those who break the rules relating to how sources should be used.

CHAPTER FIVE

5.1 CHALLENGES FACED IN MANAGING SURFACE WATER SOURCES

Surface water sources by their nature (here water flows over the surface of the earth) face a number of challenges that ground water sources may not face. Although surface water sources face unique challenges they continue to be a major source of water for household use and for production purposes in most parts of South Western Uganda. The challenges that surface water sources face especially in the South Western districts of Mbarara and Kiruhura are detailed in the next pages of the dissertation. The challenges that are detailed in the next pages include the unique challenges that are only faced by surface water sources and all those other challenges that surface water sources face but can also be faced by other types of water sources such as ground water sources. When I present a challenge, I will attempt to show whether it is a unique challenge faced only by surface water sources or can also be faced by ground water sources.

Table 13: Challenges faced in Management of Surface water sources

	Government sources	Individual sources	Total
Dries up during the dry season	0 (0%)	13 (100%)	13 (26%)
Users don't follow the rules	6 (40%)	9 (60%)	15 (30%)
Users don't participate in maintaining the source	10 (35.7%)	18 (64.3%)	28 (56%)
Dysfunctional technology	3 (100%)	0 (0%)	3 (6%)
Wild animals intrude into the source	15 (100%)	0 (0%)	15 (30%)
Using the source stealthily at night	6 (66.7%)	3 (33.3%)	9 (18%)
The source is small	6 (85.7%)	1 (14.3%)	7 (14%)
Reporting users who break the rules is a problem	1 (50%)	1 (50%)	2 (4%)
Land ownership problems	3 (75%)	1 (25%)	4 (8%)
Total	25 (50%)	25 (50%)	50 (100%)

*Multiple response was possible
*Percent and totals based on respondents

5.1.1 Water source dries up during the dry season

The two districts of Mbarara and Kiruhura lie within the Ankole-Masaka dry corridor of Uganda, and experience prolonged drought between June-August every year. This period of the year is the most difficult period for livestock, human beings and even wild life in this part of the country. Most ground and surface water sources dry up, and nearly all the vegetation that is supposed to act as food for the livestock and wild life dries up leaving the ground bare. During this dry season, water becomes quite important and its prices also sky rocket in some parts of these two districts to reflect its scarcity.

Surface water sources are dependent on both acquifiers and surface run off in order to replenish the amounts of water available to livestock and human beings. Surface run off is the most important way in which these sources are replenished. And this surface run off happens only when it has rained. Acquifiers too depend on the amounts of rain available, so that when rain is low, little water is produced by the acquifiers into the surface water sources. But with the prolonged drought that Mbarara and Kiruhura face every year, the amounts of water produced by both the acquifiers and surface run off reduce significantly leaving surface water sources dry.

According to the table above, all the respondents 13 (100%) who reported that one of their biggest challenges was drying up of the water sources were overseeing individually constructed water sources. On the other hand none of the respondents who were overseeing government constructed sources pointed out that drying of a water source is a challenge.

The differences that can be seen above between government constructed water sources and individually constructed sources when the challenge of drought is considered has largely to do with the differences in sizes and locations of these sources. The government constructed sources tend to be bigger compared to sources that are constructed by individuals, and this enables them to keep much more water that can take the users for a long period without rain to replenish the sources. The government constructed sources are few but are strategically located in places where most run off gathers, so, they get more water to store compared to the sources that are constructed by individuals which by default have to be located on their farms even if such areas do not have very strategic points to locate hand dug wells, valley dams, or valley tanks.

5.1.2 Water users do not easily participate in maintaining the source

Maintaining a surface water source is very important if it is not to deteriorate to a level where it can no longer be useful to livestock and human beings any more. Maintaining a surface water source involves regular desilting the source, clearing the bushes around the source, fencing the water source against livestock and wildlife intrusion, and so forth. This regular maintenance of a source is supposed to be carried on by the regular users of a water source; but the study established as shown in the table above, that rallying water users to participate in maintaining water sources was problematic.

Participation in maintaining the water source is quite important if it is not to get silted up and become dysfunctional. However, this study established that all water users of any particular source were not willingly participating in maintaining that water source. According to the table above, 10 (35.7%) of the respondents who pointed that water users did not participate in maintaining water sources were overseeing government constructed water sources compared to 18 (64.3%) who were overseeing privately constructed sources

Respondents who were overseeing individually constructed sources generally did not expect too much help from users, mainly because they wanted their water sources to remain private property. Consistent participation of all the water users in the regular cleaning of the water source would help to transfer some rights to the water users who participated in the cleaning. This reality drove the overseers of some of these private water sources who were usually the ones who constructed them to always attempt to maintain them single handedly.

The desire to maintain all the rights regarding how the water source should be used is concerned not withstanding; the water users too are not cooperative in maintaining water sources. If an individual called the water users to participate in cleaning up the water source, some of the users will not turn up because they know that they can be able to continue to use the source without investing too much energy into it. When this happens, it creates reason for many other people not to participate in cleaning up a source next time because they realized that the last time those who failed to participate in the cleaning up did not loose their right to use the water sources. This supports the idea of the tragedy of the commons where individuals are shown to gain benefits from a particular resource, but at the cost of diminishing the total resource.

5.1.3 Dysfunctional water pumping technology

Water pumping technology is important to ensure that water is pumped from the surface water sources to where it is needed. With cattle rearing being an important activity in the study area, water is always needed for livestock's consumption at quite a distance from the sources themselves. But the study established that at all the government constructed sources where some form of water pumping technology had been fixed to help ease the farmers' task, it was now dysfunctional. This challenge of dysfunctional water pumping technologies is also elaborated in the table above.

With the government constructed water sources attempts had been made to install water pumping technology to pump water to watering troughs. This was meant to ensure that livestock can easily have enough drinking water within the troughs and therefore do not come very close to the water sources. These watering troughs were even located outside the fence around the water sources. Unfortunately the technology to pump the water to the watering troughs on all government constructed water sources that I visited was dysfunctional. This meant that the watering troughs that had been located quite a distance from the sources, could never be used again as it is very laborious to carry water to these troughs. As a result, the farmers constructed other watering troughs close to the water sources using local materials; and this meant that now the animals can go through the fences around the water sources to drink either directly from the sources or from the watering troughs.

When animals drink directly from the source, they urinate and defecate into the source further reducing the quality of the water. By stepping in the water, there is also a possibility that animals will bring in dirt (including human feaces) that they would have stepped on earlier while grazing. Still when they drink directly from the source, the water source silts up very quickly because they easily push the silt at the banks of the water source into the water as they come running to drink water.

Photo 1: Abandoned watering troughs due to dysfunctional water pumping technology

5.1.4 Wild animals from the park intrude into the water source

Sanga Sub-county in Kiruhura district neighbours Lake Mburo National park and because of this, human activities in the sub county are partly influenced by the presence of wild life quite close. Although arrangements have been put in place by the Uganda Wildlife Authority (UWA) to ensure that local communities in areas around national parks benefit directly from the revenue that national parks bring into the country, the human-wild life conflicts continue; and these include conflict over water resources. The table above shows details about the challenge of wild animals intruding into surface water sources.

According to the table above 15 (100%) of the respondents who pointed out that wild animals from the park were intruding into their water sources were overseeing government constructed sources. However, all the respondents who were overseeing individually constructed sources did not see wild animals from the park as a problem. This was largely because all the communities that were next to the national park were being served by government constructed surface water sources. It should also be noted that this challenge of wildlife intrusion into the water source largely applies to surface water sources and not to other sources such as ground sources since wildlife cannot operate for instance a bore hole to obtain drinking water.

Although every surface water source is supposed to be fenced by the community it serves against intrusion from livestock and even wildlife, the kinds of fencing materials available to the communities cannot withstand the strength of some wild animals. Some wild animals such

as buffaloes and zebras, it was pointed out were quite too strong for some of the simple fencing materials that are used. During the dry season, when a herd buffaloes for instance intrudes into a water source it can be able to leave it dry, leaving human beings to suffer without water. In support of this a female FGD participant aged 41 pointed out;

> *Because we are near the national park, wild animals from the park such as giraffes, buffaloes usually break the fence around the water source as they search for water to drink especially during the dry season. When buffaloes for instance come in a big herd, they can empty a shallow well during the dry season.*

When the above happens, the surface water source is left in poor state since wild animals do not only drink the water but also can defecate and urinate into the water source.

Photo 2: Zebras from Lake Mburo National park grazing on a cattle farm belonging to a private individual.

5.1.5 Water Safety

Although during the one to one interviews with the caretakers of water sources, the challenge of water cleanliness was not raised, during the two focus group discussions with the water users in the two sub counties, there was consensus about the cleanliness of the water sources. It was agreed among the participants of the focus group discussions that the water in surface water sources was not safe for household use and even at times for livestock consumption. In relation to this a male FGD participant aged 32 pointed out;

> *We have some challenges. The biggest challenge is that; it is not a clean water source because it is down hill; you have to slope downhill to go to it. So if it rains there is no proper drainage for run off from the rain water. It comes and joins into the well. So if it rains, most times we cannot collect water. You have to go the next day because the water is all mixed up. Its dirty you can't use it, it's just the*

color of the run off. Then another challenge with this water source is that, there is no proper protection because it is in the same water source you would step while drawing water you are going to take. You are stepping in the water and you are using may be a cup to draw water, so the water you are taking is not really clean. Then there are trees around this well. These trees do loose leaves during a certain season and the leaves would shade off into the water, these trees have fruits that fall off too into the water. All these rot in that water, but as long as people come and find that the water has not yet dried up, they just keep drawing the water for household use!.

Still in relation to the above, one of the District Water Officers when asked whether surface water sources for the people in the district pointed out;

Yes. But their water is not safe; that one you need to know. When we are describing safe water, we do not consider that as safe. Safe water has to pass tests. But now this water that comes by storm into the wells/dams is not safe. It is not treated as safe until you treat it by boiling or any other treatment that we may prescribe.

Surface water sources face the unique challenge of generally providing unsafe water compared to other water sources. It is because of this, the Ministry of Water and Environment classifies the water produced by surface sources as water for production. This is in a bid to discourage people from using this unsafe water. But in situations where access to safe water by a big portion of the rural population persists, households as in this study area continue to significantly depend on surface water sources for water for household use.

5.1.6 Some people use the water source stealthily at night

During the dry season (June-August every year) water becomes extremely scarce in the drier parts of Mbarara and Kiruhura where this study was conducted, and because of this scarcity the prices of water shoot up. Surface water sources are the first water sources to dry up in face of a prolonged drought. Because of this scarcity of water, individuals whose water sources dry up quite early opt to stealthily water their animals at night at the few surface water sources that are able to retain water longer than the rest.

When water becomes very scarce, its prices shoot up leaving human beings, livestock and even wild life suffering. However, because not all water sources dry up at the same time those who are lucky to have their water sources dry up last restrict access to their water sources. This restriction on access towards the last wet water sources compels those who badly need water to wait for the cover of darkness to be able to collect water for household use and be able to water the animals from the last wet water sources.

The above practice of using water sources stealthily at night especially to water animals is facilitated by the fact that many herders during the dry season opt to graze their animals at night. This is mainly because during the night hours, the dry grass gets a bit soft for the animals to be able to eat such grass. So, after grazing the animals, the herder whose water source dried up long time ago opts to use other people's water sources to be able to give their animals some water to drink.

When the water source is used stealthily at night, it means that the owner is stretched to ensure that they guard the water source at night. Guarding the water source is extra cost on the owner. Where the guarding is not available it is unlikely that the one stealing the water will use the watering troughs to water the animals; the animals will drink directly from the source causing all the deterioration highlighted earlier on. In relation to this a care taker of a privately

constructed source in response to how they are handling the challenge of those watering their animals at night pointed out; "*There we have to hire some one to stay there at night like a guard and it becomes expensive".* Enforcing private property rights over surface water sources in this case becomes costly since these sources are usually located quite a distance from the owners homesteads.

5.1.7 The water source is small

The size of the surface water source is important in determining how much water it can be able to hold at ago. When the source is big enough, it can be able to hold more surface run off that takes both livestock and human beings through the long spells of drought. But when the source is small, it dries up quickly and this challenge was brought quite clearly in the table above.

Although surface water sources constructed by private individuals are quite smaller compared to government constructed sources, according to the table above majority of those who pointed out that their water sources were small were those overseeing government constructed sources. This could be attributed to the numbers of people and livestock that were using and were supposed to use these different types of sources. Whereas with government constructed sources, many people and livestock were using these sources, few people and livestock were using water sources constructed by individuals. Although the government constructed sources were quite big in size compared to the private sources, they were quite small compared to the numbers of people and livestock they have to water. This is largely why the challenge of the size of the water sources is mainly mentioned by individuals who were overseeing government sources.

Still related to the above, individuals who were overseeing government constructed water sources mentioned that the size of the water sources were quite small because of the potential water users (people and livestock) they could host. By the mere fact that a water source is government constructed source, many more people are entitled to use it. So, even those individuals that had their own sources and rarely used these government sources, they had a right to use these government sources if they wanted. So, in consideration of this too, caretakers who were overseeing government constructed sources were more inclined than their counterparts to mention that the water sources they were overseeing were quite small.

Photo 3: A small privately constructed water source that can easily dry up during the dry season

5.1.8 Reporting water users who break the rules is a problem

According to the table above, only 2 (4%) of the respondents pointed out that reporting water users who break the rules was a problem. However, when I visited the water sources, I found water users flouting rules left and right. For instance, photograph 5 on page 51 was taken after interviewing the care taker for this government constructed dam who had pointed out that amongst the rules they have for this source, was not allowing users to step into the water as they collect water. Photograph 4 on the next page also shows a cow drinking directly from the water source, a practice that the caretaker of this water source had just said was not allowed.

Photo 4: A cow drinking directly from a government constructed valley dam in Sanga sub- County.

It is not only failure of water users to report their fellow users who break rules, even when users who break rules are reported to the caretakers especially of government constructed sources heavy punishments are not meted out on these culprits. In response to the question on what are the most important challenges they face, a FGD participant pointed out;

> *For me what I see is that some times much as those informal guidelines or forms of control are there but still people break them. Some body comes with a basin of water and decides to wash his feet and you know where the water source is it's a bit low. Even if the water source is here and you decide to wash your legs from here certainly this water will get back into the water source. And I have seen that being done quite a number of times. Much as people complain, people still continue and I think because there is no body or committee that is there, so people take things not very serious I would really think. Especially washing their legs from there and fixing water containers be it sauce pan, jerry can or pot into the water source. That is very common much as people have complained but it still goes on and in a way like at a certain point it has come part of the life style and many people have given up complaining and life still goes on like that.*

As shown in the photograph below, water users break the basic rules that the water user committees put in place every day. This supports Hardin's tragedy of the commons theory that what belongs to everyone belongs to no one.

Photo 5: Water users stepping into a government constructed valley dam as they fetch water.

5.1.9 Land ownership arrangements are problematic

Although not very prevalent as shown in the table above, land ownership arrangements posed a challenge for some government constructed dams/tanks. In most cases, the government did not first acquire land from the owners to construct/expand water sources. The government only requested communities to suggest areas in which a proposed water source could be constructed. And when communities suggested a particular spot, the communities (beneficiaries) did not go further to acquire the land from the owner so that it now becomes completely community land. After the construction of the water source, in the few instances above, the land owners now attempt to have much more control over the water sources than the rest of the communities.

5.2 How are you addressing the above challenges?

Table 14: How are you addressing the above challenges?

	Government sources	Individual sources	Row Total
Work with those who are cooperative	0 (0%)	11 (100%)	11 (22.4%)
Strengthen the committee	3 (100%)	0 (0%)	3 (6.1%)
Advise and educate users continuously	7 (63.6%)	4 (36.4%)	11 (22.4%)
Guard the water source	6 (66.7%)	3 (33.3%)	9 (18.4%)
Closely work with park authorities	9 (100%)	0 (0%)	9 (18.4%)
Desilt source before it dries up completely	0 (0%)	6 (100%)	6 (12.2%)
Column Total	25 (51%)	24 (49%)	49 (100%)

*Multiple response was possible
*Percent and totals based on respondents
* 1 missing case

5.2.3 Guard the water source

Guarding the water sources at night against those who would want to use the source stealthily is an option that water users have to adopt during the dry season. During the dry season, when there is scarcity of pasture and water, cows die due to hunger and thirst. And because of this situation, individuals whose cows do not have water to drink during this season opt to use other peoples' sources stealthily at night. The table above summarizes the extent to which the practice of guarding water sources in response to the challenge of 'water thieves' was reported to as prevalent.

As shown in the table above, 6 (66.7%) of those who pointed out they guarded their water sources were overseeing government constructed sources compared to 3 (33.3%) overseeing private sources. Guarding water sources they pointed out was largely done during the dry season when water scarcity was at its highest. Guarding the water source could also be done during day time, but was largely done at night.

5.2.5 Desilt the source before it dries up completely

Removing silt from a surface water source is vital to ensure that it continues to hold water. Desilting the source ensures that the water source remains deep enough to hold enough water. During the process of desilting a source, the long grass around the water source is also cleared. This desilting of the sources as shown in the table above, was said to be done best before a water source dried up completely.

Individuals who were overseeing privately constructed water sources pointed out that as a strategy to obtain labour from other water users they have to desilt their water sources before they dry up completely. According to the table above all the respondents 6 (100%) who reported that they were desilting their water sources before they dry up completely were overseeing privately constructed water sources. But this kind of strategy was not reported to be adopted by those overseeing government constructed sources.

Although removing of silt from a water source would be quite easy if the water users waited for the source to dry up completely, it does not work for those overseeing privately constructed water sources. By removing silt from a water source before it dries up completely it enables the person overseeing the source to easily tap the labour of the water users. Because the water source still provides some water to the users during the period when water is very scarce, the individual overseeing a water source is sure that he/she will be able to get very many water users coming to this source to collect water. Instead of going around the village to call all the water users to turn up to desilt a source, he/she goes straight to the water source and starts to work, and every adult who gets him/her there cleaning the source, has to participate in cleaning it too.

The above strategy works much better than waiting for the source to dry up completely; and the care taker of the source moves around the village to call people to come and clean the source. Because the water source would have dried up completely, very few if any of the individuals that use it regularly would turn up to desilt it when it has no any water left in it. So, in order to be able to tap the labour of some of the water users, those overseeing especially privately constructed sources have to desilt their sources before they dry up completely.

5.3 Who can help to address the above challenges?

When asked who can help to address the various challenges they had pointed, the respondents mentioned three agencies; government, local government and Uganda Wildlife Authority. Although I have combined government and local government (to government) for the most part in this dissertation for comparison purposes, I will bring them out in this section as the respondents presented them.

Table 15: Who can help to address the above challenges?

	Government sources	Individual sources	Row Total
Government	19 (65.5%)	10 (34.5%)	29 (61.7%)
Local Government	22 (62.9%)	13 (37.1%)	35 (74.5%)
Uganda Wildlife Authority	3 (100%)	0 (0%)	3 (6.4%)
NGOs	6 (100%)	0 (0%)	6 (12.8%)
Column Total	25 (53.2%)	22 (46.8%)	47 (100%)

*Multiple response was possible
*Percent and totals based on respondents
*3 missing cases

5.3.1 Government

According to the table above 19 (65.5%) of the respondents who suggested that the central government especially through its Directorate of Water Development could be able to address the numerous challenges they were facing with surface water sources were overseeing government constructed sources. Only 10 (34.5%) of those who thought that government could be of help in trying to alleviate the challenges they surface water sources faced were overseeing privately constructed sources.

The difference in expectations between those overseeing government constructed sources and privately constructed sources above, can be explained by the rationale of constructing these sources in the first place. With government constructed sources the rationale for constructing

the sources was to provide water to entire communities, with privately constructed sources, it was mainly to provide water to single households. So, individuals that constructed their own sources had realized that government sources were not serving them appropriately. And because these individuals know that they are not excluded from the use of government water sources, they get reluctant to mention government as the agency that can help them to sort out the challenges they face with their private sources.

5.3.2 Local government

Majority 22 (62.9%) of the individuals who mentioned the local government (district government) as the agency that can help them address the water challenges were overseeing the use of government constructed sources compared to only 13 (37.1%) who were overseeing privately constructed sources. This difference still be can be explained by the reasons as to why these different sources were constructed that was brought out earlier.

5.3.3 Uganda Wildlife Authority (UWA)

The Uganda Wildlife Authority (UWA) although too is a government department, was specifically mentioned by respondents from Sanga sub County who were overseeing water sources close to Lake Mburo National park. According to the table above, it is only 3 (12%) respondents overseeing government sources that mentioned Uganda Wildlife Authority as the agency to help them with their surface water related challenges. They were keen to point out UWA because wildlife from the park sometimes drinks water from their surface water sources. This wildlife also destroys the fences around the sources, and defecates into the sources during the process of drinking from these sources.

In relation to the above, UWA is already running a programme that attempts to bring communities neighbouring National parks to share in the benefits from wildlife conservation. Under this programme, communities receive money from UWA to rehabilitate their roads, health centres and schools. So respondents mentioned UWA as a way of ensuring it also thinks about their water sources.

5.4 How can the above challenges be addressed?

Now that they had challenges that were clear to them, respondents were asked what can be done to address these challenges. A comparison of the responses by who constructed the water sources are presented in the next pages.

Table 16: How can the above challenges be addressed?

	Government sources	Individual sources	Row Total
Expand & deepen water sources	3 (15%)	17 (85%)	20 (40%)
Construct more water sources	3 (37.5%)	5 (62.5%)	8 (16%)
Fence water sources	15 (71.4%)	6 (28.6%)	21 (42%)
Generator to pump water	13 (100%)	0 (0%)	13 (26%)
Column Total	25 (50%)	25 (50%)	50 (100%)

*Multiple response was possible

*Percent and totals based on respondents

5.4.1 Expanding and deepening water sources

Expanding and deepening water sources would ensure that they hold more run off water during the rainy season which water can be able to take users for a long time during the dry season. This task can be undertaken by the water users themselves and these users can also be helped by the government/local government. The table above brings out the details on expanding and deepening of water sources.

According to the table above, 3 (15%) of the respondents who reported that they desired to have their water sources expanded and deepened were overseeing government constructed sources compared to 17 (85%) who were overseeing privately constructed sources. The privately constructed water sources were quite small in terms of size compared to the government constructed sources; that is why those who were overseeing these privately constructed sources held the desire to expand and deepen these sources.

5.4.2 Constructing more water sources

Water provision facilities in rural areas in Uganda are still very limited. So when respondents were asked what could be done to address the various water challenges they had highlighted, they pointed out there was need to construct more water sources. In this case, the respondents did not only suggest surface water sources but also other water sources such as boreholes, protected springs etc. According to the table above, 5 (62.5%) of those who suggested that there was need to have more water sources constructed were overseeing private water sources compared to 3 (37.5%) who overseeing government constructed sources.

Constructing more water sources would ensure that water users have more water than they have today. The government can help to provide more safe water sources such as boreholes, gravity flow schemes, and protected springs to provide communities with water for household consumption while the surface water sources are reserved to provide water for production. Individuals who have access to points where they can construct their own water sources, they can be encouraged to construct their own sources so that the amounts of water that is available in every community increases.

5.4.3 Fencing water sources

Fencing water sources was also identified as important in helping to improve the situation of surface water sources in the two districts of Mbarara and Kiruhura. As shown in the table above, 21 respondents pointed out they needed to do more in order to have strong fences around their water sources.

Fencing water sources according to the table above was mentioned by 15 (71.4%) of those overseeing government constructed sources compared to 6 (24%) of those overseeing privately constructed sources. While most water sources that I visited had fences around them, these fences had structural holes that had been created by both animals and human beings which holes had not been mended. These holes provided entry points for especially livestock and in the case of Sanga sub county wildlife to access the surface water sources without any hinderance.

Whereas the task of constructing fences around water sources is the responsibility of the water users, in some cases, the government took it upon itself to construct these fences around some of the water sources it constructed. This to some extent rendered the community of users to get very lazy, to think that government will always come back to mend the fences that it had

constructed. And because the water sources are used by many, there is a tendency to think a few will mend the fences around the sources, and these few also actually never mend these fences.

5.4.4 Generator to pump water

If livestock is not to intrude into the water source, it must have its water pumped out of the water source to the troughs which must also be located outside the fence around the source. In the absence of a pumping mechanism, the water users have two options; the first being to bring the watering troughs very close to water source, and the second being to labour so much to carry water from the source to the watering troughs located outside the fence. Unfortunately the former option of bringing the troughs close to the source –with its negative consequences, is the option that works for many water users.

According to the table above all the 13 (100%) respondents who mentioned that they needed a generator to help them pump water out of the surface water source were those overseeing government constructed sources and no respondent overseeing a privately constructed source mentioned such. This was partly because with the government constructed sources, the pumping mechanism had been provided for at the time when the sources were constructed while for the private sources none has such a mechanism. This was partly so because, the government constructed sources on average serve many more water users than the privately constructed sources and therefore these users (especially livestock) put a lot of pressure on the water sources.

Although the generator to pump water out of the surface water sources to water the livestock, may not be the best option to provide to the communities, the need for a pumping mechanism was expressed. The generator would require to be fuelled on a daily basis which would turn out to be expensive. It would also be quite difficult to repair using the local technical expertise. In view of this need, attempts can be made to provide hand pumping mechanisms that are simple to use and to repair locally. This kind of technology would help to ensure that animals always have enough water to drink in the watering troughs and therefore do not get tempted to break the fence to drink directly from the sources.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusions drawn from the findings. The conclusions start with a section on whether the institutionalisation process can be seen taking firm root in the management of surface water sources in the two districts of Kiruhura and Mbarara. Also presented in this chapter are recommendations both for further research in the area of water provision in order to strengthen the practice of community based management of water sources including surface water sources.

6.2 Conclusions

6.2.1 Are Enduring Institutions already in place?

Although recurring practices and rules that are essential for the firm establishment of institutions to govern the use of water sources are already in place, there is a lag that exists between the two. So, strong institutions to support the sustainable use of surface water sources cannot be said to be already in place. Where as, rules are already in place especially with government constructed sources, the everyday practices of the water users show that there is a big gap between the rules and what is being done on the ground.

The potential for the development of effective institutions to govern the use of surface water sources exists. This potential is presented by the long dry spell (June-August every year) and by the fact that some households live and only own land upstream which means that when these households need water they have to rely on communal sources.

The above potential has not yet been fully exploited to ensure that people's daily practices point to a trend in which water sources can be said will be used sustainably. As the situation stands now, most surface water sources cannot be used for a period of up to 15 years before they silt up completely when there has not been any drastic change in the practices. The rules and the potential to generate more current rules to respond to changing situations exist but the practices in some cases drastically differ from what is expected under the existing rules.

At the theoretical level, this study was partly guided by Ostrom's design principles illustrated by long enduring common pool resource institutions Although many of the design principles of Ostrom were found to be attained in a number of areas and to some extent, the overall finding is that there is no firm institutional process taking place. This in essence suggests that traces of Hardin's tragedy of the commons theory are seen to be at play in some of the areas of community based management of surface water sources in Kiruhura and Mbarara districts.

6.2.2 Other conclusions

The idea pointed out by Silkin (1998) that communities can fully embrace the water options provided to them if they are the only options available to them is quite important. In the study area, water harvesting (from the roofs of houses) provides an alternative water source option to households. This indirectly contributes to the lowering of the households' morale to participate in maintaining especially government constructed water sources. Agencies

involved in the water sector should attempt to work with communities during the times when such communities are in the most need such as during the prolonged dry season (June to August every year) for the case of the two districts of Mbarara and Kiruhura.

Increasingly, households are constructing their own private surface water sources that provide an alternative to government constructed sources. The advantage with these private sources at the moment is that they continue to be used communally but largely maintained privately. This arrangement should be supported by all the stakeholders involved in the provision of water to rural communities as one of the forms of community based management of surface water sources. In this form of community based management of water sources, the owner has more rights than the rest of the water users but the users too retain rights of access to the water sources.

Meaningful participation of the communities from the time of hatching the idea of constructing especially the government sources was lacking. A few individuals press the government to provide a water source within their community and when government responds, majority of the community members never get aware of the process of pressing government to provide a water source looks like. This in a way is disempowering to those individuals that don't participate in pushing the government to provide the water source because they miss out on the advocacy and lobbying skills that this process involves. Because a bigger number of the people from the communities did not participate in this process from the start, they will never fully own the water source as a result of this wrong start.

Although the idea of community based management of water sources does not assume and does not need a fully literate community, its failure to take firm root in the case of Mbarara and Kiruhura districts is partly explained by the levels of literacy here. The population that largely depends on these sources of water has low levels of education and low levels of personal confidence. These two are important to support meaningful participation of community members in the management of their resources including surface water sources.

The changing land use patterns partly as a result of population pressure have ensured that there is increased movement towards the construction of private water sources from communal government sources. Land is now being put to many more uses than ever before to ensure that maximum benefit is obtained out of it. The possibility of these many more land uses to conflict with the provision of communal surface water sources increases with the many uses. In order to continue to provide water to entire communities it will be necessary to find better ways of transporting the water to the farms and households of the users.

Surface water sources are known to have unsafe water for human consumption, but out of the 50 respondents that I interviewed none mentioned water quality as a challenge. The issue of water quality was only brought out by the two focus group discussions that were conducted. Although the water in surface water sources is low, people continue to use surface water sources both for water consumption and production. The major worry for communities in the study area remains on accessing minimal amounts of water rather than get worried about the quality of water they get.

6.3 Recommendations

During the study, it was realised that changing land uses had a significant influence on the provision of safe water. Over the period, land uses in Western Uganda have been changing partly as a result of increasing population. With many more people to feed, agriculture here

has had to adjust to ensure that more food is produced. But these changes in the agricultural land use have ramifications for the provision of safe water to a community of users. Other changes in land use also have impacts on the provision of safe water communities. There is need for further research on how the changes in land uses are impacting on the potential to provide safe water to rural communities.

The Directorate of Water Development that is in charge of providing water to the rural communities in Uganda should reconsider the type of technology they provide to pump water from surface water sources to livestock watering troughs. Simple hand pumps that can pump water from the sources into watering troughs should be sought and adopted. These simple hand pumps should be made in such a way that they can be easily made and repaired by the local water users themselves. When these simple hand pumps are availed to the communities, they would go a long way in ensuring that the water quality is improved, by keeping livestock away from the sources, and by ensuring that the fences around the sources are not broken by thirsty animals.

The district local governments should foster meaningful participation of most water users from the start –when the idea of constructing a water source is hatched. This meaningful participation of users from the start is important for sustainability. It is a time consuming exercise to ensure that most of the potential water users participate meaningfully from the start but if sustainability of the water source is major goal, there are no short cuts. When people are involved from the start, the assumptions that are held, the resources that were mobilised, and the costs that were incurred during the process of constructing the water source will be clear to all. So, the problem of having few community members personalising a government constructed water source will be addressed.

Civil society organisations should sensitize the people about safety of the water; this will help the communities to come to demand more safe water for household use. The situation as it is now is that government has only categorised the different water sources into water for production and water for household use but continued to allow her people to use water for production for household use. Other agencies should come in to help explain the difference between water for production and for household use and in that way, the extent of the need for safe water in rural areas will be realised among the communities.

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APPENDIX 1: QUESTIONNAIRE (FOR OVERSEERS OF WATER SOURCES)

CONSENT FORM –OVERSEERS OF WATER SOURCES

My name is Christopher Tumwine. I am a graduate student from the University of Agder-Norway. I am doing a study on Community Based Management of Water Sources in the rural areas of South Western Uganda as part of the requirements to complete a Masters programme in Development Studies of the University of Agder.

You have been selected to participate in this study because you as a person you oversee a surface water source(s). If you accept to participate in this study, you will be asked to complete one interview where I will ask you about how the water source is managed, the challenges you face in the management of this source and how best you think this water source can be managed.

Participation in this study is purely voluntary and your participation or refusal to participate shall not lead to any negative consequences befalling you.

You have a right not answer any question you feel you shouldn't and also to end the interview at any time.

There are no many risks associated with your participation in the study, but during the interview you may feel anxious or depressed.

There will be no direct benefits to you for your participation in the study. However, the study will provide information to policy makers and service providers at both national and local government levels on the state of Community of Based Management of surface water sources in rural areas and what can be done to improve the management of surface water sources.

The information that you provide to the study will be kept as confidential information. This form will neither contain your name nor signature.

Do you have any questions?

Do you accept to participate in this study?

a. Yes ☐

b. No ☐

If you do accept to participate in this study, please write the initials of your name or thumb print here below.

…… or ☐

(Initials) Thumb print

QUESTIONNAIRE-(for overseers of Water Sources)

SOCIAL DEMOGRAPHIC CHARACTERICTICS

1. Age
a) 18-24
b) 25-31
c) 32-39
d) 40-47
e) 48+ (Indicate age) …….

2. Marital status
a) Married
b) Single
c) Widowed
d) Divorced
e) Cohabiting

3. Gender
a) Male
b) Female

4. Religion
a) Protestant
b) Catholic
c) Moslem
d) Seventh Day Adventist
e) Other (Specify)……

5. Main Occupation
a) Farming (cultivation)
b) Farming (Livestock)
c) Salaried
d) Unemployed
e) Other (Specify)……..

RULES AND PRACTICES

6. Who constructed the water source that you draw water from?
    a) Government
    b) Individual
    c) Community
    d) Non Governmental Organisation
    e) Other (Specify)

7. How was the water source that you draw water from constructed?

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8. Do you know all the households/individuals that draw water (both for livestock & domestic use) from this water source?
    a) Yes
    b) No

9. How do households that draw water from the water source (both for livestock & domestic use) gain the right to draw water from this source?

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10. Do the households/individuals that draw water from the water source that you oversee ever hold meetings to discuss the use of this source?
    b) Yes
    c) No

11. If yes above, what are the most important things that you discuss in relation to the use of this water source?

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12. If no, why don't you ever meet?

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13. What are the most important rules that households/individuals who draw water from the water source you oversee must follow?

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14. What happens to those who break the above rules?

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15. How do you monitor to tell that a household/individual has broken the above rules?

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CHALLENGES

16. What challenges do you face as you oversee/manage this surface water source?

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17. How are you addressing the above challenges?

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18. Any outside institutions/organizations that you think would help you to address the above challenges?

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19. How can the above institutions/organizations help you to address the above challenges?

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APPENDIX 2: FOCUS GROUP DISCUSSION GUIDE (Water Users/Household heads)

SOCIAL DEMOGRAPHIC CHARACTERISTICS (to be completed for every respondent)

1. Age
    a) 18-24
    b) 25-31
    c) 32-39
    d) 40-47
    e) 48+ (Indicate age) …….

2. Marital status
    a) Married
    b) Single
    c) Widowed
    d) Divorced
    e) Cohabiting

3. Gender
    a) Male
    b) Female

4. Religion
    a) Protestant
    b) Catholic
    c) Moslem
    d) Seventh Day Adventist
    e) Other (Specify)……

5. Main Occupation
    a) Farming (cultivation)
    b) Farming (Livestock)
    c) Salaried
    d) Unemployed
    e) Other (Specify)……..

RULES AND PRACTICES

6. How was the water source that you draw water from constructed?

7. How do households that draw water from the water source (both for livestock & domestic use) gain the right to draw water from this source?

8. How is this water source maintained (clearing bushes, fencing, removing silt, clearing drainage etc)?

9. What organizations/committees are in place in oversee the management of this water source?

10. How were these organizations/committees put in place?

11. What are the important rules that those who use this water source must be aware of?

12. What happens to those who break the above rules?

13. How do you monitor to see that a household/individual who has broken the above rules is brought to book?

CHALLENGES

14. What challenges do you face as you use this surface water source?

15. How are you addressing the above challenges?

16. How would you want the above challenges to be addressed?

APPENDIX 3: INTERVIEW GUIDE (FOR WATER OFFICERS)

RULES AND PRACTICES

1. What is the process of constructing surface water sources in this district?

2. How do households/individuals that draw water from surface water source (both for livestock, domestic use & irrigation) gain the right to draw water from this source?

3. How are surface water sources maintained (clearing bushes, fencing, removing silt, clearing drainage etc) in this district?

4. What organizations/institutions do you (as a district encourage) to be put in place to manage surface water sources?

5. How are these organizations/institutions put in place?

6. What are the important rules that those who use surface water sources must be aware of?

7. What happens to those who break the above rules?

8. How is the monitoring done to ensure that households/individuals who have broken the rules are brought to book?

CHALLENGES

9. What challenges are faced in managing surface water sources in this district?

10. How are these challenges being addressed?

11. How would you want the above challenges to be addressed?